

# FOCUS ON EUROPEAN ECONOMIC INTEGRATION

This Issue's Special Focus:  
Foreign Currency Loans

The OeNB's quarterly *Focus on European Economic Integration (FEEI)* presents peer-reviewed studies on macro-financial and monetary integration in Central, Eastern and Southeastern Europe (CESEE) as well as related country analyses and statistics. This publication reflects a strategic research priority of the OeNB.

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| <b>Publisher and editor</b>    | Oesterreichische Nationalbank<br>Otto-Wagner-Platz 3, 1090 Vienna, Austria<br>PO Box 61, 1011 Vienna, Austria<br>www.oenb.at<br>oenb.info@oenb.at<br>Phone (+43-1) 40420-6666<br>Fax (+43-1) 40420-6698 |
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| <b>Printing and production</b> | Web and Printing Services   |

**DVR 0031577**

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Printed according to the Austrian Ecolabel guideline for printed matter.



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*Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.*

# Call for Entries

## Olga Radzyner Award 2011 for Scientific Work on European Economic Integration

The Oesterreichische Nationalbank (OeNB) has established an award to commemorate Olga Radzyner, former Head of the OeNB's Foreign Research Division, who died in a tragic accident in August 1999. The award is bestowed on young economists for excellent research on topics of European economic integration and is conferred annually. In 2011, four applicants are eligible to receive a single payment of EUR 3,000 each from an annual total of EUR 12,000.

Submitted papers should cover European economic integration issues and be in English or German. They should not exceed 30 pages and should preferably be in the form of a working paper or scientific article. Authors shall submit their work before their 35<sup>th</sup> birthday and shall be citizens of any of the following countries: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, FYR Macedonia, Hungary, Kosovo, Latvia, Lithuania, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia and Ukraine. Previous winners of the Olga Radzyner Award, ESCB central bank employees as well as current and former OeNB staff are not eligible. In case of co-authored work, each of the co-authors has to fulfill all the entry criteria.

Authors shall send their submissions by postal mail – with the envelope marked “Olga Radzyner Award” – to the Oesterreichische Nationalbank, Foreign Research Division, Otto-Wagner-Platz 3, PO Box 61, 1011 Vienna, Austria. Entries for the 2011 award should arrive at the OeNB by October 10, 2011, at the latest.

For more information, please see [www.oenb.at](http://www.oenb.at) or contact Ms. Eva Gehringer-Wasserbauer in the OeNB's Foreign Research Division either by e-mail ([eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at)) or by phone (+43-1-40420-5205).

Studies

# Households' Exposure to Foreign Currency Loans in CESEE EU Member States and Croatia

Katharina Steiner<sup>1</sup>

*Most Central, Eastern and Southeastern European (CESEE) countries saw a substantial rise in foreign currency lending to households during the last decade. This involved risks to macro-financial stability, in particular because most of these borrowers were unhedged. This paper provides evidence on eleven CESEE countries regarding (1) the extent of foreign currency lending to households from 1995 to 2009, (2) the supply and demand factors at work in the period before the crisis and (3) the regulatory responses to address the situation. Panel data estimates covering the period from 1996 to 2007 reveal that, on the demand side, foreign currency borrowing was attractive because interest rates for foreign currency loans were lower than those on domestic currency loans, and private sector consumption as well as housing prices were on the rise. Mitigating factors on the supply side were higher interest margins on domestic currency loans than on foreign currency loans and banking sector reforms. Regulatory measures account at least partly for the different patterns of currency structures according to descriptive evidence.*

*JEL classification: C23, E41, F31, G19, P20*

*Keywords: Financial development in transition, foreign currency loan, supply and demand, currency substitution, emerging markets*

## 1 Introduction

The catching-up process of emerging economies is usually accompanied by credit growth; however, not every size and kind of credit expansion is beneficial. This paper focuses on foreign currency lending to households, which has become widespread in many Central, Eastern and Southeastern European (CESEE) countries. The household market segment is of particular interest: Households are typically not hedged against a weakening of the local currency relative to the loan currency, which increases the risk of loan defaults given unfavorable developments. International institutions (e.g. IMF, EBRD) and the OeNB had drawn attention to the risks involved in this type of lending well before the financial crisis and had called for a constant monitoring of the growing share of foreign currency loans in total domestic lending (OeNB, 2005).

It is important to understand the driving forces behind the developments in foreign currency lending in order to take well-targeted regulatory and supervisory measures in this area. While the earliest publications on the determinants of foreign currency lending to households focused on Austria, a large number of empirical analyses covering the CESEE region followed.<sup>2</sup> Some studies use bank survey data and focus on foreign currency lending to firms (e.g. Brown, Kirschenmann and Ongena, 2009), whereas other empirical papers draw on

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<sup>2</sup> Publications with a focus on Austria: Epstein and Tzanninis (2005) and Beer, Ongena and Peter (2008); publications with a focus on the CESEE region: Basso, Calvo-Gonzalez and Jurgilas (2007), Dvorsky, Scheiber and Stix (2008), Luca and Petrova (2008), Rosenberg and Tirpak (2008), Brown, Kirschenmann and Ongena (2009), Haiss, Paulhart and Rainer (2009), Neanidis and Savva (2009), Bakker and Gulde (2010), Brzoza-Brzezina, Chmielewski and Niedźwiedzińska (2010), Csajbók, Hudecz and Tamási (2010), and Zettelmeyer, Nagy and Jeffrey (2010).

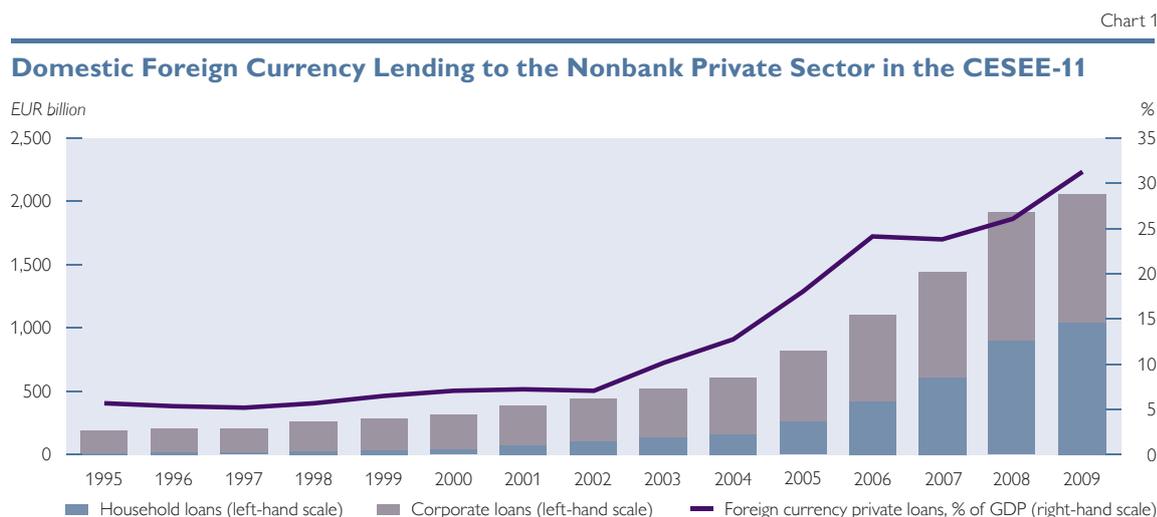
macroeconomic data (e.g. Luca and Petrova, 2008) and consider foreign currency borrowing by households (e.g. Csajbók, Hudecz and Tamási, 2010).

This paper contributes to the empirical research by explicitly concentrating on loans to households and providing additional evidence of supply- and demand-side factors related to the popularity of this type of loan in the years leading up to the financial crisis at the macroeconomic level. Moreover, it provides a detailed overview of regulatory attempts to limit risks arising from this development in eleven CESEE countries (CESEE-11<sup>3</sup>) and explicitly refers to their impact on the supply of, and demand for, foreign currency loans to households.

The remainder of the paper is structured as follows: Section 2 provides stylized facts on foreign currency lending to households in the CESEE-11. Section 3 presents the mechanisms underlying the estimating equation as described in the literature and indicates the data and the estimation method used. Section 4 summarizes the results and contains robustness checks, while section 5 outlines the regulatory and supervisory measures taken to tackle the issue with different speed and intensity in the CESEE-11. Section 6 concludes.

