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Euroization in Central, Eastern and Southeastern Europe – New Evidence On Its Extent and Some Evidence On Its Causes

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Editorial

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Euroization in Central, Eastern and Southeastern Europe – New Evidence On Its Extent and Some Evidence On Its Causes

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Abstract

We present new evidence on de facto euroization in eleven Central, Eastern and Southeastern European countries. Estimates of the extent of foreign currency cash holdings are derived from survey data. Furthermore, we define overall euroization indices, relating both assets and cash holdings. Results confirm that some countries are heavily euroized and that euro cash holdings constitute a sizeable share of local currency in circulation. Euroization levels in other –mainly Central European– countries are low and economically insignificant. Evidently, high euroization bears various significant consequences for economic policies. Therefore, we inquire on the determinants of euroization. We find that euroization is highly correlated with the quality of past economic governance, reflecting past periods of instabilities. In contrast, the more recent –pre-financial crisis– course of economic history had only limited impact. Thus, our results are in line with the view that policy makers in highly euroized countries are severely constrained by past events and that euroization levels might be difficult to revert through stable macroeconomic policies.

Key words: Dollarization, Euroization, Currency Substitution, Survey Data, Central, Eastern, Southeastern, Europe, CEE, SEE
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1. Introduction

The ownership and use of financial assets denominated in foreign currency is considered to be a widespread phenomenon in some countries of Central, Eastern (CEE) and South-Eastern Europe (SEE). This de facto dollarization—or better matching reality in these countries, euroization—constrains the effectiveness of monetary and fiscal policy. If a country's objective is to join European Monetary Union, euroization also bears implications on the transition path to full membership. During the recent financial crisis, de facto euroization and possible by-products like balance sheet mismatches have gained considerable attention.

Despite its importance, relatively little empirical evidence is available on the extent of financial euroization.[2] In particular, while the extent of financial euroization is typically measured by deposit euroization which is readily available from national statistics, information on foreign currency cash holdings (FCC) is barely available.[3] As it can be expected that foreign currency cash holdings comprise a significant share of agents' financial portfolios in countries with underdeveloped financial systems (either low demand for or low supply of banking services), the focus on only deposits might miss a relevant dimension when attempting to measure euroization. Also, the relative weight of cash and deposits in residents' portfolios matters for economic policy — the existence of substantial foreign currency cash balances deprives a sizeable share of asset holdings from statistical recording. Notwithstanding its effects on tax bases, this renders agents' reaction to policy changes difficult to observe which increases uncertainty about the effectiveness of economic policy

[2]We will use the following terminology in this paper: Currency substitution will refer to the substitution of foreign currency cash (FCC) for local currency cash (LCC). Asset or deposit substitution –both terms will be used interchangeably– refers to the substitution of saving deposits denominated in foreign currency (FCD) for saving deposits denominated in local currency (LCD). Because the euro has a predominant role in the countries analyzed, we will make use of the term euroization (instead of dollarization). Hence, financial euroization refers to the overall, and in our case, unofficial extent of currency and asset substitution. This terminology differs from the literature in two aspects: First, currency substitution as we use it does not necessarily mean that foreign currency cash replaces domestic currency cash as a medium of exchange. Second, our use of the term asset substitution focuses only on saving deposits and neglects other financial assets.

[3]Feige and Dean (2004) present comparable estimates of foreign currency cash holdings for many European countries. Their estimates are based on currency shipment data collected before the time of the euro cash introduction. It is likely that the recent years exerted a profound impact on the structure of euroization. For example, a sizeable share of FCC holdings might have been converted into FCDs.

actions and ultimately aggravates economic policy making.

Likewise, a profound knowledge of the factors which drive euroization is of importance for economic policy: Can euroization be traced to a lack of institutional credibility? Or is it driven by expectations regarding the economic future? In light of the current financial crises: How strongly do agents react to financial market uncertainties and to exchange rate variations? – to name just a few of the questions that come up in this context.

Against this background, this paper presents new evidence on the extent and the determinants of euroization in CEE and SEE. Importantly, we employ data from a household survey which has been conducted in eleven Central, Eastern and Southeastern European countries. This survey, commissioned by the Oesterreichische Nationalbank and entitled "OeNB Euro Survey", provides information which goes far beyond previously available aggregate statistics:

First, the survey provides information on almost all countries in the CEESE region allowing for country comparisons based on harmonized data. In particular, the sample comprised 6 EU Member States (Bulgaria, the Czech Republic, Hungary, Poland, Slovakia and Romania) as well as 5 EU candidate and potential candidate countries (Albania, Bosnia and Herzegovina, Croatia, the FYR Macedonia and Serbia).[4]

Second, the survey contains information on the size of FCC holdings as well as their currency composition. This allows directly estimating the extent of currency substitution and to present a refined euroization index which combines information on cash and deposit holdings.

Third, the survey delivers information on foreign currency denominated savings deposits (FCD). While aggregate information on the extent of deposit euroization is available from national statistics, the survey provides important supplemental information on the portfolio choice of households. For example, a comparably high inequality of wealth and income, raises the question of how widespread the phenomenon of euroization is among the population - concentrated among a minority (owning a large share of assets) or observable for a large share of the population.

Fourth, the survey provides information on various factors that have been shown or that

[4]The survey does not cover Montenegro and Kosovo, which have unilaterally introduced the euro. Slovakia has introduced the euro on 1.1.2009.

are considered to be of importance for the extent of euroization but for which information has only rarely been available previously – for example, agents' recollection of past economic turbulence, confidence in the banking system. The availability of such information allows providing new evidence on the causes of currency and asset substitution.

Fifth, the survey provides information on the behavior of private households. This is important as aggregate statistics on asset substitution often also contain corporations, whose behavior can differ significantly from households.[5]

Given this information, the paper's aim is twofold: In a first step, we assess the extent of euroization. In particular, we present evidence on the extensive (the dissemination of foreign currency ownership among the population) and the intensive margin of currency substitution (i.e. amounts or portfolio shares) and on the motives behind the holding of foreign currency denominated assets. We then discuss the importance of FCC for the respective economies. The availability of estimates of FCC holdings allows defining an overall euroization index.

In a second step, we aim at analyzing whether observed cross-country differences in euroization levels can be explained by differences in various explanatory variables. In particular, we focus on variables that have been shown in the literature to have empirical relevance as well as on variables that have been identified to be of importance but for which evidence has only been scant, like agents' memory of economic turbulence.[6]

2. Data Description

The data used are based on two surveys which were conducted in October/November 2007 and May/June 2008. In each country, the surveys comprised face-to-face interviews with about 2,000 persons aged 15+. The sample was selected via a multi-stage stratified random sampling procedure, with the exception of Bulgaria, where quota sampling was applied. In Poland, sampling was restricted to the population of the ten largest cities only. The surveys' focus was on private individuals – hence we do not consider foreign currency

[5]Evidence in this direction is provided in Basso, Calvo Gonzalez and Jurgilas (2007). In particular, the authors report that their model cannot well explain the behavior of households.

[6]Cf. Basso, Calvo Gonzalez and Jurgilas (2007); Ize and Yeyati (2003); Nicolo, Honohan and Ize (2005); Yeyati (2006).

holdings of the corporate sector, which might be substantial in some countries.

Great care has been taken to ensure that the (weighted) sample is representative for the corresponding population. Furthermore, if possible results were compared with those from other surveys. For example, some questions were formulated similar to questions contained in the Eurobarometer of the European Commission.[7] A comparison shows that results from both surveys are highly correlated. Moreover, we have compared answers about foreign currency deposits with statistics collected by national institutes (ECB, 2008). Again, the correlation with our results is high.

The questionnaire also contained several questions on the value of financial assets and the answers are used to project aggregate statistics. Of course, caution is warranted in this context. First, due to the sensitive nature of these questions it can be assumed that underreporting regarding the size of asset holdings is very likely, even if the survey instrument does not explicitly refer to holdings obtained from grey economy activities or illegal sources. Therefore, any results relating to amounts should be regarded as constituting a lower bound of actual figures.[8]

Second, figures may be biased because of item nonresponse. On average across all countries, 18% of the respondents who reported euro cash holdings refused to state the respective amount.[9] Varying nonresponse rates could bias results if item nonresponse is not random. In the following calculations, we did not impute missing values but assumed that nonresponse is random.

