Money demand during crisis – (post) transitional perspective

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Abstract: The existing literature on money demand in Croatia and Serbia is mostly concerned with identifying whether traditional factors are present and to what extent. The aim of this paper is to extend the traditional concept with variables that are more related to specific recent developments in analysed countries – transition and crises. Specifically, the precautionary motives for holding money are expected to be important during the crises, while financial transaction motives are expected to be important in the period before the crises. Additionally, instead of traditional cointegration approach, an ARDL testing procedure was utilized in the paper in order to avoid specific problems related to the unit root identification problems. Comparative perspective of the analysis should help to distinguish between common and specific features in the analysed countries.

Key-Words: money demand, Croatia, Serbia, crisis, cointegration, ARDL

1 Introduction

Sousa (2014) argues that in order to understand monetary policy in a specific country, there are two segments a researcher needs to devote attention – money demand and the monetary policy rule. Empirical analysis of money demand is abundant, and there are common conclusions related to income and interest rate elasticities. For advanced economies, the focus of the research has turned to the stability of money demand and the increased use of money substitutes in transactions - such as electronic money transfers (Kumar, 2013). Without specific empirical research, we cannot claim that the same stylized facts hold for transition economies, whose financial system have been underdeveloped and household behaviour related to savings might be, due to habit formation processes, different.

The focus of the present paper is on money demand in post transition economies. Particular focus is on comparative analysis of two countries during the financial crisis - Croatia and Serbia. The choice has been made because these countries share common past (including monetary system), had similar hyperinflation experiences at the beginning of 1990s and experienced the effects of latest global financial crisis. Although when examining the labour market, fiscal and international trade indicators it might be argued that price stability is not amongst the key problems these countries are facing, the question remains whether misbalances on other markets have the potential to manifest themselves as price distortions as has been the case many times in the past – both during the time when Serbia and Croatia constituted Yugoslavia and since independence.

Specific motivation for the present paper is to provide additional insights into alternative motives for holding money. The latter is inspired by de Bondt (2009), who investigates the role of equity and

labour markets situation in euro area money demand. The idea is that equity affects money demand through wealth effect, either through a financial transaction motive or speculative motive. Households can in general allocate their wealth in housing or financial assets. In Croatia and Serbia, in particular due to the underdeveloped financial system, households sector mostly invested in real estate as a means of savings. The result is that there is already a high percentage of home-ownership by household sector, much higher than in the European economies. The slow development of the financial sector during the transition phase, as well as the hyperinflation experience, swerved households away from investing in more diversified financial products. However, few large privatization projects (such as telecommunications, oil company) introduced the concept of investing in financial assets and raised awareness of other savings possibilities in the household sector, just before the crisis began.

The analysed period entails effects of latest financial crisis, which has been prolonged in both countries due to idiosyncratic reasons. To account for those factors, unemployment as a precautionary motive for holding money is included in the analysis. Specifically, we speculate that due to the high, persistent and during the crisis rising unemployment in both countries, demand for money increased in the household sector. This can be confirmed by the households' savings data, whose growth rates were extremely high during the crisis period. For example, the annual monthly growth of households savings (in domestic currency) based on the data from Croatian National Bank during the 2012 and 2013 was approximately 10 percent, while the comparative data for Serbia is more volatile and ranges from 8 percent to almost doubling by the end of the period. The savings in foreign currency, which is in the amount by far larger than savings in domestic currency in both countries also achieved additional growth of ranging from 1 to 6 percent in Croatian, and 3 to 27 percent for Serbia, when looking at annual monthly changes.

The structure of the paper is following. The next section provides literature review, with the emphasis on money demand analysis in Croatia and Serbia. Section 3 discusses estimation strategy and data sources. Section 4 presents estimation results. Section 5 contains robustness check. The last section brings conclusions.

2 Findings from previous studies - Croatia and Serbia

Money demand is frequently analysed and discusses in the literature. The review of the literature is beyond the scope of this paper, but the interested reader could consult Sriram (1999). This section focuses on the previous findings for Croatia and Serbia.

Money demand estimates for Croatia mostly rely on monthly observations and cover relatively short time periods. The money demand was analysed during the hyperinflation period in relation to the difficulties in maintaining stability of prices (Anušić, 1995). These estimates focus only on the January 1991 – November 1993 period, and simulate the money demand in the period after the introduction of the stabilization program, which managed to lower inflation in Croatia, but never actually followed through any of the other envisaged policy steps. The main conclusion of that paper was that demand for money will stabilize only if prices remain stable.