## 2 Stylized Facts: Diverse Picture of Foreign Currency Lending in the CESEE-11

While currency substitution of loans in the CESEE-11 as a whole had increased only slightly during the late 1990s, this section provides evidence that it has gained considerable momentum since then. In most of the region, foreign currency loans are typically denominated in euro, except in Hungary and Poland, where Swiss francs play an important role (Beckmann and Stix, 2010). Indexation of domestic currency loans to a foreign currency has been widespread in Croatia, but not in



<sup>3</sup> The country sample includes the ten CESEE EU Member States – the Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Slovakia (SK), Slovenia (SI), Bulgaria (BG) and Romania (RO) – as well as Croatia (HR), which was added to the sample as it is likely to join the EU in the near future.

the other countries under review. In some CESEE-11 countries (e.g. Bulgaria), this practice is even prohibited.<sup>4</sup>

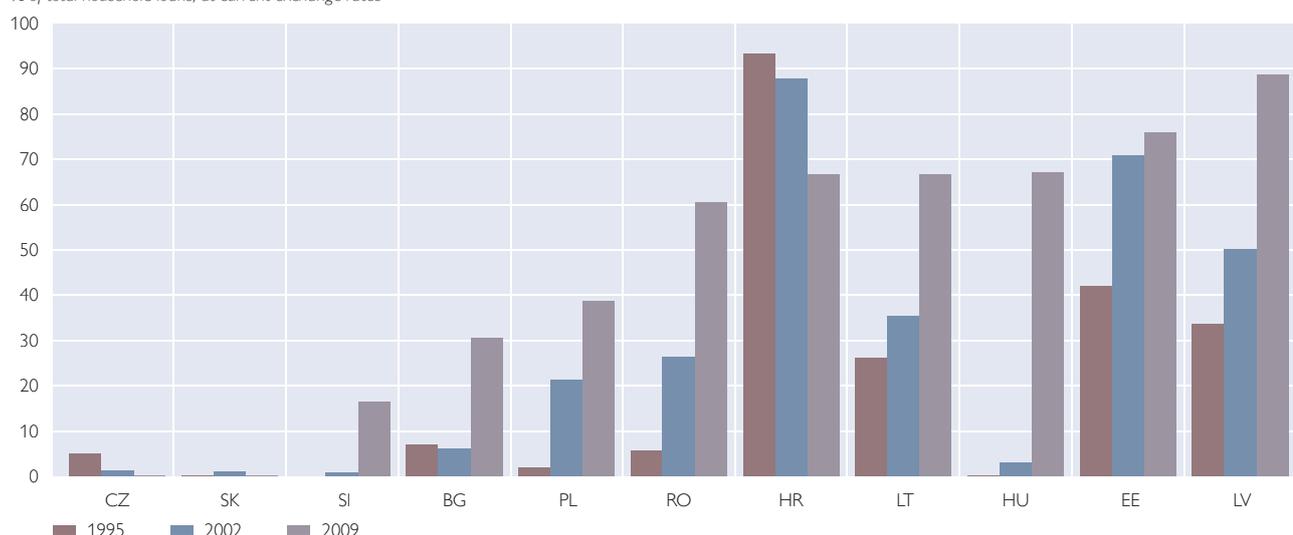
To capture the size of the foreign currency loan market in the CESEE-11, chart 1 shows the aggregated total volume of foreign currency loans to the nonbank private sector<sup>5</sup> in nominal terms and as a share of GDP. The data reflect two phenomena: overall credit growth and increasing currency substitution. The ratio of foreign currency loans to GDP came to 6% in 1995 and increased to 31% by 2009 (chart 1). This rise was particularly pronounced from 2002 to 2006 and again from 2007 to 2009, but in 2009, it was largely attributable to the contraction of GDP in the face of the Great Recession. Aggregate developments were mainly driven by high growth of foreign currency lending in Estonia, Latvia, Lithuania, Hungary, Poland, Bulgaria and Romania. The rise in foreign currency lending to the household sector was much more pronounced than that of such loans to the corporate sector: The share of household loans in total foreign currency loans to the nonbank private sector soared from 8% in 1995 to 51% in 2009. In most countries, mortgage loans account for the bulk of loans to households, which implies that the respective households may be doubly exposed, namely to unfavorable developments in both exchange rates and housing prices.

Besides the rise of currency substitution in the market segment of household loans in many countries of the region, chart 2 also shows considerable country differences in the timing and pace of developments. For the CESEE-11 region as a

Chart 2

### Foreign Currency Lending to Households in the CESEE-11

% of total household loans, at current exchange rates



Source: National central banks, OeNB.

<sup>4</sup> Foreign currency-indexed loans are normally registered as domestic currency loans. This can lead to an underestimation of the full significance of instruments denominated in, or indexed to, a foreign currency (Backé and Walko, 2006). In Croatia, where foreign currency-indexed loans account for a large share of total loans, they are explicitly reported in the statistics of the Croatian National Bank.

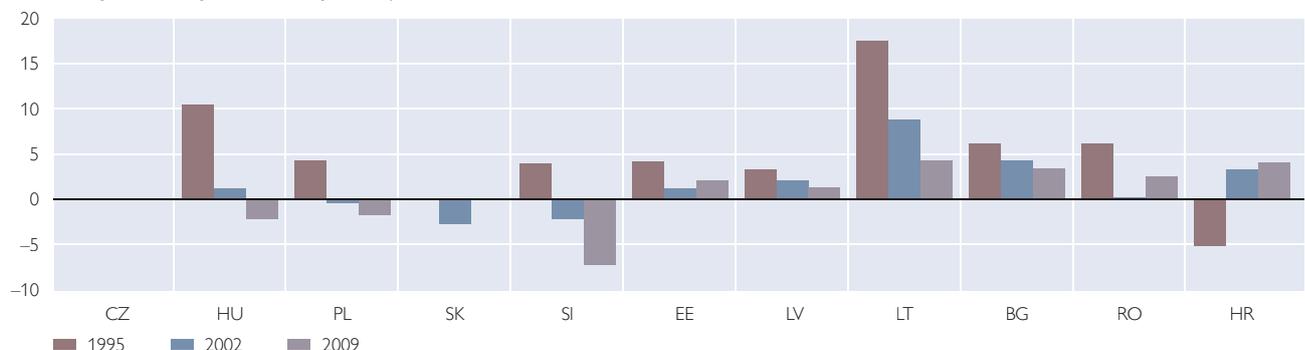
<sup>5</sup> This sector includes households and nonprofit institutions serving households as well as nonfinancial corporations.

whole, the share of foreign currency lending in total household loans, as based on nominal data, increased from 4% in 1995 to 60% in 2009. This increase in nominal terms is not only attributable to the granting of new loans, but also to exchange rate movements. The latter indicate increasing risks in terms of rising repayment burdens for households. A look at the individual countries shows that, in the Czech Republic and Slovakia, the share of foreign currency lending in total lending to households remained low. In the Czech Republic, the differential between interest rates for domestic and foreign currency loans remained very small throughout most of the sample period, which can be ascribed to the low level of households' foreign currency indebtedness. By contrast, Croatia, Latvia, Estonia, Hungary and Lithuania recorded high shares of foreign currency loans in total loans to households in 2009. In Croatia, the share of loans denominated in, or indexed to, a foreign currency was high throughout the sample period, as indexation of deposits and loans became widespread in the wake of the hyperinflation period of the early 1990s. In addition, households received sizeable income from tourism, which is often denominated in foreign currency and provides some natural hedge. The share of loans denominated in, or indexed to, a foreign currency decreased slightly over the review period, but is still very elevated. In the remaining countries, foreign currency lending to households increased to different degrees. It is noteworthy that the popularity of foreign currency loans to households in Hungary rose considerably only after the conditions for housing loan subsidies had tightened and the extent of the subsidy had been linked to the reference treasury bond yield in 2003-04. When people had to pay higher interest for housing loans denominated in domestic currency than for foreign currency loans, the latter became more attractive (OECD, 2010). Slovenia experienced a sudden jump in foreign currency lending to households (from 4% in 2004 to 43% in 2006) in the run-up to the euro introduction in 2007 (Banka Slovenije, 2006), while in Slovakia, the respective rise before the adoption of the single currency in 2009 was also notable but less pronounced.

Chart 3

### Recent Trends in the Relative Share of Foreign Currency Loans to CESEE-11 Households

Annual change in percentage points, exchange-rate adjusted



Source: National central banks, OeNB.

Note: Annual change in percentage points refers to the share of foreign currency loans in total loans to households at constant exchange rates as of January 1, 2008, adjusted for changes in the exchange rate of the local currency against the euro or the Swiss franc. Due to a lack of detailed information, the data for Croatia on euro loans include all foreign currency loans, and the adjustment is made using the EUR/HRK exchange rate.

The most recent developments in foreign currency loans to households in the CESEE-11 are depicted in chart 3, which provides data on the year-on-year change in the share of foreign currency lending in total household loans. The exchange rate adjustment is particularly relevant for the most recent period, as the financial crisis led to substantial exchange rate swings in CESEE countries with flexible exchange rates. The chart shows that, in some countries, the share of foreign currency loans to households rose even after correction for exchange rate changes, while it declined in others (in Slovakia mostly due to the euro introduction).

In the CESEE-11 region as a whole, the rise in the share of foreign currency loans in the household sector has moderated considerably and growth has declined during the course of the financial crisis, but it has not fully leveled off. Beckmann and Stix (2010) present additional results based on survey data, which show that the number of households planning to take out foreign currency loans declined during the crisis, but most recently seems to be rising again in some countries (e.g. Croatia and Romania). Thus, foreign currency lending to households remains a key feature of financial intermediation in the CESEE-11 region.