Third, the OeNB Euro Survey focuses on individuals as opposed to households. Consequently, the questionnaire addresses personal holdings. This approach might constitute a problem in those cases for which it is difficult to distinguish between personal and house-

[7]The Eurobarometer is only conducted in EU Member States.

[8]It is difficult to determine the extent of underreporting. For example, Feige (2003) reports estimates on the amount of foreign currency in circulation in Croatia, using data from currency in- and outflows from around the time of the euro cash changeover. The comparable results from an old survey for Croatia are five times lower than his estimates. In contrast, Kraft (2003) reports a currency substitution index of 76% for Croatia at the end of 2001. Our estimates from the new survey for 2007/8 is 34%. Under the (strong) assumption that the behavior of Croats has not changed, this would imply an underreporting factor of 2.2.

[9]Nonresponse rates differed considerably across countries, with the highest nonresponse rates reported for some SEE countries (e.g. 34% for Serbia and 32% for Bulgaria and Romania) and relatively low rates for Slovakia and the Czech Republic (4%).

hold holdings (e.g. in the case of a couple with joint holdings). The questionnaire accounts for this issue by asking whether the interviewed person owns foreign currency holdings personally or jointly (together with a partner).

In light of these limitations – in particular underreporting and non randomness of item non-response – it is advisable not too take the projected figures too literally and not to base our judgment on a single indicator alone. Therefore, we will provide secondary evidence whenever available. This evidence is derived from neutral statements about the behavior of fellow inhabitants, not involving any amounts. Despite the likely presence of biases, we expect that cross-country comparisons are still meaningful if biases are constant across countries. In fact, the results from the projections and the results from the secondary evidence yield a rather consistent picture about cross-country comparison.

3. Foreign Currency Cash

3.1. Direct Survey Evidence

The surveys provide evidence about foreign currency cash holdings from several dimensions. The first dimension concerns the dissemination of cash holdings among the population – focusing solely on the ownership of FCC without regard to amounts. Figure 1, which shows the share of respondents who answer that they hold EUR or USD cash, reveals two main results: First, the share of respondents who hold euro cash reaches substantial levels in some countries and varies considerably between countries. Second, euro banknotes clearly dominate in importance over USD banknotes.

Concerning the share for euro cash we find that in six countries at least every fourth respondent reports euro cash holdings, with the highest shares in FYR Macedonia (43%), Serbia (39%) and Albania (32%). Still substantial, but slightly lower dissemination shares were obtained for Croatia, Slovakia and the Czech Republic (around 25%). In the remaining countries, shares range from 9% to 15%. In contrast, US dollar cash only seems to play some role in Albania (7%), Czech Republic and Poland.[10]

For countries in vicinity to the euro area and/or which are relatively rich, like the Czech Republic and Slovakia, it can be suspected that euro cash holdings do not serve as a store

[10]The high margins of random variation for such low percentages precludes a country ranking.

of value but rather to settle transactions in the euro area (travel activities) and accordingly amounts should be low in value and economically insignificant from the aggregate view of the respective economies. In order to analyze this further, the survey also provides evidence about the underlying motives and the reported amounts.

Figure 2 summarizes the relative importance of two motives behind euro cash balances.[11] The results support the view that motives differ across countries. In CEE, euro cash is mainly held to make payments in the euro area whereas the store of value function of cash is significantly less important. In SEE, results are detrimental with the store of value function being more important than the transaction motive.[12]

A similar picture can be obtained by analyzing amounts, summarized in Figure 3. In particular, those who answered that they hold euro cash where asked to indicate the amount (in categories) and whether they hold this amount alone or together with a partner. Nominal median euro amounts vary between 90 euro in Slovakia to about 734 euro in Serbia. In general, the results are in accordance with the contention that euro cash is being held for different reasons in CEE than in SEE. In the former group of countries the median is 190 euro while in the later it is 550 euro.[13] Overall, this impression gets attenuated if median amounts are adjusted for differences using PPP exchange rates as countries in SEE are relatively poorer than countries in CEE.

The evidence which has been presented so far is all directly derived from survey answers. How reliable are these figures? We have checked for the robustness of the derived results in several ways. First, for Croatia, Slovakia, the Czech Republic and Hungary, we can resort to comparable survey results from previous survey waves (Ritzberger-Grünwald and Stix; 2007). A comparison of the actual results with older survey waves shows that the share of

[11] In particular, respondents who held euro cash were asked whether they agreed or disagreed to the statement "I hold euro cash as a general reserve or means of precaution" or "I hold euro cash to make payments abroad, for holidays". Figure 2 shows the sample means for each country. A value of zero implies that, on average, people do neither agree nor disagree. A positive value means that people agree. A comparison of answers obtained for the two motives indicates the relative importance of motives.

[12] Interestingly, the strength of the motives also proxy well the aggregate size of foreign currency cash holdings. For example, the correlation between the importance of FCC as a store of value motive (from Figure 2) and the share of euro cash in total currency in circulation (see below) is 0.79.

[13] Notice that results on median holdings are not only consistent with motives in a cross-country comparison but also across individuals. That is, if we compare individuals who answered that they hold their cash balances for expenses abroad with those who answered that they hold their cash balances as a store of value then we find that median holdings are lower for the former than for the latter.

respondents who hold foreign currencies is very stable across time. Concerning amounts, more variation is found, however it is not so strong to blur the ranking among countries. Hence, from previous surveys in some countries, we know that results are subject to change over time but that this change is not overly strong. Additionally, the survey questionnaire allows for a second way to check for the plausibility of results. In particular, respondents were asked to state their degree of consent with the statement that it is common in their country that people hold FCC. The results from this neutral question are clearly in line with the picture obtained from the direct questions about cash holdings (Figure 4): In the CEE countries, respondents, on average, disagree with this statement whereas they agree in SEE countries, with the highest level of agreement for Serbia, FYR Macedonia and Croatia.

3.2. Projections for Euro Cash Holdings

Assessing the importance of currency substitution from an aggregate perspective requires to combine answers about foreign currency ownership with answers about the respective foreign currency amounts. The respective result then needs to be projected onto the whole population.

Before discussing the results, several methodological notes are necessary. First, our projections have been calculated without using imputation techniques – by simply ignoring non-responses. In particular, this assumes that those individuals who do not give answers are identical on average to those who do respond, an assumption which is very strong. Therefore, it is advisable to treat the results as indicative only and focus mainly on cross-country differences. Second, as mentioned we have to account for the fact that the survey does not focus on the financial situation of the household but on individuals. We have accounted for this fact by asking the interviewed person whether the stated accounts or cash holdings were held personally or jointly with a partner. If a person answered that an account is held together with a partner the stated amount was divided by two and the adjusted amounts were used in our projections.[14] Third, in the projections we do not

[14]How to collect information on the financial situation of households or individuals is a difficult issue. For partners, it is probably easiest and the division by two is probably most accurate. However, there might be situation where grandparents or uncles/aunts live in the same household or where three generations of the same family live together. In designing the questionnaire we have applied great care in distinguishing

use median amounts (derived from all respondents who held foreign currencies) but rather employ the whole frequency distribution of answers concerning the categorical amounts. This, together with the other assumptions, implies that the projection results can change relative to those results obtained by analyzing median amounts (in Figure 3).

The results from the projections are summarized in Figure 5. The left panel shows per capita PPP adjusted euro cash balances.[15] These figures reveal a discernible difference between the EU member states (values below 200) and the Balkan states with values ranging from 259 in Bosnia and Herzegovina to 466 in Croatia, 576 in Albania, 755 in FYR Macedonia and 906 in Serbia.

Putting average cash holdings in relation to monthly GDP (right panel) does not change the overall picture that cash holdings are much more important in the Balkan countries than in the EU Member States, however the ranking among countries change.

4. Foreign Currency Deposits

This section presents results for FCDs. We focus on the extensive margin, i.e. the dissemination of FCDs among the population and neglect the stated amounts because population aggregate figures on the value of FCDs are available from national statistics.

Table 1 summarizes the dissemination of FCDs, i.e. the share of respondents with a savings account. Czechs, Slovaks and Croats tend to have a savings account with higher likelihood than people in the other countries. In general, the share is rather low, in particular, in Bosnia and Herzegovina and Serbia with only 10 or less percent of respondents reporting such an account.[16] This corresponds with our previous findings that PPP-adjusted median cash holdings were quite high in these countries.