Subsequent period, namely October 1994 – August 2000 was analysed by Erjavec and Cota (2001). They follow the Johansen procedure and estimate VEC model including money (M1, M1a or M4), output, prices and interest rate. They find that output is dominant positive factor, and have found negative significant interest rate (measured by deposit interest rate in domestic currency). These estimates confirm that money-price relationship has disappeared in the post stabilization period. Similar period – June 1994 to August 2002 - was analysed by Payne (2003). He recognizes that previous studies suffer from the inability to adequately capture the long-run relationship among the variables due to relatively small sample size as well as the low statistical power of the unit root and

cointegration tests. Thus, he uses the bounds testing procedure. He finds that output has a positive, but statistically insignificant impact, while the opportunity cost variables - interest rates, inflation, and the real effective exchange rate have a negative and statistically significant impact on the error correction money demand functions. Moreover, post estimation tests indicate that money demand functions appear structurally stable.

Contrary to other studies which mostly use monthly data, Hsing (2007) analyses quarterly data in the period 1994 Q2 to 2005 Q3, with the focus on the role of the kuna/euro exchange rate and the euro interest rate. The estimation method does not attempt to distinguish between short-run and long-run determinants, but rather relies on OLS estimates. The results show that the demand for real M1 has a positive relationship with real output and a negative relationship with the domestic deposit rate, the kuna/euro exchange rate, the euro interest rate, and the expected inflation rate. Similar results are found for the demand for real M2 except that the coefficient for the nominal exchange rate is insignificant. From these results, Hsing concluded that substitution effect dominates the wealth effect, while the capital mobility effect dominates the cost of borrowing effect.

The latest available estimate for Croatia can be found in Devčić (2012) who estimates money demand using VEC model during the period 1998 January to July 2010. The Johansen procedure has identified one cointegration vector with positive long-run relationship between real money and economic output, and negative with inflation. Exchange rate and interest rate are weakly exogenous. In the short-run, money is positively affected by lagged values of output, money itself, interest rate and exchange rate, while the inflation's influence is negative.

The estimates for Serbia seem to be even less widespread than for Croatia. This is partly due to the additional disintegration process that Serbia was part of, after the initial breakdown of former Yugoslavia at the beginning of 1990s. The Serbia continued to be in the union with Montenegro until 2006, and there is still a politically sensitive relationship with Kosovo, even though Kosovo declared independence in 2008. The early monetary developments under hyperinflation while still being a part of the wider union are analysed in Petrović and Mladenović (2000). They use monthly data for narrow money (Ml), black market exchange rate, and retail prices during the period December 1990 to January 1994. Their main finding is that during hyperinflations, exchange rate movements are more important in relation to money than price movements. Re-examining the same story with daily data provided somewhat different picture (Mladenović and Petrović, 2010) - implying that not only period under analysis matters, but in cases of hyperinflation data frequency seems important.

More recent period which is concentrated specifically on Serbia can be found in Maravić and Palić (2005). Using the monthly data in the period January 1996 to March 2005 the authors find the cointegrating relationships between money, output, prices and interest rate. The short run dynamics is mostly under the influence of expected inflation. The authors discuss the instability of the estimated money demand functions during that period and attribute this partially to the changes in the financial system.

Based on the previous evidence in can be seen that empirical analysis of money demand in both countries relies on a fairly standard approach. As Bahmani (2013) states, money demand estimates in the literature frequently include a scale variable measured by income, an opportunity cost variable measured by the interest rate, and the exchange rate, which accounts for currency substitution. The inclusion of the latest variable seems more than appropriate for Croatia and Serbia, since they are considered to be highly euroized countries (Tkalec, 2013). However, even the significance of traditional variables is not constant across analysed periods, leading to conclusion that the stability of money demand is questionable.

3 Data and estimation strategy

As established in the previous section, the existing analysis of money demand in the analysed countries focused on traditional variables – scale variable (output), opportunity cost variable (interest rate – mostly domestic, but also foreign), exchange rate and inflation. To stipulate that the analysis is related to crisis period we add unemployment into equation and to address the potential influence of financial market developments we include share prices to the list of variables (Appendix contains the data sources for all variables used in the analysis). When it comes to estimations strategy, previous papers mostly relied on VAR and Johansen procedure to detect cointegration. Although our estimation procedure included VAR estimation and Johansen procedure for cointegrating relationships (results available upon request), we present only the results of ARDL approach (Pesaran et al, 2001). The benefits of the VAR environment are that it enables performing some of the tests that are not available in the single equation environment. These tests did guide some of the choices in further modelling. However, we do not believe that VAR estimates themselves are highly informative or even in some cases stable.