### 3 Derivation of the Econometric Model and Empirical Specification

#### 3.1 Supply- and Demand-Side Determinants of Foreign Currency Lending

The aim of this section is to simultaneously identify the relationship between supply- and demand-side factors and foreign currency loan developments in the CESEE-11. In order to formulate the estimation equation, it is necessary to recapitulate the mechanisms underlying the supply of, and demand for, foreign currency loans to households based on the literature on credit growth and currency substitution.

On the supply side, we have to consider how banks finance their foreign currency loan business. In early transition, banks basically financed loans with domestic deposits (Weller, 2000). Therefore, the empirical analysis of this paper tests whether there is a positive relationship between foreign currency deposits and loans.

Since the early 2000s, external funding sources have become increasingly important for financing rapid credit growth in many CESEE-11, as local currency funding in terms of domestic currency savings was insufficient (Walko, 2008; Lahnsteiner, 2010). Therefore, the margin between interbank rates and lending rates can be assumed to be an alternative and important supply-side factor determining the currency denomination of loans. When interbank rates abroad are lower than the costs of refinancing in the domestic interbank market, banks in transition economies have an incentive to seek financing abroad and to grant foreign currency loans to their customers, as they have to keep their net open foreign currency positions below a certain limit (Basso, Calvo-Gonzales and Jurgilas, 2007). However, when interest margins on domestic currency loans are higher than those on foreign currency loans, this is assumed to serve as a disincentive to foreign currency lending to households.

The role of ownership in refinancing (domestic versus foreign and private versus state ownership) must be considered as well, given that different types of ownership may matter for banks' access to funding from abroad. Foreign banks' subsidiaries, for instance, can turn to their parent banks for funding. Bakker and Gulde (2010) find that foreign banks accounted for a substantial share of the

growth in foreign currency lending to households. Residential deposits were not sufficient for funding domestic currency loans. During the financial crisis, parent banks continued to support their subsidiaries, and parent bank funding was even more stable than wholesale refinancing (Lahnsteiner, 2010). In addition, parent banks promote a more diversified range of lending products, because they have more experience and know-how in risk management compared to domestic banks (De Haas and Naaborg, 2006).

In most CESEE-11 countries, the banking sector is dominated by foreign ownership. The rising numbers of foreign entrants and financial sector consolidation have further fostered competition and, at the same time, have increased concentration in the banking market due to mergers and acquisitions among parent banks (e.g. the takeover of Bank Austria by the Italian UniCredit Group; Drakos, 2003). Therefore, banking concentration might be positively related to currency substitution of loans, too. In addition to these explanatory factors, increasing quality in banking sector regulation and banking sector reforms, and thus regulatory restrictions on foreign currency loan markets, might dampen foreign currency lending.

On the demand side, income or consumption should enter empirical testing, following Brown, Kirschenmann and Ongena (2009). For example, Calvo and Vegh (1999) find that strong increases in consumption are related to credit booms. A positive relationship can be assumed, as increasing consumption and expectations of rising future income might imply that households are very optimistic about future developments in general. In turn, households might underestimate the risks of unfavorable exchange rate movements and thus of foreign currency borrowing.

As highlighted in section 2, foreign currency loans were mainly used for house purchases and consumption. The findings of Égert, Backé and Zumer (2006) further show a robust positive correlation of large increases in housing prices with total private loans. Therefore, rising housing prices may add to a rise in foreign currency borrowing by households and will be tested as an additional variable of interest.

In addition to factors that are explicitly related to the supply of, or demand for, foreign currency loans to households, several variables are supposed to be related to both supply and demand, such as the interest rate. Households will be induced to take out a loan denominated in foreign currency as long as interest rates on such loans are below the price of domestic currency loans.<sup>6</sup> In transition economies, interest rates on domestic currency loans tend to be higher than those on foreign currency loans, which can be attributed to higher key interest rates compared to mature economies, also reflecting expectations of macroeconomic volatility. The theory of supply suggests that a higher price (interest rate) on domestic currency loans should serve as an incentive for banks to lend in domestic currency. But a positive relationship might indicate that banks are inclined to promote the new “cheaper” product in order to gain market share, despite possible risks that borrowers might default. Basso, Calvo-Gonzalez and Jurgilas (2007) present first evidence on supply and demand factors driving up the share of foreign currency

<sup>6</sup> In general, compared with domestic currency loans, higher additional fees are charged on foreign currency loans, thus adding to the cost of such loans. As no specific data are available on these administrative fees charged by banks in the CESEE-11, the analysis in this paper sticks to interest rates only.

lending in total private loans in 24 CESEE countries from 2000 to 2006. Their estimations show that the interest differential is an important explanatory variable.

The exchange rate regime and the exchange rate itself are important factors that work both on the supply and the demand side. As the loan has to be repaid in foreign currency, the borrower bears the exchange rate risk. Therefore, borrowers who are sufficiently risk-averse and do not have any income in foreign currency should be less inclined to take out a foreign currency loan, if the domestic currency depreciates or is very volatile (ECB, 2006).<sup>7</sup> On the supply side, banks which can be assumed to be risk-averse might also be less willing to lend in foreign currency, as the default risk of borrowers will increase if they are not hedged against exchange rate changes. As concerns differences in exchange rate regimes, one may expect that in the presence of credible fixed exchange rate regimes, the supply of, and demand for, foreign currency loans will increase; the empirical literature on this issue is not clear-cut, however. Anticipation of a future accession to the euro area might also play an important role in the decision of CESEE-11 households to take out euro loans.

High and rising inflation is related to uncertainty about the ability of borrowers to repay their loans. Domestic inflation is therefore expected to be negatively related to borrowing denominated in domestic currency (Eller, Frömmel and Srzentic, 2010). But it can be expected to be positively related to foreign currency loans to households in the CESEE-11, because these loans can be seen as more stable products concerning the price than domestic currency loans.

It should be noted that the determinants set out in this subsection often relate to some “deeper” underlying factors. For example, the interest rate differential between domestic and foreign currency loans is linked to expected macroeconomic volatility, exchange rate depreciation and, possibly, a low level of domestic currency savings, and thus to the availability of local currency funding.<sup>8</sup>

### 3.2 Specification of the Econometric Model

In general, supply and demand have to be viewed in a simultaneous equations context, because the observed volumes and interest rates of foreign currency loans are determined by the equilibrium condition that supply equals demand. The two structural equations can be written in the following way: quantity (the share of foreign currency loans in total loans to households) as a function of price (lending interest rate on domestic currency loans minus that on foreign currency loans), additional exogenous regressors related to supply and demand, and disturbance terms. The joint determination of quantity and price and the associated endogeneity call for identification of the simultaneous equations system.

<sup>7</sup> *If the nominal exchange rate remained stable, an appreciation of the real effective exchange rate could induce an increase in the repayment amount. Besides the mere development of nominal and real exchange rates, the volatility of exchange rate movements could also be of importance. Basso, Calvo-Gonzales and Jurgilas (2007) analyze the relationship of the relative volatility of real exchange rates, inflation and foreign currency lending to the private sector in CESEE. I decided to use the nominal exchange rate, assuming that households take economic decisions primarily based on nominal figures.*

<sup>8</sup> *I am grateful to one of the two anonymous referees for bringing up this point.*

The reduced-form specification estimating the determinants of foreign currency lending to households derived from such a system of simultaneous equations<sup>9</sup> is:

$$\begin{aligned} \ln(\text{fx-loans})_{it} = & \beta_{0,it} + \beta_1 \ln(\text{fx-depos})_{it} + \beta_2 \ln(\text{i-margin})_{it} + \beta_3 \ln(\text{consum})_{it} + \\ & + \beta_4 \ln(\text{i-diff})_{i(t-1)} + \beta_5 \ln(\text{exr})_{it} + X_{it} + \mu_i + \tau_t + \omega_{it} \end{aligned} \quad (1)$$

where  $i=1, \dots, N$  is the country index and  $t=1, \dots, T$  the time index,  $\beta$  represents the parameters,  $\mu_i$  are country-fixed effects,  $\tau_t$  is a deterministic linear trend and  $\omega_{it}$  is the disturbance term. In line with Luca and Petrova (2008), the dependent variable is specified as the share of foreign currency loans in total household loans (*fx-loans*). On the supply side, the share of foreign currency deposits in total household deposits (*fx-depos*) and the difference between the interest margins on domestic and foreign currency loans (*i-margin*) enter the equation specification, while private domestic consumption to GDP (*consum*)<sup>10</sup> is related to the demand side. The price, proxied by the differential between interest rates for domestic and foreign currency loans (*i-diff*) enters the reduced-form specification with a lag, following Basso, Calvo-Gonzales and Jurgilas (2007), to avoid problems of endogeneity because price and quantity are jointly determined in specifications considering supply and demand. Besides *i-diff*, also the exchange rate (*exr*) is related to both supply and demand. These five explanatory variables are tested as basic determinants of foreign currency lending to households given the discussion in section 3.1, and therefore enter each estimation equation. The variables enter the equations in logarithmic form to account for potentially nonlinear relationships in the data, such as between *i-diff* and *fx-loans*. Table 1 summarizes the variables and expected signs of the reduced-form estimations, which are based on the relationships identified in section 3.1.