The third column summarizes the share of those who have a FCD among those with a savings deposit and the fourth column the share of respondents with a euro savings deposit among those with a FCD. Notice that these shares are based on only a few observations

these cases and in giving interviewers detailed instruction how to handle such cases. In any way, the results of the survey will be influenced by these considerations.

[15] Per capita refers to those respondents older than 14 years.

[16] Note that country-specific forms of bank savings might not be reflected in the answers because of the harmonized questionnaire design.

for some countries such that these point estimates cannot be considered very reliable.[17] Despite this limitation, the results fit well into the picture obtained from questions on FCC-holdings: Foreign currency accounts are frequent in SEE and of no great relevance in CEE. Our results indicate that about 30% (Bulgaria and Romania) to about 80% (Bosnia and Herzegovina and Serbia) of those respondents with a savings account hold accounts in foreign currency. Finally, the vast majority of these accounts are denominated in euro.[18]

Also in this context, we have posed a question to cross check respondents answers. In particular, respondents were asked to indicate their degree of consent with the statement that it is common in their country that people hold foreign currency deposits. The results from this indirect approach are broadly in line with the findings when respondents were directly asked about their behavior (Figure 6).

5. Synopsis

In order to derive a compound picture of the extent of de facto euroization, we calculate a currency substitution index (CSI), a deposit substitution index (DSI) and an overall euroization index (EI). These indices are defined as proposed by Feige and Dean (2004) but are adjusted for the fact that we focus only on individuals.

$$\begin{aligned} CSI &= FCC/(LCC + FCC) \\ DSI &= FCD/(LCD + FCD) \\ EI &= (FCC + FCD)/(LCC + FCC + LCD + FCD) \end{aligned}$$

The data about FCC are taken from the survey while official aggregate national figures are used for deposits and local currency in circulation (LCC). The respective results are summarized in Figure 7.

[17] The low number of observation is due to non-response and the fact that the third column uses those with a savings account as the base, which applies in Bosnia and Herzegovina for example to only 6% of respondents.

[18] The lowest share is obtained for Poland where, according to the surveys, only two thirds of foreign currency savings account are in euro. We suspect that the British pound might play some role in Poland because of migration flows.

The currency substitution index expresses FCC in percent of total currency in circulation. The results, shown in the left panel of Figure 7, confirm the substantial role of FCC in SEE countries. Projected foreign currency circulation ranges from 2% to 22% (Hungary, Romania) in the EU member states and from 27% to 76% in the Balkan countries. Concerning the last group of countries the results suggest two clusters: FYR Macedonia and Serbia with shares higher than two thirds and Albania, Bosnia and Herzegovina and Croatia with shares around 30%. These high shares of euro circulation in total currency circulation are striking, in particular, given the fact that the underlying figures result solely from survey answers (and in particular stated amounts). As it is likely that the survey responses understate true holdings, the degree of currency substitution is likely to be even higher.

As the results concerning the deposit substitution index have been summarized in other places (e.g. ECB; 2008), we do not want to inquire in great detail about country differences. In brief, private households hold between 80% and 90% of their deposits in foreign currency in Serbia and Croatia and between 40% and 60% in the remaining SEE countries. For the CEE countries these shares range from 4% to 15%.

Figure 7 summarizes the overall index of euroization, putting the FCC and the FCD component in relation. Several aspects of these results deserve attention: First, Serbia exerts the highest euroization ratio, followed by Croatia, FYR Macedonia, Bulgaria and Bosnia and Herzegovina. In these countries between 50% and 90% of all financial assets are held in foreign currencies. Second, the previous picture that euroization reaches modest levels in CEE but is sizeable in SEE gets further amplified by the composite euroization index. Third, while the contribution of FCC is significant in some countries, notably FYR Macedonia, Serbia and to some extent Albania, we find that the ranking of countries with respect to their euroization levels is almost the same as the ranking with respect to deposit substitution.

To account for the likely scenario that currency balances are underreported, the calculations were repeated with the FCC amounts multiplied by three. These calculations show that the overall picture regarding cross-country differences does not change, qualitatively. Also, the EIs by itself do not change much: it increases by at most 13 percentage points in Albania, by 12 Pp. in FYR Macedonia, 8 Pp. in Romania and Bosnia and Herzegovina

but only by 4 Pp. in Croatia.[19]

6. Structural Causes of Euroization

How can the observed differences across countries be explained? Are currency and deposit substitution driven by the same factors? In order to provide some answers we analyze next whether the varying degree of deposit and currency substitution across countries can be explained by cross-country differences in explanatory variables.

As the low number of countries precludes a regression based analysis, we will follow a descriptive approach and analyze bivariate correlations. Evidently, results from this approach can only be regarded as indicative. We nevertheless consider this exercise a worthwhile undertaking for mainly two reasons: First, from survey responses we can construct several explanatory variables which have been hypothesized or conjectured as being of importance but for which empirical evidence has not been available previously. In particular, this concerns variables which are related to people's sentiment (for example the memory of past economic turbulence). In addition, we can relate the extent of currency substitution to indicators about the use of foreign currencies as a medium of exchange. Second, the survey allows focusing not only on the intensive margin of deposit substitution (as is typically done in the empirical literature) but also on the extensive margin and on people's broad assessment of currency substitution.

Clearly, any empirical analysis of the causes of euroization is plagued by the difficulty of determining the directions of causality. To mitigate these concerns, we focus on only such explanatory variables which have been either identified as important in the previous

[19]Feige and Dean (2004) have reported CSIs (derived from banknote shipment data) for a number of countries for which we also provide information. How do their results compare with our results? Feige and Dean's estimates are substantially higher for all countries but Albania and Macedonia. We think that there are three plausible reasons for this discrepancy: First, the data used by Feige and Dean (2004) date back to the late 1990s and the early 2000s. As the confidence in the banking system has increased, a substantial portion of cash balances might have been transferred onto bank accounts. Also, the introduction of euro cash might have induced a reduction of FCC holdings. Second, a natural candidate to explain our lower figures is underreporting about which we can only guess. However, what we can do is to compare Feige and Dean's results with the non-monetary indicators of currency substitution. For example, the data from Figure 4 do not indicate that currency substitution has such a high importance in Romania whereas it has the highest currency substitution share in Feige and Dean (2004). Third, we do not have information on FCC holdings of the business sector, in particular unrecorded income (e.g. from tourism) which would show up in aggregate measures but not in survey responses.

literature (e.g. Basso et al.; 2007; Ize and Yeyati; 2003; Yeyati; 2006; Nicolo et al.; 2005) or which are related to the economic record (for example, people's memory of high inflation rates in the past). For the latter type of variables the reverse causality issue is less of a problem than for contemporaneous or forward-looking variables.

6.1. Determinants of Cross-Country Differences in the Degree of Deposit Substitution

Figure 8 shows scatter diagrams of three deposit substitution indicators against seven explanatory variables.[20] The first indicator, derived from national statistics, is the one typically employed as the dependent variable in studies of asset substitution: the overall share of foreign currency deposits (DSI). The second indicator is derived from the survey and represents the extensive margin of asset substitution, i.e. the share of respondents with a foreign currency deposit among those respondents who have a savings deposit. The third indicator represents respondents' sentiment and will be discussed below.

The first three explanatory variables have been selected because of their significance in the theoretical and empirical literature: The first variable is the minimum variance portfolio (MVP) dollarization ratio as proposed by Ize and Yeyati (2003), whose model highlights the portfolio aspects of dollarization and focuses on the real return of financial assets denominated in local versus foreign currency. In particular, Ize and Yeyati's model predicts dollarization persistence if the expected volatility of inflation remains high relative to the volatility of the real exchange rate - notably an explanation resting on forward looking aspects. Ize and Yeyati (2003), Nicolo et al. (2005) and Basso et al. (2007) have established a positive correlation between the MVP dollarization ratio and actual asset substitution. This positive correlation is also evident in our small sample, with the correlation coefficient being around 0.46 for both indicators.[21]

Another variable which has been shown to be influential is the quality of institutions (e.g. Nicolo et al.; 2005) – reflecting the view of euroization as the "collateral cost of low

[20] For a definition of explanatory variables see Table A.2.