There are many reasons for preferring ARDL procedure. The first one is that there is no need to a priori assume or test for unit root processes in the analysed series. This does not imply that the testing procedure has not been performed. Indeed, all of the series have been submitted to the following unit root tests: ADF, KPSS ERS and Ng-Perron (results available upon the request). However, due to the small sample, and the possibility that entailing crisis influences the data generating process, there were cases when unit root testing did not reach firm conclusions. This was in particular of importance for our task of comparing estimates for two countries. Specifically, due to the problems in establishing the true nature of data generating processes by unit root testing, Johansen procedure was very sensitive in defining the number of cointegrating relationships to different specifications. Some of the insights gained from VAR-VEC modelling were subsequently included in ARDL specification. Specifically, VAR environment enabled testing for weak exogeneity, which was then translated into ARDL equation.

The second desirable property of the ARDL approach is that it easily implements general to specific approach to modelling, with additional identification of cointegrating relationship. General to specific approach with the ability to detect lag significance independently for each variable seemed more appropriate in our case.

The original specification started with following variables: real money, inflation, real exchange rate, domestic interest rate, output and share prices as endogenous variables, as well as foreign interest rate and unemployment rate as exogenous variables. All variables are presented as annual changes and were not subjected to seasonal adjustment since attempts to detect seasonal patterns mostly fail. The initial number of lags included in the specification was five. Following the general to specific approach by applying the Wald test in each step it was trimmed-down to the final specification. The final specification was then tested for the remaining autocorrelation, heterogeneity and normality of the residuals, stability of the coefficients was inspected and CUSUM tests were performed. The cointegration was tested with the Pesaran et al (2001) bounds testing approach. The initial equation is presented by expression (1).

$$\Delta rm_t = \alpha_0 + \sum_{i=1}^{5} \alpha_{1,i}\Delta rm_{t,-i} + \sum_{i=1}^{5} \alpha_{2,i}\Delta cpi_{t,-i} + \sum_{i=1}^{5} \alpha_{3,i}\Delta reer_{t,-i} + \sum_{i=1}^{5} \alpha_{4,i}\Delta rate_{t,-i} + \sum_{i=1}^{5} \alpha_{5,i}\Delta share_{t,-i} + \sum_{i=1}^{5} \alpha_{6,i}\Delta ind_{t,-i} + \delta_1 rm_{t-1} + \delta_2 cpi_{t-1} + \delta_3 reer_{t-1} + \delta_4 rate_{t-1} + \delta_5 share_{t-1} + \delta_6 ind_{t-1} + u_t \quad (1)$$

The equation was estimated using the monthly data in the 2005:01-2013:12 period. This period has been chosen due to the comparative nature of the analysis. Namely, since Montenegro declared independence from Serbia in 2006, the time series for the time before 2005 included dynamics in both countries. Even though Montenegro is relatively smaller than Serbia, the construction of longer time

series data by assuming that the money demand is the same for Serbia as it is for both countries, could hardly be justified. It has to be emphasized that due to the time period and the frequency of the analysed data, it was not possible to include another type of household wealth – specifically, house prices.

Before presenting the results, additional point has to be made regarding the choice of dependent variable. Although different money aggregates have been used in money demand estimates in the literature, the analysis below focuses on M1. The main reason is that this is the only aggregate simultaneously published by the respective national banks. The other is that, at least for Croatia, some of the previous estimates with alternative aggregates did not lead to "sensible outcomes" (Erjavec, and Cota, 2001).

4 Results

We first present results for Croatia. In addition to previously mentioned variables, specification also included dummy variable which equals one for the duration of the crisis period. The timing of beginning of crisis in Croatia is determined in Krznar (2011), and since the GDP growth rates have not yet shown any signs of turning to positive values for the rest of the period under analysis, the presumption is that the crisis is remaining active. Even though the dummy variable was not significant in the presented estimation results, it is still included to capture the possible shifts related to the crisis effects. The estimation results are presented in Table 1.