The following variables of interest ( $X$ ) also enter the equation: a dummy controlling for a surge in foreign currency loans in Hungary and Slovenia (*dummy\_HU,SI*), foreign ownership in banking (*fsfdi*), a proxy for banking sector concentration based on the total assets of the three largest banks as a share of the total assets of all commercial banks (*bconcentration*), an index for banking sector reform (*banking-reform*), a housing price index (*housing*), a dummy for EU membership (*dummy\_EU*) to proxy expectations of future euro area accession, and inflation (*infl*). Table 2 presents descriptive statistics on the variables employed in the subsequent estimations (the number of observations refers to annual data from 1996 to 2007 for a total of eleven countries).

In view of the short time series available for the CESEE-11, and given that this analysis aims at detecting common supply- and demand-side factors despite cross-

<sup>9</sup> More details on the simultaneous equations system and related estimation specifications and techniques can be found in Steiner (2009).

<sup>10</sup> Besides consumption, I tested households' disposable income and their expected income (proxied by the concept of adaptive expectations) as alternative explanatory variables. The results further support a positive relationship between higher expected income and foreign currency borrowing by households (see Steiner, 2009, for details).

Table 1

### Identification and Expected Signs of the Reduced-Form Parameters

| Expected sign / variable | Definition   | Related to supply or demand | Source                              |
|--------------------------|--|-----------------------------|-------------------------------------|
| fx-loans                 | Share of foreign currency loans in total household loans   |                             | National central banks              |
| fx-depos                 | Share of foreign currency deposits in total household deposits   | S                           | National central banks              |
| i-margin                 | Interest margin between domestic and foreign currency loans ( $i\text{-margin} = m_{dc} - m_{fx}$ with $m_{dc} = i_{dc} - ibr_{dc}$ , $m_{fx} = i_{fx} - ibr_{EUR}$ and $ibr$ referring to the 3-month interbank rate) | S                           | National central banks              |
| consum                   | Private domestic consumption as a share of GDP   | D                           | AMECO and IMF                       |
| i-diff                   | Interest rate differential between domestic and foreign currency loans ( $i_{dc} - i_{fx}$ )   | S&D                         | National central banks              |
| exr                      | Average nominal exchange rate (units of national currency per EUR)   | S&D                         | IMF                                 |
| dummy_HU,SI              | Dummy with a value of 1 controlling for the strong increase in <i>fx-loans</i> over 2005–2007 in HU and SI   | S&D                         | Author's compilation                |
| fsfdi                    | Financial sector FDI as a share of GDP   | S                           | EBRD                                |
| bconcentration           | Share of the three largest banks in total bank assets  | S                           | Beck et al. (2000), updated dataset |
| bankingreform            | Index of banking sector reform   | S                           | EBRD                                |
| housing                  | Index of housing prices (1995=100)   | D                           | Euromonitor                         |
| dummy_EU                 | Dummy with a value of 1 after EU accession and 0 otherwise   | S&D                         | Author's compilation                |
| infl                     | Annual change of the consumer price index  | S&D                         | IMF                                 |

Source: Author's compilation.

Table 2

### Descriptive Statistics

|                | Mean    | Median | Maximum | Minimum  | Standard deviation |
|----------------|---------|--------|---------|----------|--------------------|
| fx-loans       | 28.642  | 17.241 | 96.804  | 0.007    | 30.513             |
| fx-depos       | 35.916  | 28.981 | 98.166  | 3.484    | 24.584             |
| i-margin       | -5.846  | -1.861 | 15.634  | -149.646 | 16.809             |
| consum         | 60.433  | 58.929 | 75.894  | 47.769   | 6.351              |
| i-diff         | 1.535   | 1.525  | 30.37   | -20.214  | 5.395              |
| exr            | 51.511  | 7.406  | 264.26  | 0.088    | 85.726             |
| fsfdi          | 5.603   | 4.106  | 38.089  | 0.001    | 5.89               |
| bconcentration | 0.675   | 0.647  | 1       | 0.38     | 0.152              |
| bankingreform  | 3.348   | 3.33   | 4       | 2        | 0.454              |
| housing        | 873.727 | 209    | 7.458   | 100      | 1,737.283          |
| infl           | 8.542   | 5.65   | 59.1    | -1.18    | 10.147             |

Source: Author's calculations.

Note: Based on 132 observations.

country differences in foreign currency lending to households over time, panel data analysis is applied. The feasible general least squares (FGLS) estimator with country-fixed effects and contemporaneous covariances (cross-section SUR) is used to estimate the reduced-form parameters of supply and demand simultane-

ously, as it shows the best fit.<sup>11</sup> This estimator should be applied if the residuals are both cross-sectional heteroscedastic and contemporaneously correlated. Basso, Calvo-Gonzales and Jurgilas (2007) also apply the FGLS estimator with panel heteroscedasticity and panel-specific autocorrelation in their estimations of the determinants of developments in foreign currency lending to households and firms in the CESEE-11. Country-fixed effects are included because there are persistent cross-country differences in the development of foreign currency loan markets. This should, for instance, account for differences in the households' perception of the risk inherent in such loans on the demand side or for differences in banks' marketing strategies on the supply side. These factors are difficult, or rather impossible, to measure, they remain persistent over time and vary across countries. Fixed country effects can account for these differences. In order to control for a trending behavior of the examined series, a deterministic linear trend ( $\tau_t$ ) is included in the regression specifications.<sup>12</sup>

#### 4 Empirical Results

Table 3 shows the results of the relationship between supply- and demand-side factors and developments in foreign currency lending in the CESEE-11 in the period from 1996 to 2007 (i.e. before the crisis). Column 1 presents the baseline regression, and columns 2 to 7 show the results of level estimations using the explanatory factors identified in section 3. In addition, several robustness checks were conducted, which show that the results are sensitive to the chosen empirical proxy for specific variables. Instances when the use of different proxies produced different results are discussed in the following.

On the supply side, the results do not show a robust impact of the share of foreign currency deposits (*fx-depos*), and its coefficients are rather small. When controlling for a sudden and strong increase in foreign currency lending in Hungary and Slovenia in 2005 (using a shift dummy with a value of 1 in these two countries in 2005–07, denoted by *dummy\_HU,SI*), the effect of the dummy remains relatively small compared to the other coefficients, and *fx-depos* shows mostly the expected positive sign. However, there are also specifications where *fx-depos* has a significant negative impact. This can be explained by the steady decrease of foreign currency deposits as a percentage of total household deposits over time (while at the same time, external sources of financing have become more important, see also section 3). When conducting experiments with a broader foreign currency deposit base that includes not only household deposits but also firm deposits to get a closer measure of foreign currency funds available for the bank to feed foreign currency lending, the results remain qualitatively unchanged.

<sup>11</sup> The application of the ordinary least squares (OLS) estimator, both with cross-country fixed effects and robust variance specification, did not produce efficient results, as there are signs of autocorrelated and heteroscedastic residuals. In addition, the OLS estimation did not really deliver robust results, as the sign and significance of the estimated coefficients changed from one specification to the other. Therefore, another option of dealing with nonsphericalness of the disturbances is applied: the FGLS estimator, as described above.

<sup>12</sup> In light of the comparatively high  $R^2$  in all regressions, tests for cointegration or the existence of unit roots were conducted for all variables. As there was no clear evidence of cointegration and unit roots, a model specified in levels including the linear deterministic trend is estimated.