[21] Notice, however, that MVP ratios are calculated using historical exchange rate and inflation figures in spite of its forward looking character. This opens the potential for reverse causality problems since highly euroized countries typically do not allow for large exchange rate fluctuations and had a history of high inflation rates that have declined over the past years. If this combination translates into low real exchange rate variability and high inflation variability then one would predict that high euroization leads to high MVP dollarization ratios and not vice versa.

institutional credibility" (Yeyati; 2006, p.82). In order to account for this argument we plot a composite governance indicator of the World Bank against our DS-indicators. The results reveal a strong negative correlation and are thus much in line with evidence derived in the previous literature: The higher the quality of governance, the lower the level of asset substitution.

Also, we assess whether past inflation is a driving force of deposit substitution. In particular, we use respondents' assessment of inflation during the past year, a measure which might deviate from the measured inflation rate. Theoretical considerations suggest that this variable should, at least in principle, affect the currency composition of cash holdings but not of bank deposits (as nominal returns should compensate savers for differences in inflation rates). In accordance with this, we find almost no correlation.[22]

Earlier models of dollarization have identified the lack of confidence in domestic money or the lack of credibility of economic policy resulting from past periods of turbulence as important (Feige; 2003; Nicolo et al.; 2005). The next three explanatory variables are related to some of these effects. In particular, we include a measure of people's recollection of high inflation ("I remember periods of high inflation during which the value of the [LOCAL CURRENCY] dropped sharply"). We find that cross-country differences in the memory of high inflation periods are not correlated with cross-country differences in both deposit substitution indicators.

Furthermore, the survey asked whether people experienced restrictions on the use of their savings deposits ("I remember periods during which access to savings deposits was restricted in [MY COUNTRY]"). For instance, in former Yugoslavia, households were allowed to hold a foreign currency deposit to store remittances or earnings from tourism. When the central state needed the reserves the deposits were converted to domestic currency. Even though the interest rate was high, the real value of the deposits was eroded quickly by the high inflation rate (Barisitz; 2003). Such forced conversions are very likely to increase the underground economic activity and hence cash use. In principle, such memories, whether warranted or not, are likely to be correlated with a mistrust in authorities and banks. Hence, they should affect the portfolio share of cash and deposits but not di-

[22] Alternatively, we employed the average inflation rate over the past five years. Also, this variable does not seem to play a role.

rectly the currency composition of savings deposits. In fact, we find a positive correlation with both DS-indicators. However, closer scrutiny reveals that this correlation is driven by one country only, namely Serbia.

Confidence in the banking system has been shown to have some effects on (individual) agents' portfolio decision (Stix; 2009).[23] Given that in the countries under analysis the last wave of banking sector problems (as seen from before the financial crisis) occurred in the not too distant past, it can be expected that these events still affect respondents' current behavior.[24] To account for this effect, we use respondents consent to the statement that "savings deposits at foreign banks are much safer than those at domestic banks". We think that answers to this question reflect a general sentiment about the local banking system (trust in the local banking system).[25] The bivariate correlation analysis yields results which are in line with our expectations: a higher level of mistrust in the banking system is associated with higher deposit substitution levels, although the correlation is not as strong as it is for the governance indicator.

In principle, one would expect this variable to affect the choice between cash holdings and bank deposits but not the currency composition of bank deposits. The positive correlation can nevertheless be rationalized by the presence of an indirect effect: Answers on the questions of trust in the banking system mainly reflect past attitudes (as contemporaneously many banks are foreign owned). The mistrust in authorities (banks) then induced people to hold foreign currency cash. As the situation has stabilized and confidence in the banking system has rebounded, cash holdings were transferred onto bank accounts (albeit in foreign currency), thereby affecting asset substitution.

[23]The analysis in Stix (2009) is restricted to Croatia, Slovakia and Slovenia and based on individual and not aggregate data.

[24]Two waves of banking sector crisis can be identified in many transformation countries. The first one in 1992/1993, when the transformation process started and the second one in the late 1990s. Examples are the Czech Republic, Bulgaria, Romania and Slovakia (from 1996 to 2001). The consolidation of the state-owned banking sector was brought about by the closing down of unprofitable institutions (see e.g. Croatia), but also by enhanced privatization efforts. Several foreign banks, mainly from Austria, Italy and the Netherlands, entered the CEE banking markets resulting in a significant share of foreign banks in most countries, reaching almost 100% in a few of them.

[25]Foreign banks play a sizeable and in some countries dominant role in both CEE and in SEE. Hence, the question, if taken literally, entails some ambiguities. For this reason, we have compared results from this question with results from a direct question about trust in banks derived from the "Life in Transition (2006)" survey (World Bank and EBRD). We find that results are very similar.

Finally, a potentially important determinant of euroization could be the existence of remittances and income in euro: For example, in former Yugoslavian countries emigration to industrialized European countries, mainly to Germany and Austria was important. The associated remittances were often not converted into domestic currency, given the lack of confidence in the domestic financial sector. Furthermore, tourism has played an important role in some parts of former Yugoslavia generating income in legacy currencies and then in euro. Also in CEE, many people have started to commute and thus have been generating income in euro.

As the survey contains information on the sources of euro holdings (income, remittances or conversion from local currency) we can construct a proxy variable about the percentage of euro holdings coming from income in euro or from remittances. Figure 8 suggest that this variable is not related with the DS-indicators.

The asset substitution indices we have discussed so far reflect people's behavior – how much has been saved in euro and how many save in euro. The last column in Figure 8 presents the result for an alternative indicator based on the sentiment towards foreign currency savings. In particular, respondents were asked to indicate their level of agreement to the statement that "saving deposits in foreign currency are better to safeguard the value of my money than saving deposits in [LOCAL CURRENCY]", focusing on people's broad assessment of the return they get when investing in foreign currency versus the return in local currency — such return considerations might encompass the exchange rate, the inflation rate and any risk consideration a respondent might have. Another difference to the previous indices is that this index also includes answers from those who do not hold foreign currency denominated assets but have nevertheless a certain attitude towards savings in euro (i.e. people who do not have enough assets and hence do not hold FCDs but would do so if they could).

Again, the MVP dollarization share and this indicator are positively correlated. This result is interesting as it shows that people's broad assessment of FCDs –irrespective of whether households hold foreign currency denominated assets– are in line with what would be predicted by theoretical considerations. The governance indicator has no explanatory power for this asset substitution indicator. In contrast with our previous results, we find that the past inflation rate is correlated with agents perception of the advantage of foreign

versus local currency savings. The higher the perceived inflation the higher the share of people saying that FCDs are better than LCDs.

Concerning the governance indicator and inflation we find an interesting pattern of results. Whenever the outcome of agents' behavior is concerned (the intensive and extensive margin of observed asset substitution), we find that that the governance indicator is important whereas past inflation has no direct importance. However, for the general assessment of FCDs relative to LCDs, which is likely to include a forward looking aspect, we find the opposite picture. The institutional variables are not important but past inflation is. Thus, given the assessment that the governance indicators largely reflects past political and economic instabilities, this finding is consistent with the view that observed asset substitution is largely the result of past but not of contemporaneous effects[26] – it seems that past instabilities induced people to hold foreign currency denominated assets. Once people had such assets they stick to them despite economic normalization. However, when it comes to the contemporaneous assessment of FCDs, the current inflation situation plays a role whereas institutional credibility is irrelevant which is very plausible given that the banking sector is thought to be relatively stable (compared to past experiences).

6.2. Determinants of Cross-Country Differences in the Degree of Currency Substitution

Figure 9 summarizes the results for three indicators of currency substitution. The first indicator is euro currency in circulation expressed as a percent of total currency in circulation (CSI) and the second indicator the share of the population holding euro cash as a store of value. In a similar vein as before, these two indicators represent the intensive and the extensive margin of currency substitution. The third indicator summarizes respondents assessment of how common it is that euro cash is held in the respective country ("In [MY COUNTRY] it is very common to hold euro cash"). This is a neutral statement for which no sensitive information needs to be revealed by respondents and hence serves as a test for the other two indices.[27] In general, we find that the results from all three indicators are very similar, which strengthens our confidence in the reliability of results.

[26] As a case in point, we observe a correlation coefficient between the World Bank Governance Indicator for political stability from 1998 and from 2007 of 0.9. In our view, this clearly shows that the governance indicator we use measures mainly past developments.

[27] In particular for the CSI which is based on projections.