Table 1. Money demand in Croatia (Source: author's estimates)

Variable	Coefficient	Standard error
ECM(-1)	-0.204***	(0.036)
HR_unemp	0.065***	(0.016)
D_rate	0.047***	(0.014)
Dummy_hr	0.006	(0.008)
D(HR_cpi(-2))	1.557***	(0.482)
Diagnostics		
N = 105	Breusch-Godfrey LM Test (12):	Heteroskedasticity White:
Adjusted R2 = 0.25	F-statistics = 0.93	F-statistics = 1.11
Jarque Berra = 0.28	Obs*R2 = 12.04	Obs*R2 = 30.39
Upper bound F = 10.43***		Scaled SS = 28.87

Notes: *** denotes significance at the level of 1 percent. Heteroskedasticity ARCH test also did not detect any additional problems. Recursive coefficient estimation detected stability problems, mostly before the crises period. Referent values for upper bound statistics without trend and constant from Pesaran et al (2001).

The general to specific approach applied to Croatian data excluded financial transaction motives for holding money from the money demand equation. Yet, the other non-traditional money demand factor – unemployment - remained significant. This means that precautionary motive is positively correlated with money demand - as the rate of unemployment increases in Croatia, the demand for money rises. Croatia is the country with one of the highest unemployment rates in European Union. Most of the demand on the labour market comes from the non-tradable sector (government services related to the increase demand related to adopting and implementing the EU procedures), while the tradable sector has significantly reduced its demand for workers. Additionally, recent crisis has adversely affected private and public sector employment and wages dynamics. While private sector adapted to the decreased product demand by reducing employment and/or wages, public sector - due to collective agreement procedures - was not able to adjust quickly. Only recently, the current government decided to terminate collective agreements in a hope to start renegotiations process. However, this has been after 5 continuous years of GDP decline. Since new collective agreements imply reduction of existing workers' rights and benefits, they increase uncertainty and contribute again to precautionary savings. Such labour market developments influence the misbalances on the product market and international trade, since increases in the share of nontradable sector in the economy leads to Dutch disease effects.

Foreign interest rate is positive and significant, while exchange rate and domestic interest rate are not significant. Interest rates are, according to the theory, expected to be interpreted as opportunity cost variables and their expected sign is negative. Although domestic interest rate does not seem to be significant, the positive and significant foreign interest rate indicates sensitivity of domestic money demand to foreign money market developments. Since Croatia is small and open economy, and also an economy with large and growing foreign debt, the increases in the foreign interest rate can be simply translated into the need to raise more money to repay debts. Another issue is the fact that most of the banking sector in Croatia is foreign owned, and the sources for financing in Croatia heavily depend on the situation mother-financial institutions are facing on their local markets. Both government and enterprises are known to borrow at the domestic and foreign market. Borrowing on foreign market is associated with large inflow of foreign currency which needs to be sterilized through the domestic banking system. In these circumstances, central bank frequently manages the exchange rate in order to avoid its transmission into the domestic prices. The domestic interest rate plays only minor role in conducting monetary policy.

As we can see from Table 1., lagged inflation was found to be significant for money demand in Croatia, so the relationship between money and inflation persists. Although under the period of

analysis inflation remained low (indeed, as of beginning of 2014 questions on the deflationary pressures have been mentioned in the public debates), it can be argued that with the history of hyperinflation and rising uncertainties, keeping an eye on inflation in relation to the proxy for holding money seems important. Evidence from the literature argues that inclusion of alternative proxies for holding money, such as inflation and exchange rate, reduces income elasticities estimates in advanced economies (Kumar, 2014). Since we have included both inflation and exchange rate in the original specification, and only lagged inflation remained significant, it could be argued that income elasticities presented below are robust. This leads us to the discussion on the long-term money demand which is, as Laidler (1993) has emphasised, more important for a rule-based monetary policy. Thus, we inspect the cointegrating relationship in the error correction model, which is identified as expression (2).

$$ECM(-1) = Rm1(-1) - 1.625HR\_ind(-1) + 2.085HR\_cpi(-1) \quad (2)$$

The cointegration vector implies that in the long-run, the demand for money in Croatia depends only on the output and price dynamics. This is somewhat similar to previous estimates by Devčić (2012) who using Johansen procedure also finds that in the long-run there are significant positive relationship between money and output and significant but negative relationship between money and inflation, while the relationship with exchange rate and interest rate are not significant.