Table 3

**Reduced-Form Estimations for the CESEE-11, 1996–2007**

| Explanatory variables             | Dependent variable: $\ln(\text{fx-loans})_{it}$ |                          |                              |                          |                          |                          |                          |
|-----------------------------------|---|--------------------------|------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|                                   | Baseline  | $\ln(\text{fsfdi})$      | $\ln(\text{bconcentration})$ | bankingreform            | $\ln(\text{housing})$    | dummy_EU                 | infl                     |
| Constant                          | -32.282<br>(-18.643) ***                        | -36.537<br>(-27.858) *** | -36.575<br>(-44.659) ***     | -28.467<br>(-12.996) *** | -32.772<br>(-19.832) *** | -28.813<br>(-98.867) *** | -33.394<br>(-17.431) *** |
| $\ln(\text{fx-depos})_{it}$       | 0.001<br>(-0.0157)                              | -0.095<br>(-1.702) *     | 0.068<br>(1.788) **          | 0.106<br>(-11.989)       | 0.0138<br>(0.173)        | -0.792<br>(-29.740) ***  | -0.018<br>(-0.261)       |
| $\ln(i\text{-margin})_{it}$       | -0.251<br>(-10.930) ***                         | -0.300<br>(-15.179) ***  | -0.285<br>(-31.658) ***      | -0.215<br>(-7.431) ***   | -0.262<br>(-11.179) ***  | -0.371<br>(-67.915) ***  | -0.275<br>(-13.003) ***  |
| $\ln(\text{consum})_{it}$         | 7.792<br>(19.746) ***                           | 9.054<br>(27.745) ***    | 8.836<br>(49.195) ***        | 7.306<br>(13.994) ***    | 7.688<br>(20.153) ***    | 7.335<br>(100.069) ***   | 8.386<br>(18.980) ***    |
| $\ln(i\text{-diff})_{i(t-1)}$     | 0.327<br>(7.328) ***                            | 0.230<br>(6.478) ***     | 0.320<br>(13.362) ***        | 0.129<br>(1.870) *       | 0.340<br>(7.394) ***     | 0.586<br>(70.821) ***    | 0.359<br>(11.039) ***    |
| $\ln(\text{exr})_{it}$            | -0.423<br>(4.184) ***                           | 0.174<br>(2.007) **      | 0.486<br>(4.940) ***         | 0.426<br>(4.893) ***     | 0.082<br>(0.601)         | 0.824<br>(23.059) ***    | 0.039<br>(0.353)         |
| dummy_HU,SI <sub>it</sub>         | 2.959<br>(12.468) ***                           | 3.312<br>(14.067) ***    | 2.941<br>(17.648) ***        | 2.814<br>(9.965) ***     | 3.053<br>(12.485) ***    |                          | 2.939<br>(11.377) ***    |
| trend <sub>it</sub>               | 0.180<br>(34.565) ***                           | 0.130<br>(22.028) ***    | 0.180<br>(36.700) ***        | 0.248<br>(28.000) ***    | 0.156<br>(19.778) ***    | 0.193<br>(70.780) ***    | 0.159<br>(32.477) ***    |
| $\ln(\text{fsfdi})_{it}$          |   | 0.241<br>(6.559) ***     |                              |                          |                          |                          |                          |
| $\ln(\text{bconcentration})_{it}$ |   |                          | 0.910<br>(18.568) ***        |                          |                          |                          |                          |
| bankingreform <sub>it</sub>       |   |                          |                              | -0.768<br>(-11.703) ***  |                          |                          |                          |
| $\ln(\text{housing})_{it}$        |   |                          |                              |                          | 0.317<br>(3.216) ***     |                          |                          |
| dummy_EU <sub>it</sub>            |   |                          |                              |                          |                          | 0.113<br>(16.050) ***    |                          |
| infl <sub>it</sub>                |   |                          |                              |                          |                          |                          | -0.026<br>(-8.701) ***   |
| Number of observations            | 132   | 132                      | 132                          | 132                      | 132                      | 132                      | 132                      |
| Adjusted R <sup>2</sup>           | 0.989   | 0.994                    | 0.996                        | 0.987                    | 0.989                    | 0.998                    | 0.990                    |
| F-Value                           | 705.533 ***                                     | 1,232.708 ***            | 1,918.286 ***                | 532.802 ***              | 641.582 ***              | 5,133.387 ***            | 760.073 ***              |

Source: Author's calculations.

Note: Static variable-intercept panel data model. FGLS (cross-section SUR) with country-fixed effects including a linear trend. t-statistics are in parentheses. Asterisks indicate the significance of the coefficients at the 10% (\*), 5%(\*\*) and 1%(\*\*\*) levels. The Hausman test on fixed effects confirms the reported estimation results at the 5% level. The Jarque-Bera test confirms normal distribution of the residuals. The time span ranges from 1996 to 2007.

When interest margins on domestic loans are higher than those on foreign currency loans (*i-margin*), banks have an incentive to strengthen their business in domestic currency. For instance, an increase in *i-margin* by 1% leads to a decline by 0.25% in the share of foreign currency loans to total loans to households (*fx-loans*) in the baseline regression. In addition, different proxy variables are tested: the difference between the interest spread on domestic and foreign currency loans (with the spread referring to the lending rate minus the deposit rate). One would expect banks to increase domestic lending with higher interest spreads in the domestic currency business. The results show the expected negative sign for higher interest spreads on loans denominated in foreign currency.

The results of the positive relationship between foreign ownership in banking (*fsfdi*) and foreign currency lending to households depend on the proxy used for foreign ownership. Using the share of foreign-owned assets in total banking assets as an alternative proxy produces results that are not significant and even have a negative sign.

The analysis results also provide further evidence that rising concentration in banking (*bconcentration*) leads to more foreign currency lending to households. Regulatory restrictions might cause the negative relationship between the index of banking sector reform (*bankingreform*) and the share of foreign currency loans in total lending to households. Constructing a more detailed indicator of regulatory measures targeting foreign currency loans would help gain further insights into the relationship.<sup>13</sup>

On the demand side, the coefficient of consumption per GDP (*consum*) contributes the most to explaining developments in foreign currency lending to households in the CESEE-11 (see table 3). An increase in this coefficient by 1% leads to a rise by 7% in the share of foreign currency loans to total loans to households (*fx-loans*) in the baseline regression. Housing prices (*housing*) are considered as an additional variable of interest. The estimated coefficient shows the expected positive relationship.

The following results were obtained for factors related to both supply and demand: The differential between interest rates for domestic and foreign currency loans (*i-diff*) with a lag of one year enters the equation with a positive sign, which is supportive of the demand-side view, i.e. when interest rates on foreign currency loans are lower than those on domestic currency loans, foreign currency borrowing becomes more attractive to households. Moreover, from the supply-side point of view, the positive sign of the parameter suggests that banks also aim at maximizing their market share in transition economies and therefore promote the seemingly “cheaper” loan product.

In the baseline regression, an exchange rate depreciation is negatively related to the share of foreign currency lending in total lending to households. The estimated positive relationship between the exchange rate variable (*exr*)<sup>14</sup> and the share of foreign currency lending in other estimation specifications is, at first glance, counterintuitive. While this might indicate a mere mathematical effect, as the calculation of the foreign currency loan share is based on nominal values, the currency depreciation observed in some countries during the first two-thirds of the sample period and slowly growing foreign currency loan shares might offset

<sup>13</sup> The empirical research presented in this paper uses a panel data setting, which would not allow drawing country-specific conclusions about the effectiveness of these measures. In addition, the direction of causality is important and would call for the inclusion of lags, which would limit the degrees of freedom. An index with only little variation over time would be correlated with the country-fixed effects applied in the estimations. For these reasons, detailed future research on the effectiveness of regulatory measures at the country level using data with higher frequency over time would be warranted.

<sup>14</sup> As an alternative specification, I introduced an exchange rate regime dummy to control for periods of fixed exchange rate regimes. This dummy has a value of 1 in periods of fixed exchange rate regimes and 0 otherwise (following Markiewicz, 2006, and Mooslechner, 2008). However, the results are subject to the classification of de-jure versus de-facto exchange rate regimes. In addition, the dummy variable is correlated with the country-fixed effects included in the estimation specification, as there is only little variation in the dummy variable over time for some countries (e.g. Estonia and Latvia). Therefore, the impact of exchange rates is estimated only by using the average nominal exchange rate.

the negative impact of appreciation on foreign currency borrowing in the last years of the sample period, and thus result in the estimated positive relationship.

The impact of EU membership (*dummy\_EU*)<sup>15</sup> on foreign currency lending is positive and significant. Inflation (*infl*) turns out to be negatively related to foreign currency lending to households, but the reduced-form parameter is very small. The trend included in all estimation specifications is positive and significant.

To sum up, the development of foreign currency lending to households can be traced back to a mixture of demand and supply factors, highlighting the necessity that regulation addresses both sides. Important factors on the demand side are private consumption and housing prices, while on the supply side, it is the difference between the interest margins on domestic and foreign currency loans, the progress in banking sector reform as well as banking sector concentration. The interest rate differential, the years of EU membership and inflation turned out to be significant factors covering both demand- and supply-side aspects, whereas the results for the foreign currency deposit base, foreign ownership in banking and the exchange rate are not that robust.

## 5 Measures Taken to Contain Currency Substitution of Loans in the CESEE-11

Foreign currency borrowing can endanger financial stability, especially if it is concentrated in particular loan market segments (e.g. households), and if borrowers are not hedged, which is largely the case for households in the CESEE-11 (but also other countries where foreign currency lending to households has been observed). As laid out in section 2, the accumulation of large stocks of foreign currency loans in many CESEE-11 countries had begun well before the financial crisis. The policy response to this development has not been uniform in the region. Some countries took regulatory and supervisory measures to limit the excessive exposure to this type of loan already in the 1990s, while others were more reluctant to do so. At the current juncture, the challenge is to ensure the implementation of a regulatory framework that will prevent excessive borrowing in foreign currency by unhedged households in the future, in particular once the CESEE-11 economies take off and credit demand revives after the crisis. Policy options range from monetary policy to administrative measures and should address both supply and demand in order to be effective.