The results for those variables we have been discussing previously are very similar. We find a strong and negative impact of governance quality on all CS-indicators. Although the inflation level should theoretically affect the currency composition of cash holdings, we do not find an effect.[28] Also, the memory of past inflation episodes is not associated with higher currency substitution levels. In contrast, we find that the memory of restricted access to bank deposits is positively correlated with all three currency substitution indicators. However, this effect is again mainly driven by two countries, namely Serbia and FYR Macedonia. However, as was the case for asset substitution, the lack of trust in banks is positively correlated with currency substitution. Again, remittances do not seem to play a role.

Given the newly available indicators of currency substitution, we can test for two separate effects which should affect or be correlated with the extent of currency substitution. The first variable accounts for the importance of the development stage of the financial system (e.g. Duffy et al.; 2006; Savastano; 1996; Stix; 2009). In particular, we have included an indicator which measures the percentage of the population with access to banks. This indicator is strongly and negatively correlated with all three CS-indicators.[29]

Another important aspect of currency substitution is that foreign currency replaces local currency not only as a store of value but also as a transaction medium. To account for this argument survey participants ought to indicate their degree of consent with the statement that it is very common that certain payments are made in euro. Again, this is a rather neutral statement about the behavior of fellow inhabitants and which does not ask respondents for sensitive information. The last row of Figure 9 plots this variable against the three CS-indicators, unraveling a very strong positive correlation. Notably, this result does not reveal any causal relationship. Nevertheless, it provides strong evidence that foreign currency holdings and domestic transactions in foreign currency are closely interlinked.

[28] One explanation for the lack of an effect could be that inflation rates were rather modest during the past five years in most countries and the variation across countries not strong: in five countries average annual inflation rates were below 3%. Only Serbia and Romania had average inflation rates above 10%.

[29] For this indictor, one could also argue in favor of reverse causality: Banks do not open branches because people do not demand banking services because of their preference for cash. On balance, we think that this direction of causality is less plausible than the opposite direction.

6.3. Currency Substitution versus Deposit Substitution

In a last step, we inquire on the relative importance of currency versus deposit substitution. This question is important from both an economic policy and a theoretical perspective. While euroization in general is considered to pose problems for economic policy, these problems are more severe if de facto euroization takes the form of currency substitution.[30] From a theoretical perspective, some of the explanations of euroization provided in the literature apply only to currency substitution while others only to deposit substitution. For example, it has been stipulated that network effects should not substantively affect deposit substitution (Calvo and Végh; 1992; Ize and Yeyati; 2003) while they should affect the extent of currency substitution. Another example concerns the effect of rising confidence into the banking system. Feige (2003) reports a negative correlation between indices of currency substitution and deposits substitution for some countries and conjectures that rising confidence in the banking system can lead to a decrease in the use of foreign currency cash and an increase in foreign currency deposits, possibly leaving the overall degree of euroization unchanged.

To analyze whether cross-country differences in the preferences towards cash can be explained, we construct a variable measuring respondents' consent to the statement "I prefer to hold cash rather than a savings account". This statement is not geared specially towards foreign currencies but rather expresses a general preference for cash. Notice that this variable has been constructed for only those who either hold FCC or FCD. Thus, the variable represents a preference for cash given that an individual has decided to hold foreign currencies in her portfolio. The respective results are summarized in Figure 10.[31]

Again, we find very similar results as before, i.e. a negative correlation for the governance indicator and the density of banking services and a positive correlation between the variables measuring trust in banks and the memory of restricted access to bank deposits. Also, a relatively high correlation can be observed between the indicator which expresses the use of euro as a transaction medium for domestic transactions and the indicator which

[30] Once foreign currencies are in the banking system, they are official and policy can design measures to affect these holdings. In contrast, FCC holdings are out of control of policy makers, both statistically and economically.

[31] Reassuringly, the top panel in Figure 10 shows that answers to this question are highly correlated with the share of FCC in total cash in circulation.

measures agents' preference for cash.

7. Summary and Conclusions

By employing information from a household survey which was conducted in 2007 and early 2008 in eleven countries of Central, Eastern and South-Eastern Europe we present a compound (pre-financial crisis) picture of the degree of euroization of households in this region.

First, the survey data allows to determine the role of foreign currency cash in this region. We find that foreign currencies are important in residents' financial portfolios and that the euro takes a predominant role. In particular, in four SEE countries more than 30% of the value of total (local and foreign) cash in circulation is denominated in foreign currency - however, foreign cash seems to mainly serve as a store of value.

Second, we present evidence about the extent of asset substitution which goes beyond aggregate value shares. In particular, we present evidence on the extensive margin of deposit substitution and on the general assessment on how people view foreign currency deposits in relation to local currency deposits. Again we find that saving deposits in foreign currency are a relatively widespread phenomenon in SEE but less so in CEE.

Third, combining survey information on cash holdings with national statistics on the currency composition of saving deposits we define an overall euroization index (the share of foreign currency assets in total assets). Accordingly, euroization ratios are close to 10% or below in CEE and range from one third to 84% in SEE. Foreign currency denominated cash holdings contribute significantly to these shares mainly in three SEE countries, namely FYR Macedonia, Serbia and Albania.

Having derived evidence about the extent of euroization, our aim was to inquire on the determinants. In particular, with simple bivariate analyses we study whether cross-country differences in various euroization indicators can be explained by a set of selected explanatory variables – variables that either have been motivated in the literature or which refer to longer-run developments (in order to alleviate reverse causality issues).

In summary, we obtain very similar results for the overall degree of asset substitution and the overall degree of currency substitution: only a few variables which have been highlighted in the literature seem to drive results—in spite of the low number of observations

it is surprising that these few variables explain a relatively large share of cross-country variation in euroization. In particular, these are the minimum variance portfolio shares suggested by Ize and Yeyati (2003) and a composite indicator which measures governance quality. A lack of trust in the banking system, which in our view mainly reflects past events, also seems to play a role – however the correlation is less strong than for the institutional quality. In contrast, neither people's recollection of high inflation and devaluation periods nor the inflation development from the more recent past seems to explain observed cross-country differences in euroization rates.

Concerning currency substitution, two additional factors are found to be of some importance: the supply of banking services and commonness of transactions in foreign currency. The latter effect opens the role for the working of network effects (e.g. Feige et al.; 2003; De Freitas; 2004; Oomes; 2003; Reding and Morales; 2004).

Although caution is necessary when interpreting the bivariate analyses, the results indicate that the observed high euroization ratios are to a significant extent the result of past periods of turbulences and not of current mistrust or a lack of confidence in the banking sector. In some countries, these turbulences might have driven euroization at levels from which a reversal is difficult to achieve. In our view, such inertia is mainly responsible for the fact that euroization levels have not declined substantially during recent years despite substantial progress towards stabilization. Indeed, the results are consistent with the view that progress in economic normalization and in restoring trust in institutions, might –in a first stage– result in a substitution of foreign currency cash holdings for foreign currency deposits, but might not necessarily affect the currency composition of overall asset holdings. Only in a longer run, stabilization efforts might materialize in overall declining euroization levels, if network effects permit. However, in some of these countries confidence and trust might still be fragil and it will be of interest to observe how people react to the current financial crises.

Our analysis can only explain differences across countries. In principle, one should also analyze how behavior at the level of individuals can be explained. This is clearly beyond the scope of this paper but seems a worthwhile undertaking.

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Table 1: Foreign Currency Deposits

	Share of respondents with ...		
	a savings deposit (in % of resp.)	a FCD (in % of those who have a saving deposit)	a FCD in euro (in % of those who hold a FCD)
CZ	35.5	8.4	91.7
HU	22.9	10.1	83.3
PL	18.5	14.3	69.5
SK	38.6	10.7	86.9
BL	22.2	31.3	84.2
RO	14.8	36.3	88.2
AB	20.0	57.1	85.6
BA	6.0	77.4	89.2
HR	26.8	62.3	93.4
MK	17.5	67.3	93.2
RS	9.8	83.6	94.6

Source: OeNB Euro Survey fall wave 2007 and spring wave 2008.
Note: FCD=foreign currency deposit. For some countries the number of observations is low and hence computed shares may not be reliable.