Erjavec and Cota (2001) for an earlier period estimated long-run income elasticity between 0.5 (Baumol-Tobin value) and 1 (quantity theory) and then restricted it to the latter value. Devčić (2012) on the other hand, produces relatively strange estimates of income elasticity exceeding the number 3. It seems that the unrestricted estimates of income elasticity produced in this paper are more plausible than previously available estimates for Croatia.

When compared to other countries we can argue that we have identified relatively high income elasticity in the cointegration relationship for Croatia. Kumar (2014) provides comparative analysis of estimated income elasticities and argues that these are consistently lower in advanced than in developing economies. Kumar also argues that as the income rises, agents substitute narrow money for broad money, which is enabled by the more developed financial system. It is highly questionable whether financial system in Croatia could be considered highly developed. Another reason for relatively high income elasticity might be due to not including all possible wealth variables in our specification. Specifically, inclusion of wealth variables usually decreases the estimated income elasticity (Dobnik, 2013; Seitz and Landesberger, 2012), although this finding is also based on the analysis of advanced economies. Indeed, Kumar (2014) argues that, since per capita wealth in developing countries is low, the effects on income elasticity may not be as large as in advanced economies.

Our initial specification did include share prices, which were ruled –out through the general to specific estimation technique. Another variable that might have potential influence on money demand are house prices. Croatian National Bank publishes hedonic price real estate index on quarterly basis. As it can be seen from the Figure 1, there is a correlation between the house price increases and money demand in Croatia. Actually, during the period 2003-2012, the two indices had very similar pattern. However, since 2012 there have been significant changes on the real estate market in Croatia, and the prices finally started to decline more rapidly than before. This also documents relative reluctance of the prices to decline for a long period of time well into the crises.

Having in mind evidence presented, it could be argued that wealth effects would be significant for money demand estimates, at least in Croatia. However, due to relatively high home ownership in transition economies, there is relatively low share of population which is currently buying or selling a real estate – and it goes without saying that house prices dynamics (at least on the coastline) is under the influence of foreign demand.

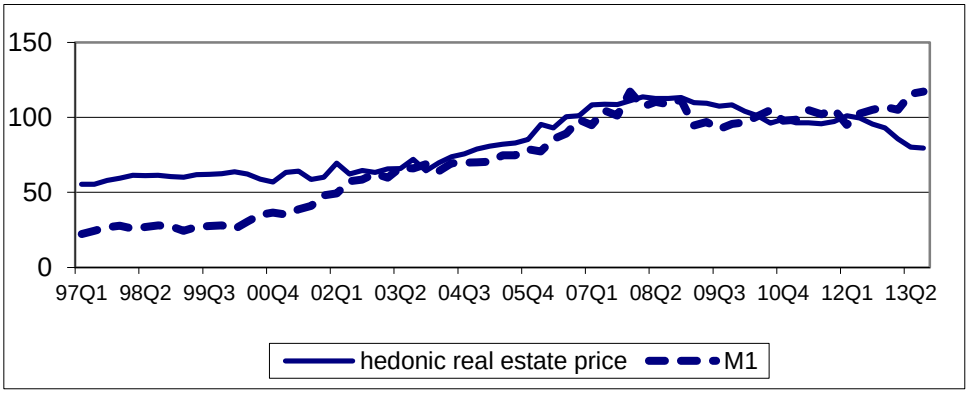

Figure 1. House prices and money indices in Croatia
Source for original data: Croatian National Bank

The overall effect on average subjective sense of well-being due to relative changes in housing wealth is thus questionable. Yet, as Sousa (2014) argues, an increase in housing prices can lead to housing wealth and consumption increases, which drives inflation. This is in particular evident if the households are actually selling their real estate when the house prices are rising. On the other hand, rising housing prices could increase housing costs, which implies that the households would have to restrain from other consumption activities. Which appropriate reaction of monetary policy is to be suggested, remains an open question.