On the supply side, key prudential measures can either target credit growth in general or foreign currency lending in particular. The toolkit in this area includes (1) tightening the requirements on foreign currency liquidity and on capital adequacy, (2) using higher risk weights according to the currency denomination of loans, and (3) tightening the rules on loan concentration. Prudential measures directly targeting the supply of foreign currency loans have been implemented in several CESEE-11 before (or during) the crisis, in particular in Croatia, but also Poland, Romania and Bulgaria. Hungary also followed suit, but only more recently. The debate on further steps in this area is still on in several countries. Plans to ban foreign currency lending to unhedged borrowers and raise risk weighting on foreign currency mortgages from 75% to 100% are being discussed in Poland to

<sup>15</sup> To proxy also expectations of a future euro area accession, *dummy\_HU,SI* also controls for expectations of euro adoption in Slovenia in 2007 and shows a positive sign.

limit risks stemming from both housing loans and foreign currency loans (IMF, 2010). Croatia, which had implemented a wide range of policy measures targeting foreign currency loans, opted for a relaxation of minimum reserve requirements and the easing of foreign currency liquidity regulations (to alleviate the government's financing needs), thus facilitating banks' access to foreign funding when the financial crisis struck (Gardò, 2010). While these measures targeted the public sector's borrowing needs, they might also have had an effect on foreign currency lending to households.

Supervisory measures included improving reporting and disclosure rules, conducting periodic stress tests of banks' balance sheets, strengthening off- and on-site inspections, and establishing an increased dialogue with home supervisors of foreign banks. In the CESEE-11, banking supervision has improved substantially since the beginning of the 1990s, which also contributed to strengthening trust in the local banking markets. Still, continued stress testing and monitoring of banks' capabilities and practices in the field of credit risk assessment remain key priorities for supervisors – particularly in the case of banks with substantial foreign currency lending. Other important measures are making headway toward higher transparency and more detailed disclosure of banking data, especially sectoral data on currency denomination or indexation as well as information about potential discrepancies between loan classification and the ultimate use of these loans (see Walko, 2008). Periodic surveys of banks' and borrowers' foreign exchange exposure can also be helpful to ensure that foreign currency lending to households remains under control and to identify indirect exchange rate risks for banks (e.g. Stix, 2008). Measures aimed at promoting a better understanding of risks, such as training of bank staff or moral suasion, can also have an effect on the supply of foreign currency loans. In addition, the establishment and increasing efficiency of credit registers can help dampen excessive foreign currency lending by improving market discipline and providing adequate reporting information to the supervisory bodies.

Majority foreign ownership in banking can make it more difficult to effectively implement prudential and supervisory measures targeting foreign currency lending. For example, local subsidiaries may shift part of their loan portfolio to the parent bank as a reaction to measures which try to limit the volume of foreign currency lending (this happened e.g. in Bulgaria and Romania in the mid-2000s). Parent bank supervisors should also help contain foreign currency lending by subsidiaries. For example, the EBRD points out that the Swedish supervisory authorities insisted that Swedish banks' subsidiaries abroad (in particular in the Baltic countries) tighten their lending standards in 2007 (EBRD, 2008). However, with hindsight, this case can also be seen as an instructive example of belated action, given that the foreign currency lending boom had already started years earlier in the Baltic countries and that it had gone very far by 2007, also compared to other CESEE countries. In January 2009, the “Vienna Initiative Plus” was established to strengthen cooperation and cross-border coordination of regulation and supervision in order to meet financial and economic challenges in CESEE (Nitsche, 2010).

The empirical estimations in section 4 also revealed the importance of demand. Public awareness campaigns, particularly among households, and other tools to warn borrowers of the risks entailed in foreign currency loans should promote a

better understanding of these risks and thus dampen excessive demand for such loans. Above all Romania and Poland took decisive measures in this field. The OECD most recently recommended promoting financial literacy programs for all age groups and especially for vulnerable groups, such as the elderly and the less educated (OECD, 2010). In addition, increased transparency of loan contracts is key to enhancing borrowers' understanding of the costs and risks involved. For example, in Hungary, a code of conduct was signed in 2009 to limit instances where banks can transfer increased loan costs to households (OECD, 2010). Poland introduced "Recommendation S" in 2006, which aimed at improving the banks' practices concerning credit exposure. Banks had to provide customers with sufficient and better information to raise awareness of the risks associated with foreign currency lending.

Besides these soft policy tools, also fiscal measures (such as abolishing or reducing existing incentives for foreign currency loans) can dampen demand for such financial products. Prudential measures that directly target demand include explicitly linking loan-to-value and payment-to-income ratios to foreign currency borrowing by households. Poland imposed an obligation on banks to require higher creditworthiness of customers applying for foreign currency housing loans than of those applying for zloty loans of an equivalent amount. As a result, banks offer their customers lower amounts of loans in foreign currencies than in zloty, so that the customers have a "buffer" in case of zloty depreciation and increased principal and interest installments. Hungary introduced different loan-to-value ratios and payment-to-income ratios according to currency denomination (forint, euro or other foreign currency) for household loans in 2010.

In addition to these instruments that directly target demand, several supply-related measures have an indirect impact on demand and vice versa. For example, market and financial institutional development in a credible macroeconomic environment are important instruments to strengthen the options banks have in terms of domestic refinancing and hedging, and to increase households' trust in the domestic banking system. The EBRD indicates that these measures are important for expanding the sources of domestic funding available and making it easier to price domestic currency loans at longer maturities (EBRD, 2009). Indeed, developing local currency capital markets would be an important measure for medium-sized CESEE countries with floating exchange rate regimes that do not intend to adopt the euro in the near future. The cost-benefit equation, however, appears to be less obvious for very small CESEE EU Member States with hard pegs.

Administrative measures, such as direct credit controls or limits on the availability of this type of loan for households, also impact both supply and demand. Such measures were temporarily implemented e.g. in Croatia in 2003 and in Romania from 2005 to 2006. More recently, in August 2010, mortgage-backed foreign currency lending was banned altogether in Hungary. Before that, in the last quarter of 2008, leading Hungarian commercial banks had made a voluntary commitment to reduce or stop lending in foreign currencies other than the euro. In the first half of 2010, currency-specific limits on loan-to-value and payment-to-income ratios had been introduced. However, EU membership and, in particular, participation in the internal market might limit the use of such administrative measures.

Monetary policy can use interest rate and exchange rate policies to impact foreign currency loan markets and address the related risks. Both the interest rate and the exchange rate are significant demand- and supply-side variables and thus have an impact on both. If, however, currency substitution of loans (and deposits) is already at a high level, the effects monetary policy can achieve are limited, as it can only impact the domestic interest rate, and foreign funding may be available at low rates in open capital account regimes (Brzoza-Brzezina, Chmielewski and Niedźwiedzińska, 2010). As concerns exchange rate policy, increased exchange rate flexibility and, with it, volatility might increase direct exchange rate risk and thus the risk of default of foreign currency debtors who are not hedged against the exchange rate risk (Backé, Ritzberger-Grünwald and Stix, 2007).

Besides Croatia and Poland, Romania is another country where the combined impact of prudential, supervisory and administrative measures targeting supply and demand helped to dampen foreign currency lending at least temporarily (namely in 2006). In Romania, monthly debt service payments were not allowed to exceed 40% of the borrower's net monthly income. The exposure of a credit institution to foreign currency loans granted to natural and legal persons had to be below 300% of the bank's own funds or of the endowment capital of foreign branches of banks. These measures were combined with other measures, such as raising reserve requirements for liabilities denominated in foreign currency from 30% to 35% in the fourth quarter of 2005 and to 40% in 2006 (Standard and Poor's, 2008). Loan classification was refined, too. However, several of these measures were discontinued when Romania entered the EU in 2007.

Future research should empirically analyze the effectiveness of regulatory measures that target the supply of, and demand for, foreign currency loans to households at the country level. As laid out earlier, regulatory restrictions might be responsible for the negative relationship between the index of banking sector reform and foreign currency lending to households shown in table 3. However, the panel data setting presented in this paper does not allow drawing country-specific conclusions.

## 6 Summary and Conclusions

Foreign currency lending to households surged in many CESEE-11 countries during the last decade, which induced several international institutions, supervisory bodies and central banks (including the OeNB) to advise caution. The financial crisis revealed the risks involved in foreign currency borrowing by households, thus providing a window of opportunity to strengthen prudential regulation and supervision of this loan market segment.

This paper contributes to the empirical research by providing evidence at the macroeconomic level that developments of foreign currency lending to households in the CESEE-11 in the period 1996 to 2007 were driven by a variety of demand and supply factors. Important factors on the supply side are the difference between the interest margins (lending rate minus interbank interest rate) on domestic and foreign currency loans, the quality of banking sector regulation (and thus regulatory restrictions on foreign currency loan markets), and banking sector concentration. On the demand side, private consumption and housing prices are significantly related to foreign currency lending to households. Important factors for both supply and demand are the interest rate differential, EU membership, and infla-

tion. The results for the foreign currency deposit base, foreign ownership in banking and the exchange rate are not that robust.

In view of these results, it seems only logical that regulation and other policy measures should target both the supply and the demand side of foreign currency lending to households. This paper contributes to the literature by discussing these measures in detail and by explicitly referring to their impact on supply and demand. Before the financial crisis, some CESEE-11 countries had taken a range of measures to limit foreign currency lending to households, while other countries had been less active in this field.