A. Country Codes and Variable Description

Table A.1: Country Codes

CZ	Czech Republic
HU	Hungary
PL	Poland
SK	Slovakia
BL	Bulgaria
RO	Romania
AB	Albania
BA	Bosnia and Herzegovina
HR	Croatia
MK	FYR Macedonia
RS	Serbia

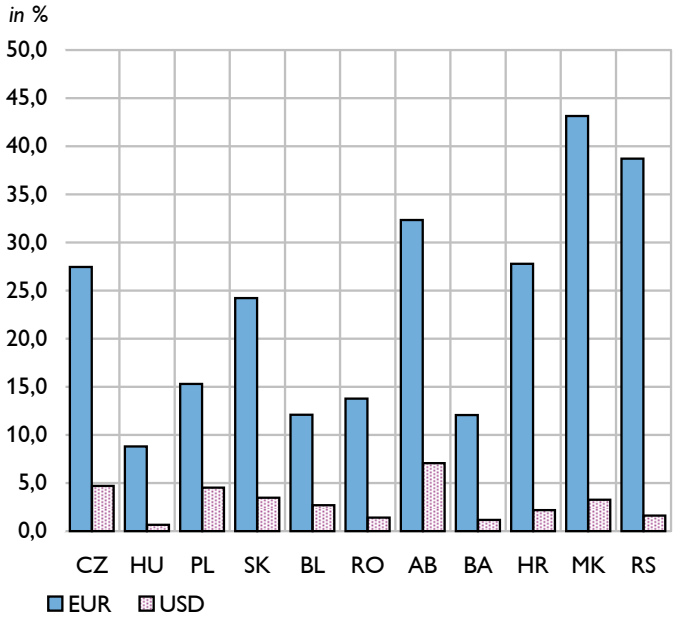
Table A.2: Definition of Explanatory Variables

Governance Indicator	This governance indicator is an average of six subindices and covers a broad range of governance topics from "political stability" to "voice and accountability" (cf. Kaufmann, Kraay and Mastruzzi; 2008).
Past Inflation	calculated as the percentage balance of respondents who answered that prices increased during the past 12 months and of those who answered that prices stayed about the same or decreased.
Bank Access	derived from "World Bank: Finance for All? Policies and Pitfalls in Expanding Access", World Bank, November 13, 2007 (http://go.worldbank.org/S3EWEOI440).
Remittances and Euro Income	derived from survey answers on question about source of euro holdings. For each country we calculate the average percentage shares of euro holdings generated from remittances or from own income in euro multiplied by the share of those who have euro cash or euro deposits.

The following variables are derived from survey answers on indicated statements. Respondents were asked to indicate their level of consent with the respective statement (answers on a scale from 1 (strongly agree) to 6 (strongly disagree)). For each country we then calculate the sample mean. Higher values imply that people on average agree more to the respective statement.

Stability of Local Currency	"Currently, the [LOCAL CURRENCY] is a very stable and trustworthy currency"
Memory High Inflation	"I remember periods of high inflation during which the value of the [LOCAL CURRENCY] dropped sharply"
Memory Restricted Access	"I remember periods during which access to savings deposits was restricted in [MY COUNTRY]"
Foreign Banks Better	"Savings deposits at foreign banks are much safer than those at domestic banks"
Payments in Euro	"In [MY COUNTRY] it is very common to make certain payments in euro"

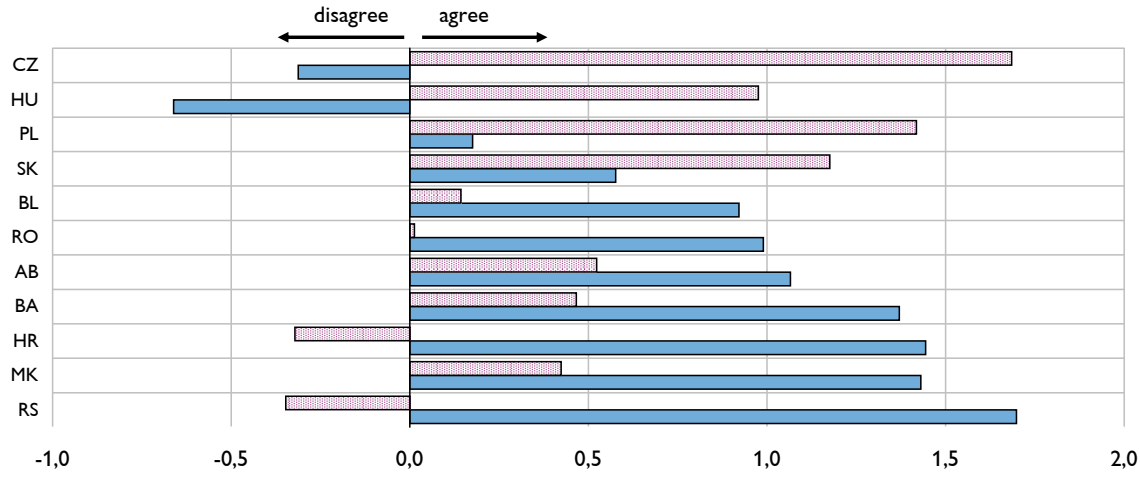
Share of Respondents Holding EUR and USD



Source: OeNB Euro Survey fall wave 2007 and spring wave 2008.

Figure 1:

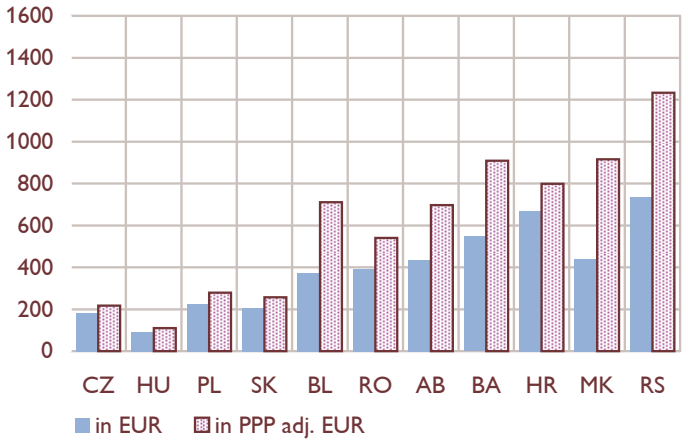
Motives for Holding Euro Cash



Source: OeNB Euro Survey fall wave 2007 and spring wave 2008.
Note: Respondents who said they held euro cash were asked whether they agreed or disagreed on a scale from 1 (fully agree) to 6 (fully disagree) to a list of motives for holding euro cash (see legend).

Figure 2:

Respondents Holding Euro Cash: Median

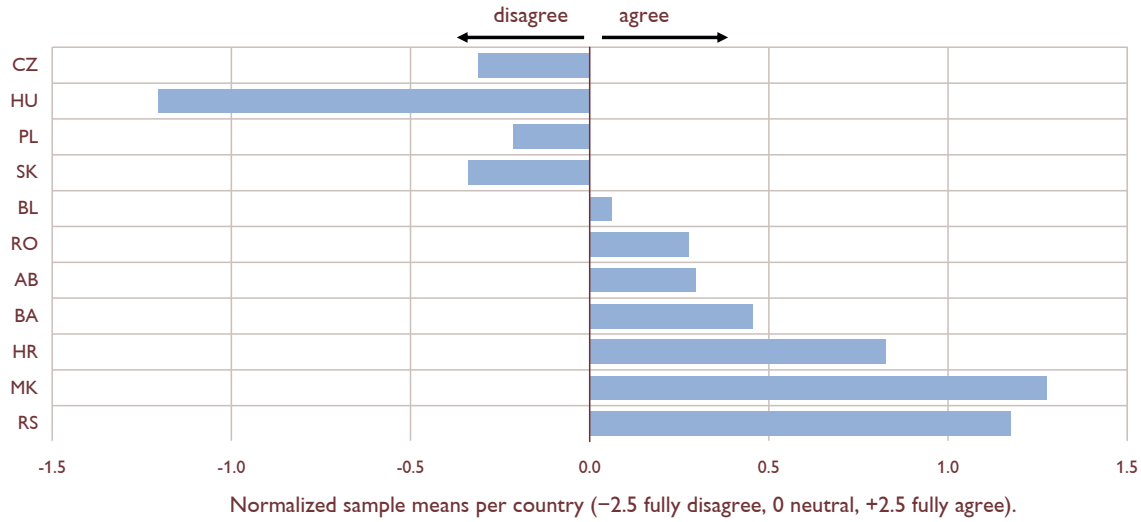


Source: OeNB Euro Survey fall wave 2007 and spring wave 2008.

Note: The chart shows median holdings of euro. Values are based on categorical answers. The median is calculated by linearily interpolating between class boundaries. PPP adjustment using PPP exchange rates from the IMF.