The estimates for Serbia followed the same strategy. The only difference is related to crisis dummy, which for Serbia takes value 1 starting from January 2009, i.e. somewhat later than in Croatia. Although the identification of peaks and troughs were not available following similar methodology as applied on Croatian data, literature suggests that the crisis spread to Serbia in early 2009 (Vunjak and Zelenović, 2013). Blunch and Sulla (2013) notice that the growth rate has started to decline in the last quarters of 2008, with negative growth rate recorded for first quarter 2009. Since we are analysing monthly data, we specify January 2009, as Jovanović and Petreski (2013) identify specifically that date as the structural break in their monthly data, and attribute this to the crisis effect. The cointegrating relationship for Serbia established following the same methodological approach presented in equation (1) is represented by expression (3).

$$ECM(-1) = Rm1(-1) - 1.58SR\_ind(-1) - 2.356SR\_reer(-1) + 6.186 \quad (3)$$

The income elasticity is actually very close to the one reporter by Maravić and Palić (2005), although these authors find inflation rate as well as interest rate included in the reported cointegration vector. What is interesting is that the income elasticity for Serbia is also very close to the one found for Croatia in the same period. However, we have found real exchange rate to be significant opportunity cost variable, and not inflation (as is the case for Croatia) or the interest rate (which seemed to be important in previous estimates). As Dobnik (2013) points out, the inclusion of exchange rate in money demand is included to capture the effect of currency substitution. The sign of the coefficient is not a priori clear. In case of positive effect, a stronger domestic currency can increase domestic money demand. The opposite is when appreciation produces a negative shock to economic activity, which in the next stage lowers domestic money demand. Our estimates point to positive relationship between the appreciation of the domestic currency and money demand in the long run.

The overall estimates are presented in Table 2.

Table 2. Money demand in Serbia (Source: author's estimates)

Variable	Coefficient	Standard error
ECM(-1)	-0.129***	(0.018)
SR_unemp	0.284***	(0.053)
D_rate	-0.011	(0.022)
Dummy_SR	0.014	(0.009)
D(SR_RM(-1))	-0.239***	(0.082)
D(SR_RM(-2))	-0.370***	(0.089)
D(SR_RM(-4))	-0.169*	(0.087)
D(SR_cpi(-3))	-0.929***	(0.346)
D(SR_rate(-2))	-0.198***	(0.047)
D(SR_rate(-4))	-0.219***	(0.050)
D(SR_ind(-2))	-0.124*	(0.069)
Diagnostics		
N = 101	Breusch-Godfrey LM Test (12):	Heteroskedasticity White:
Adjusted R2 = 0.49	F-statistics = 2.05**	F-statistics = 1.39
Jarque Berra = 0.78	Obs*R2 = 24.98**	Obs*R2 = 17.39
Upper bound F = 12.67***		Scaled SS = 13.48

Notes: *** denotes significance at the level of 1 percent. Heteroskedasticity ARCH test also did not detect any additional problems. Recursive coefficient estimation detected stability problems, mostly before the crises period. Referent values for upper bound statistics without trend and constant from Pesaran et al (2001).

The result of the general to specific approach in Serbian case has left us with larger number of variables that do have effect on money demand in the short run. First of all, there is a certain degree of persistence in the money aggregate dynamics which has not been found in Croatian case. In addition to lagged values of inflation, lagged interest rate as well as lagged output dynamics seems to have effect on the money demand. While the interest rate have expected negative sign, since they are opportunity-cost variable, the sign related to output variable is estimated to be negative (if only at the 10 percent significance level). The significance of lagged inflation rates points to the similar experience with hyperinflation that seems to have lasting effects in the region.

The unemployment rate in Serbia has also negative correlation with money demand, implying that precautionary motive is important. Thus, one of the additional variables included in the specification seems to be relevant for the analysed period in both countries.

Another special focus in this paper has been to investigate the role of financial markets and precautionary motives during the crisis. For both countries, the general to specific approach has excluded effect of financial markets from the money demand equation as being irrelevant both in the short and in the long run. Since some of the privatization processes did have profound impacts on the domestic markets (for example, IPO for Croatian telecom), it still has to be concluded that financial markets in the analysed countries are not developed enough to have lasting impact on the money market developments. Even if certain episodes did have significant impact on the market and the behaviour of the main actors (changes in household behaviour), these effects were short-lived and the households turned to more precautionary behaviour, which has been supported by the crisis.

5 Robustness check

In order to compare the usefulness of the estimated models for policy purposes, a short forecasting exercise has been performed. Based on the estimated equations, two more observations were forecasted and compared with the actual values of the dependent variable. The relatively short forecasting period is a consequence of data requirements – all the independent variables have actual out-of-sample values. This means that we are trying to comparatively assess the stability of the estimated model. Table 3 presents different forecasting accuracy measures.