Measures that primarily target demand include soft policy tools, such as awareness campaigns, but also prudential measures. Eligibility requirements for foreign currency loans, for example in terms of stricter loan-to-value and payment-to-income ratios depending on the loan denomination, were implemented and should prove particularly effective if applicable to both banks and nonbank financial intermediaries. In particular, Croatia, Poland and, more recently, Hungary have been active in this respect in view of the large foreign currency exposure of household loans. Bulgaria and Romania at least temporarily applied similar prudential measures. On the supply side, special emphasis was put on higher risk weights and capital adequacy rules related to foreign currency loans, as well as supervisory measures. Administrative measures targeting both supply and demand, such as bans on foreign currency lending to households, are more difficult to implement but were temporarily applied, too. Given the possible conflict of such measures with internal market rules, this was mostly before EU accession, though. Most recently, an increase in risk weighting on foreign currency mortgages has been discussed, for example in Poland. The EBRD has called for stricter regulation of foreign currency loans since 2009, a call that has received further support from the "Vienna Initiative Plus" (Nitsche, 2010). However, governments have to consider that overregulation can be counterproductive as long as macroeconomic stability is (still) a concern and local currency funding is not available (Zettelmeyer, Nagy and Jeffrey, 2010). In its most recent Transition Report, the EBRD (2010) calls for a deepening of local currency capital markets to foster domestic sources not only for corporate but also for bank financing.

Although growth of these loans has declined in the wake of the financial crisis, the remaining stock of foreign currency loans to households, and thus their exposure to vulnerabilities, remains large in some CESEE-11 countries. Therefore, it is important to put in place a framework that will promote new household borrowing in domestic currency or at least limit excessive exposure of unhedged borrowers. Measures should address the quantity and the quality of loans to correct existing vulnerabilities and avoid new ones. Other factors that will have an effect on future developments are the degree of openness of the capital account, the set of monetary instruments, the effectiveness of monetary transmission channels and regulatory implementation, fiscal incentives and regulatory loopholes. Given the variety of demand and supply factors that drive foreign currency lending to households, individual measures will not be enough to help keep such lending below reasonable limits. Rather, a mix of policy and regulatory measures is called for, and it should be put in place before the CESEE-11 economies take off again in terms of faster economic growth and financial sector development.

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# How the Crisis Affected Foreign Currency Borrowing in CESEE: Microeconomic Evidence and Policy Implications

*Micro data collected in the OeNB Euro Survey show that in the aftermath of the global economic and financial crisis, households have come to perceive foreign currency loans as riskier, above all in those Central, Eastern and Southeastern European (CESEE) countries that experienced depreciations during the crisis. Despite this perceived increase in risk, a majority of respondents in six out of nine countries still regard loans in euro as more attractive than loans in domestic currency. Data about the motives indicate that both supply and demand factors drive foreign currency loans. The mutual interest of banks and households and the still high attractiveness of foreign currency loans suggest that foreign currency borrowing is unlikely to vanish without policy intervention. If foreign currency borrowing were to be curbed in the short run, the only option for policymakers would be the implementation of regulatory and supervisory measures.*

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*JEL classification: D14, G01, G18, G21*

*Keywords: Foreign currency loan, financial crisis, survey data, behavior of households, Central, Eastern and Southeastern Europe*

## 1 Introduction

The implications of foreign currency lending in Central, Eastern and Southeastern Europe (CESEE) for macroeconomic and financial stability have been debated already prior to the global economic and financial crisis. After the crisis had hit the CESEE region, triggering exchange rate fluctuations and straining the financial situation of households, the issue of foreign currency lending has increasingly caught the attention of policymakers.

Foreign currency lending can increase financial vulnerability and the risk of systemic crises in several dimensions, e.g. by exposing indebted households to exchange rate risk and placing concentration risk on banks by exposing otherwise heterogeneous borrowers to the same risk factor. Moreover, foreign currency lending potentially constrains the effectiveness of monetary policy and complicates macroeconomic policy; in particular, it can limit the central bank's ability to influence output and inflation by forcing it to prioritize exchange rate stabilization (fear of floating).<sup>2</sup>

Appropriate economic policy responses to these challenges crucially depend on knowledge about (1) the sources of thriving foreign currency borrowing and (2) the impact of the crisis on the demand for foreign currency loans. Although the literature on the causes and consequences of foreign currency lending is growing, many questions remain unanswered, in particular in connection with the recent crisis. Against this background, we present new evidence on the various dimen-

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<sup>2</sup> Fernández-Arias et al. (2006) and Levy-Yeyati (2006) provide an analytic survey of the macroeconomic and financial stability concerns associated with financial dollarization. Bracke et al. (2007) and Pann et al. (2010) discuss the various risks to financial stability with a special focus on CESEE countries.

sions of foreign currency borrowing by households in CESEE. We employ data from the OeNB Euro Survey, an OeNB-commissioned survey which has been conducted semiannually among households in nine CESEE countries since 2007.

The OeNB Euro Survey complements aggregate statistics in at least three dimensions: First, the Euro Survey results allow us to move the level of analysis from macroeconomic data to responses directly obtained from households. Therefore, we can inquire into the motivations of households to take out a foreign currency loan and analyze sentiments, like the subjective assessments of the attractiveness of foreign currency loans. Furthermore, the responses provide information about both actual loans and plans to take out a loan. Second, as the survey started before the crisis and has been repeated six times, it allows drawing some conclusions about how the crisis has affected the behavior of households. Third, the survey covers almost all CESEE countries – four EU Member States (Bulgaria, Hungary, Poland and Romania) as well as five EU candidate and potential candidate countries (Albania, Bosnia and Herzegovina, Croatia, the FYR Macedonia and Serbia) – and hence allows country comparisons based on harmonized data.

Employing this data source, we aim to answer the following questions: (1) How have foreign currency loans and plans to take out such loans evolved over time? What are the characteristics of foreign currency loans? (2) What are the driving forces behind foreign currency loans? Is foreign currency lending mainly demand or mainly supply driven? (3) Has the crisis affected the behavior of households with respect to foreign currency borrowing?

In answering the first question, we can refer to survey evidence available from the period before and after the crisis. Concerning the second question, we analyze answers from households about their motivations when taking out a foreign currency loan. Evidence on the third question is essential for assessing the likely future development of foreign currency lending. Has demand for foreign currency loans declined permanently? Or will foreign currency loans continue to be a policy issue?

We do not provide a comprehensive literature review here but refer the reader to Steiner (2011) in this publication and, e.g., Zettelmeyer et al. (2010). Our paper complements results from the literature established on the basis of cross-sectional and/or time series data (e.g. Basso et al., 2007; Luca and Petrova, 2008; Rosenberg and Tirpak, 2009). It adds to the growing literature on foreign currency borrowing which uses micro data: While Brown et al. (2009) focus on firms' borrowing behavior, Pellényi and Bilek (2009) use household survey data from Hungary to analyze the determinants of foreign currency borrowing. We extend the evidence to households' foreign currency loans for nine CESEE countries. Our paper shares the same database with Fidrmuc et al. (2010), who provide an in-depth analysis of determinants of foreign currency loans to households in general. We complement their contribution by providing a first picture of how the financial crisis has affected foreign currency lending to households. We confirm that foreign currency loans are driven by supply and demand factors and provide significant evidence to underpin the ongoing policy discussion: Although the financial crisis increased households' perceived risk of foreign currency loans, households still regard foreign currency borrowing as highly attractive, which suggests that foreign currency borrowing is unlikely to vanish.

Our paper is structured as follows: The next section briefly introduces the OeNB Euro Survey and adds some methodological explanations. Section 3 presents some facts about household borrowing in CESEE. Section 4 addresses the question of whether supply or demand effects drive foreign currency lending by employing direct survey evidence on households' motives when taking out a foreign currency loan. Section 5 reviews whether the crisis has affected the borrowing behavior of households. The final section summarizes these findings and looks into their implications for economic policy.

## 2 Methodological Remarks

Our data are based on six surveys which have been conducted since fall 2007 semiannually (October/November and May/June); the latest survey took place in May/June 2010. In each of the nine countries and for each interview wave, face-to-face interviews with about 1,000 persons aged 15 and over were conducted. The respondents were selected via a multi-stage stratified random sampling procedure, with the exception of Bulgaria, for which quota sampling was applied. For Poland, sampling was restricted to the population of the ten largest metropolitan areas. Some questions concerning loans were not asked in all six surveys, therefore the time period covered will be indicated in the text.

The following issues should be taken into account when interpreting the results presented in this paper. First, the surveys contain information on the existence of a loan but not on outstanding amounts. Consequently, the surveys do not provide the ratio of the amount of outstanding loans to households' total (financial) wealth. Second, non-response rates vary across countries and across survey waves. We have not imputed missing values but assumed that non-response is random (which might be a very strong assumption). Third, depending on the statistics used, the number of observations for some of the presented results can be rather low (for example, if only 20% of 1,000 respondents have a loan, and only 40% of this group have a foreign currency loan). Fourth, loans indexed to a foreign currency are counted as foreign currency loans in Croatia but not in Bosnia and Herzegovina, the FYR Macedonia and Serbia, where indexed loans have gained in importance. Finally, the structure of the questionnaire focuses on individuals rather than households. As loans will typically be taken out by households, the questionnaire accounts for this issue by asking whether the interviewed persons have a loan either alone or together with their partners.