Figure 3:

Consent with the Statement: "In my country it is very common to hold euro cash"

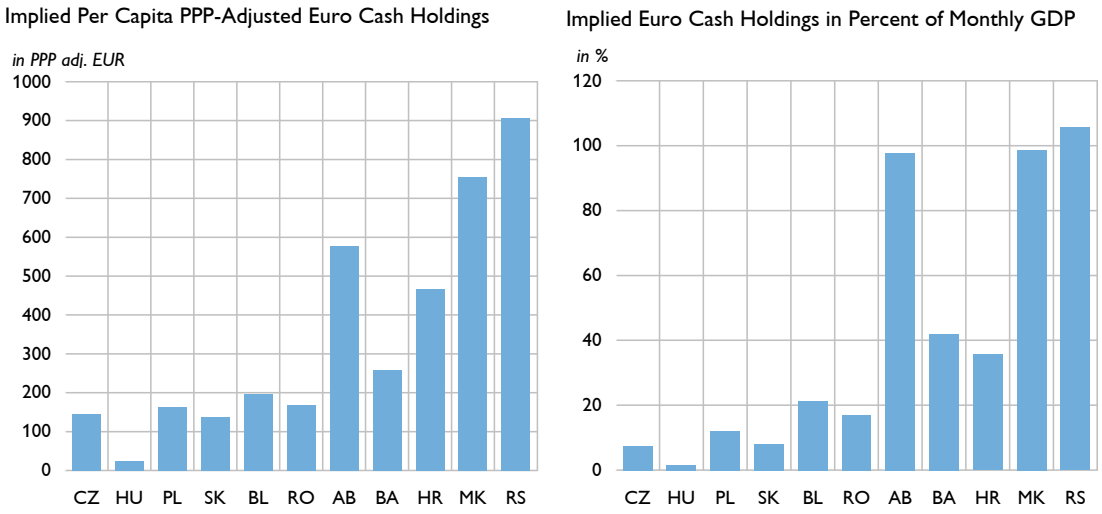


Source: OeNB Euro Survey fall wave 2007 and spring wave 2008.

Note: Respondents were asked whether they agreed or disagreed on a scale from 1 (fully agree) to 6 (fully disagree) to the statement above.

Figure 4:

Projections for Euro Cash

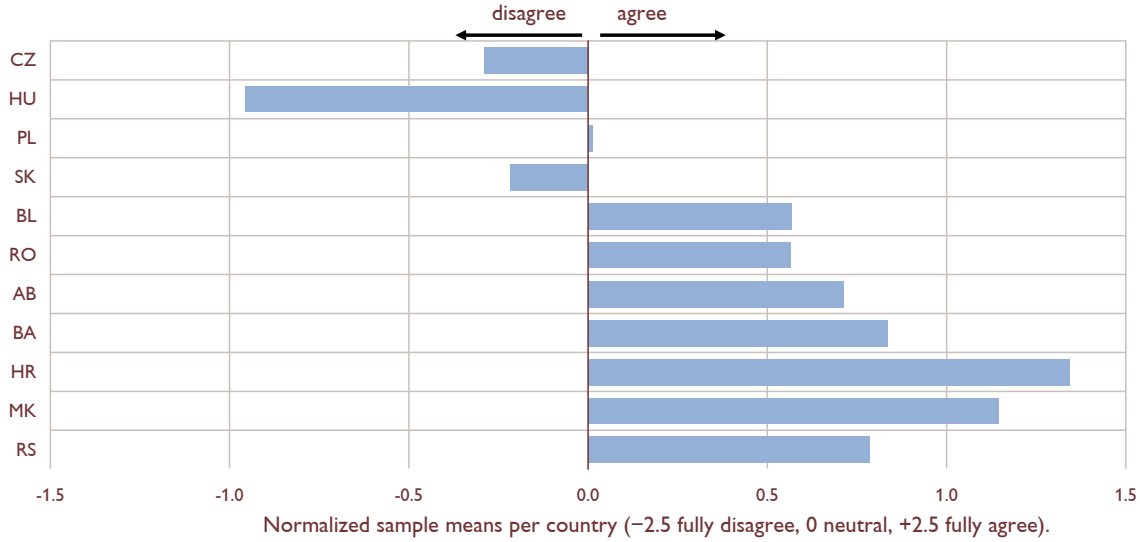


Source: OeNB Euro Survey fall wave 2007 and spring wave 2008, IMF, national statistical institutes and central banks.

Note: Projections per capita refers to the population older than 14 years. PPP adjustment using PPP exchange rates from the wiiw Database.

Figure 5:

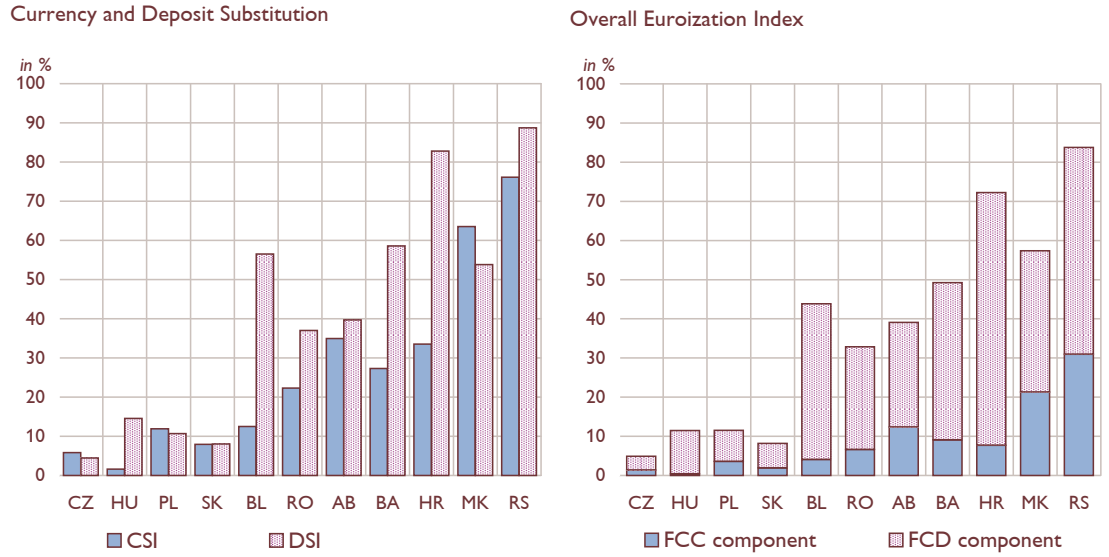
Consent with the Statement: "In my country it is very common to hold foreign currency deposits"



Source: OeNB Euro Survey fall wave 2007 and spring wave 2008.
Note: Respondents with a savings account were asked whether they agreed or disagreed on a scale from 1 (fully agree) to 6 (fully disagree) to the statement above.