Table 3. Money demand estimates forecasting accuracy (Source: author's estimates)

	Croatia	Serbia
RMSE	0.032	0.009
MAE	0.032	0.009
Theil	0.109	0.019
- Bias	0.012	0.022
- Variance	0.988	0.736
- Covariance	0.000	0.242

Obviously, all of the indicators show that the estimated equations better predict real money demand dynamics in the short run for Serbia, than for Croatia. Additional problem with Croatian estimates is the structure of the forecasting error, as shown by the Theil index decomposition. It seems that in both cases, most of the error can be attributed to variance – which reveals how much the variance of the forecasted variable is far from the actual variance. However, if we were having better estimates, than at least some of the error could be attributed to the non-systematic error – i.e., covariance. This is not at all important in Croatian case.

So, even though the CUSUM and CUSUMQ tests implied that the estimated money demand equations exert stability, forecasting exercise has suggested that the results might be more period-specific. It is interesting to note that in estimates for Croatia only a few variables seem to have correlation with money demand during the analysed period, and even simple forecasting for only two months ahead produced relatively unreliable results. One explanation could be that relationships that have been established between the variables during the crisis will be disrupted once the crisis is over. However, from the policy perspective, this period-specificity urges the need to precisely identify the stages of the business cycle. Another explanation could be frequently heard in public debates in Croatia – that monetary policy is detached from the rest of the economy and that closer cooperation between all policy makers is required in order to resolve the current crisis.

On the other hand, estimates for Serbia, even though they entail larger number of variables, do not completely conform to expectations related to the sign of the estimated coefficients. If we were only interested in forecasting money demand, than this could be (at least in the short period) dismissed as a serious obstacle. However, if we are trying to understand the processes that influence money demand in Serbia, than the issue is more important.

6 Conclusions

This paper has adopted the comparative approach to money demand estimates by analysing two post transitional countries.

Since the general to specific approach has been applied, the presented estimates reveal the "surviving" variables which seem to be correlated with the dependent variable in the analysed period. The estimates for Croatia include relatively few surviving variables, thus confirming the frequently

asserted opinion that monetary policy in Croatia is detached from other segments of the economy. Estimates for Serbia rely on a much richer data structure, and are able to produce more reliable forecasts, at least in the short run.

Notwithstanding the identification of the cointegrating relationship in the above presented results, it has to be emphasized that the interpretation of the long-run relationship should be taken with care. The caution is additionally required since the time period under analysis is relatively short. The relatively short time frame has been the curse of all the empirical studies of money demand in the analysed countries. The comparative approach taken in this paper has enables us to identify income as important long-run determinant of money demand. The similar estimates of income elasticities in both countries are encouraging. The cointegrating relationships do, however, contain different opportunity cost variables. In case of Serbia this is exchange rate, pointing to currency substitution effect. In case of Croatia inflation, to which the monetary policy is fixed upon, is dominant implying that the ghost of inflation linger longer in the memory of Croatian households.

Special focus of money demand in this paper has been put on the investigation of unemployment and share prices effect, since DeBondt (2009) finds that both play important money demand factors in euro area. This has been only partially found in case of Serbia and Croatia, where only unemployment rate points to the widespread precautionary motive for holding money. Due to the lasting and profound effects the latest global economic crisis had on the economies of both countries, these findings seem to be highly expected.

The issue of potential influence of housing prices remains an open question. It goes without saying that wealth factor is an important and in the present paper not thoroughly enough investigated money demand factor. Sousa (2014) analyses studies that higher housing price volatility and younger entry into home ownership in some countries explains smaller exposure to fluctuations in financial wealth, and vice versa. So, in order to understand the precise mechanism of Serbian and Croatian households' behaviour, more research is needed into the composition of the wealth of respective representative households.

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Appendix – Data sources

Variable	Country	Source
Rm1 = real money aggregate M1 deflated by CPI	Croatia	Croatian National Bank
	Serbia	National Bank of Serbia
Cpi = inflation measured by consumer price indeks	Croatia	Central Bureau of Statistics
	Serbia	National Bank of Serbia
Ind = industrial production, proxy for output	Croatia	Central Bureau of Statistics
	Serbia	National Bank of Serbia
Share = share prices index	Croatia, Serbia	International Finance Statistics
Rate = money market rate	Croatia, Serbia	International Finance Statistics
Reer = real effective exchange rate	Croatia	Croatian National Bank
	Serbia	National Bank of Serbia
Unemp = registered unemployment rate	Croatia	Central Bureau of Statistics
	Serbia	WIIW monthly database
D-rate = harmonised long-term interest rate	Germany	Eurostat