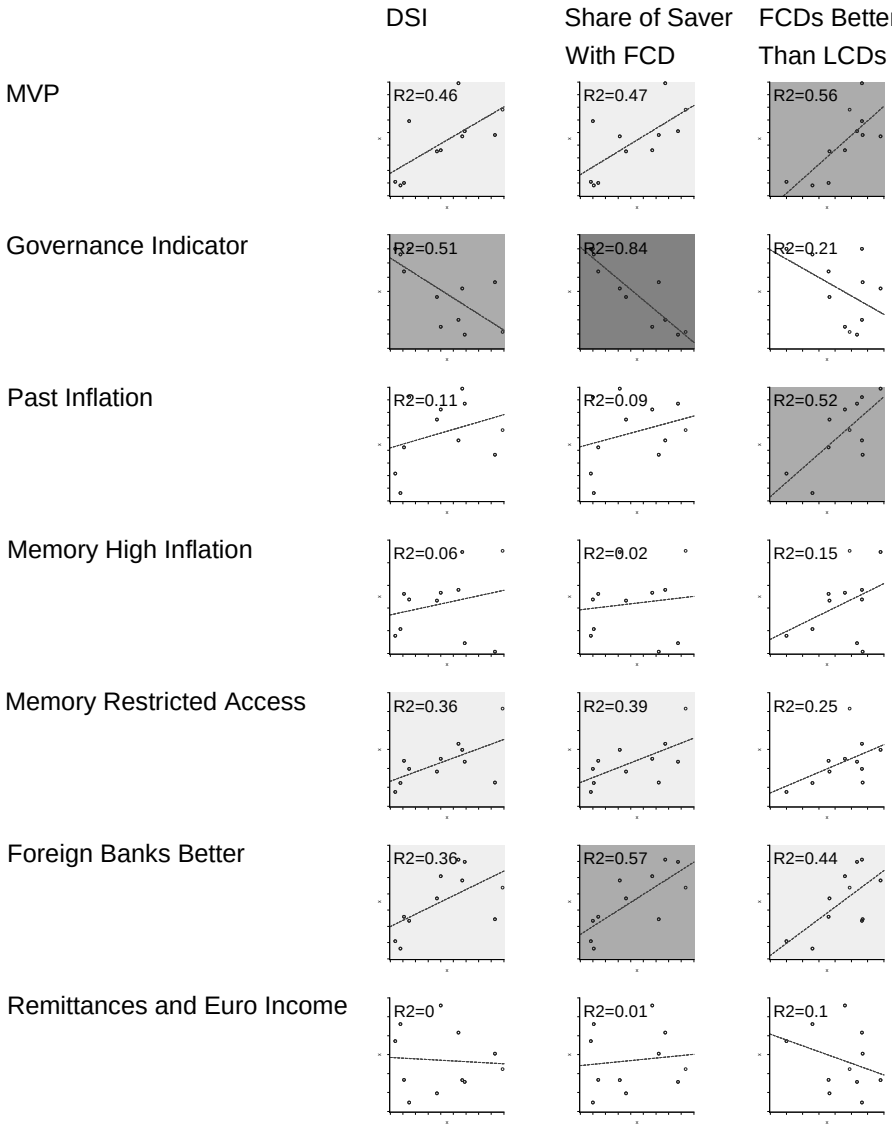
Figure 6:

Euroization Indices



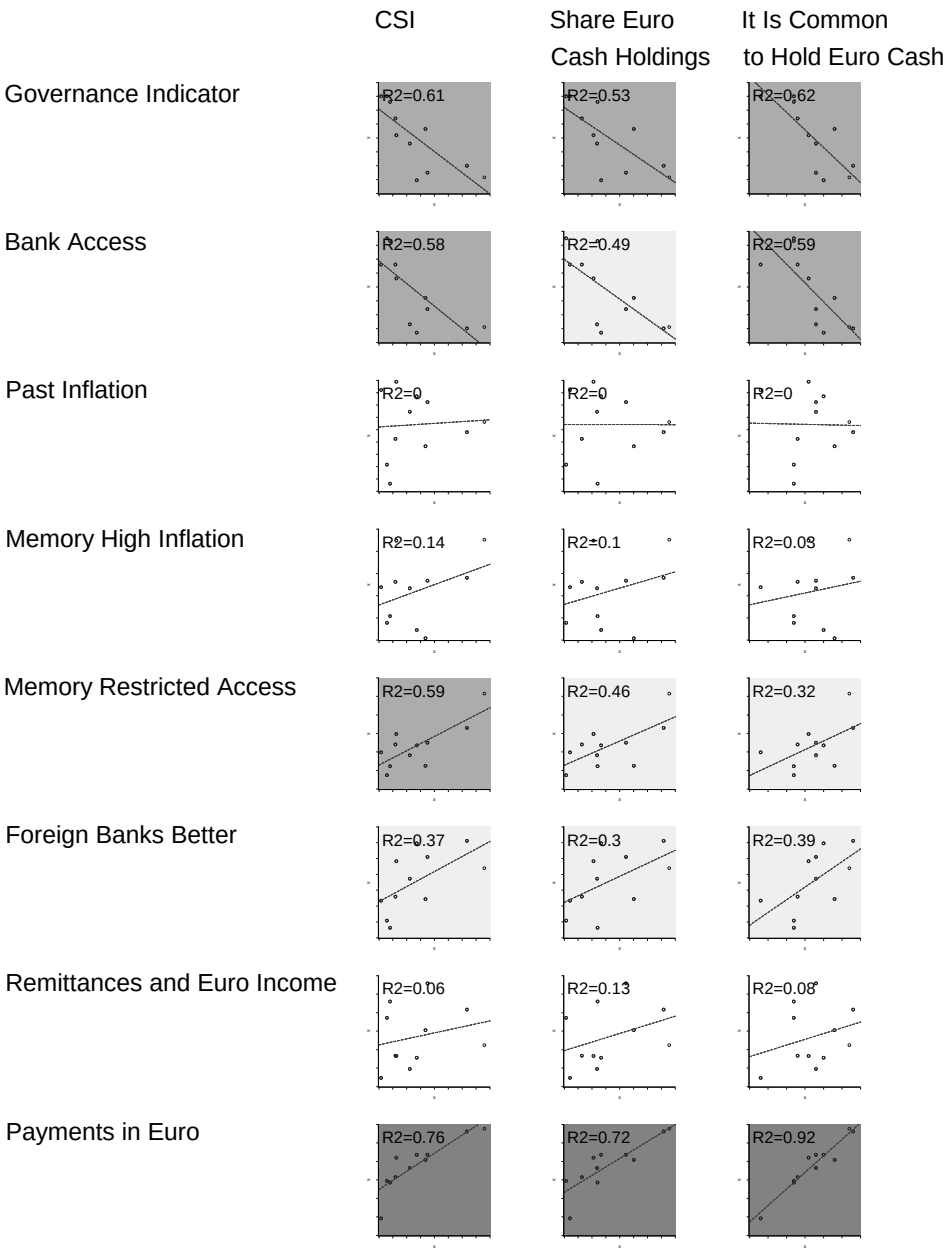
Source: OeNB Euro Survey fall wave 2007 and spring wave 2008. National central banks.
Note: The DSI indicator for Bosnia and Herzegovina is estimated.

Figure 7:



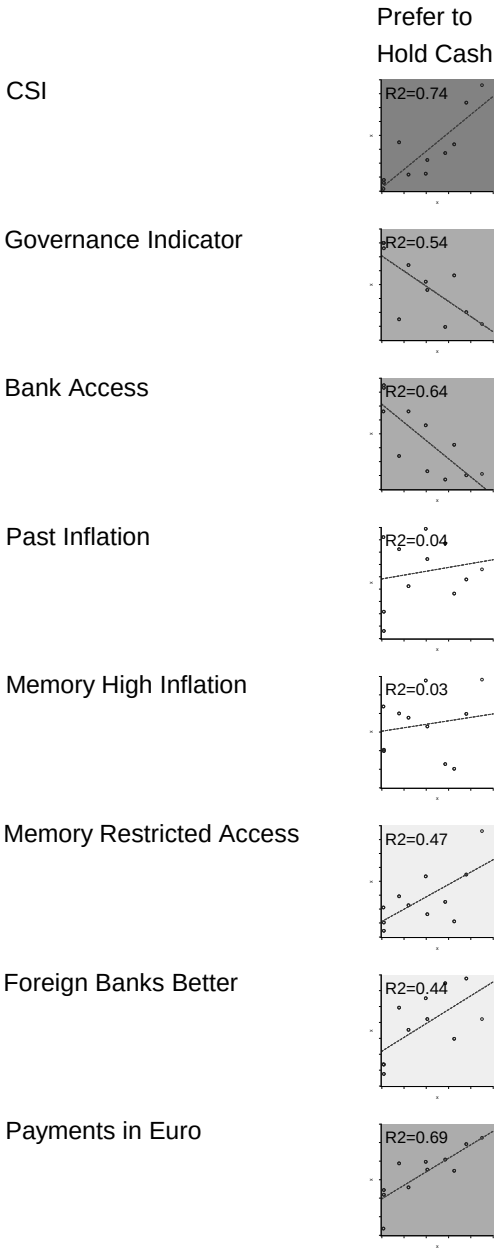
Note: The degree of shading reflect the strength of the correlation: R2 between 0.3 and 0.5=light grey, R2 between 0.5 and 0.7=middle grey, R2>0.7=dark grey.

Figure 8:



Note: The degree of shading reflect the strength of the correlation: R2 between 0.3 and 0.5=light grey, R2 between 0.5 and 0.7=middle grey, R2>0.7=dark grey.

Figure 9:



Note: The degree of shading reflect the strength of the correlation: R2 between 0.3 and 0.5=light grey, R2 between 0.5 and 0.7=middle grey, R2>0.7=dark grey.

Figure 10:

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