## 3 Some Facts about Household Borrowing in CESEE

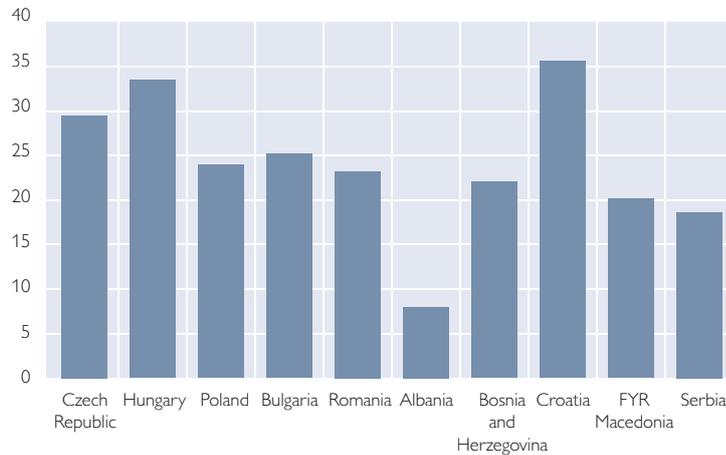
CESEE countries vary greatly in the level of financial development. The OeNB Euro Survey results mirror these differences: In countries where financial deepening with regard to financial intermediation has advanced further, such as Hungary and Croatia, up to 35% of respondents hold a loan (chart 1). By contrast, fewer than 10% of respondents in Albania have an outstanding loan. Since the 2008 spring wave the distribution of loans has not shown a clear development pattern in any of the countries.

Concerning the distribution of foreign currency loans, three out of four borrowers in Croatia and Serbia report that their loans are solely or predominantly denominated in foreign currency, followed by Hungary and Albania, where three out of five borrowers hold foreign currency loans. The two countries with a

Chart 1

### Share of Respondents with a Loan

% of all respondents (average from spring 2008 to spring 2010)



Source: OeNB Euro Survey.

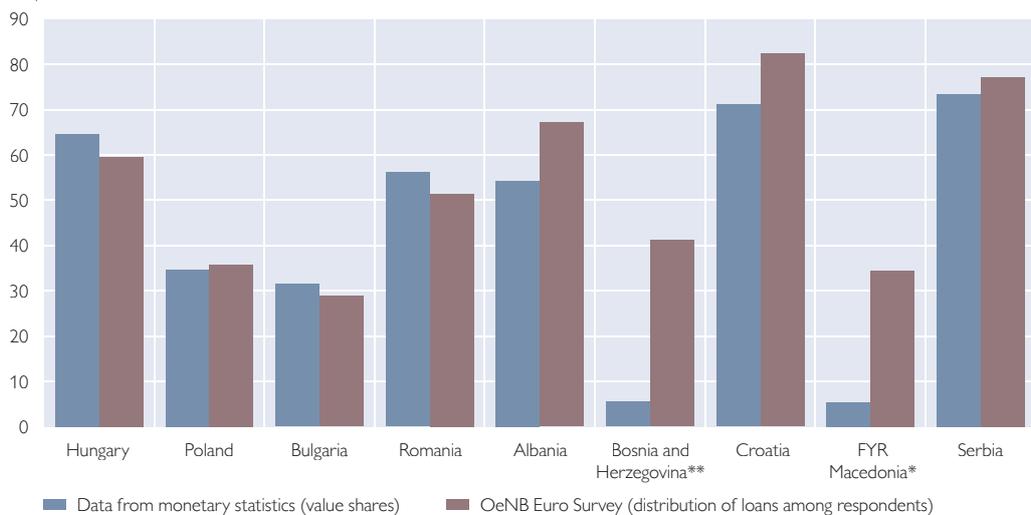
Note: Excluding respondents answering "Don't know/no answer."

currency board exhibit the lowest shares of respondents holding a foreign currency loan, i.e. 29% in Bulgaria and 41% in Bosnia and Herzegovina (chart 2). The share of foreign currency loans in total loans to households is also available from monetary statistics. Although the survey data reflect only the "ownership" of loans

Chart 2

### Comparison of Aggregate and Survey Data: Share of Foreign Currency Loans in Total Loans

% of total loans



Source: National central banks, OeNB Euro Survey 2009 spring and fall waves.

Note: Data are exchange rate adjusted, December 2009.

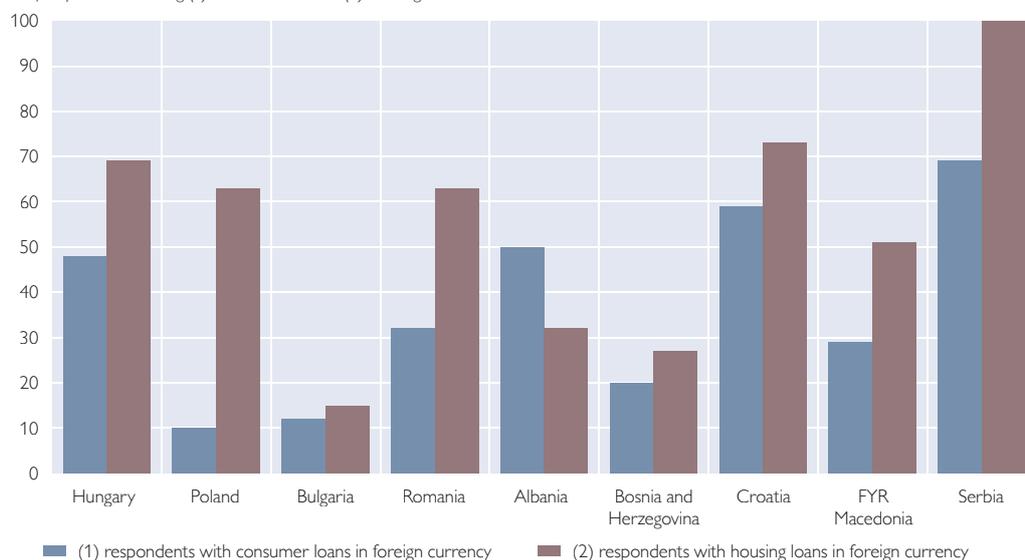
\* Official statistics classify MKD loans indexed to foreign currency as domestic currency loans. Available data therefore understate the share of foreign currency loans.

\*\* Official statistics comprise data of the household and corporate sectors. Loans indexed to foreign currency are classified as domestic currency loans. Available data therefore understate the share of foreign currency loans.

Chart 3

### Purpose and Denomination of Loans

% of respondents holding (1) consumer loans or (2) housing loans



Source: OeNB Euro Survey.

Note: Excluding respondents answering "Don't know / no answer." Data refer to spring 2010 and to the number of loan holders and not to loan amounts. The values represent percentage shares of respondents who are either holding a loan for consumption purposes or a housing loan in foreign currency. For example, in Hungary, 69% of those who have a housing loan took it out in foreign currency. Correspondingly, 31% took the housing loan in local currency. Similarly, 48% of respondents with a loan for consumption purposes in Hungary are holding it in foreign currency, and 52% are holding it in forint. For Poland, Albania, Bosnia and Herzegovina and Serbia, the number of observations is below 50.

whereas the monetary statistics reflect aggregate value shares, the results are rather similar in most countries.

On the aggregate level, evidence on the purpose of loans taken out by households is limited. Housing loans account for 40% to 50% of total loans in Hungary, Poland, Bulgaria and Croatia. In Romania, by contrast, real estate loans account for only 22% (UniCredit, 2010<sup>3</sup>). However, similar data for Albania, Bosnia and Herzegovina, the FYR Macedonia and Serbia are not available.

On the individual household level, the OeNB Euro Survey data show that a majority of loans in Serbia and to some extent in the FYR Macedonia and Bosnia and Herzegovina are loans for consumption purposes. In Hungary, a majority of respondents state that they took their loan out to finance a house or apartment.

Analyzing the purpose and denomination of loans jointly by cross tabulation demonstrates that in Hungary, Poland, Romania, Croatia, the FYR Macedonia and Serbia, the majority of respondents with housing loans hold it in foreign currency (chart 3).<sup>4</sup> In Serbia, Croatia, Albania and Hungary, a high share of consumption loans is denominated in foreign currency.

<sup>3</sup> Figures refer to 2008.

<sup>4</sup> The number of respondents in our sample who hold housing loans is relatively low in Serbia, Poland and Albania. Hence, figures should not be taken to be absolutely accurate but only as indicating a trend. Also, the reader should note that the data in chart 3 are based on spring 2010 and refer to the number of loan holders and not to loan amounts.

### Implications of the Crisis for Households' Borrowing Plans

The survey includes questions about whether respondents plan to take out a loan within the next 12 months. This allows us to look at possible future developments. The responses suggest that the number of planned loans declined during the crisis owing to dampened economic activity. In seven out of nine countries, the number of planned foreign currency loans also declined (chart 4). However, the most recent data suggest that demand for foreign currency loans has not disappeared completely.<sup>5</sup> In some countries demand seems to have dropped and remained lower, in other countries demand even seems to recover after the temporary decline caused by the financial crisis.<sup>6</sup>

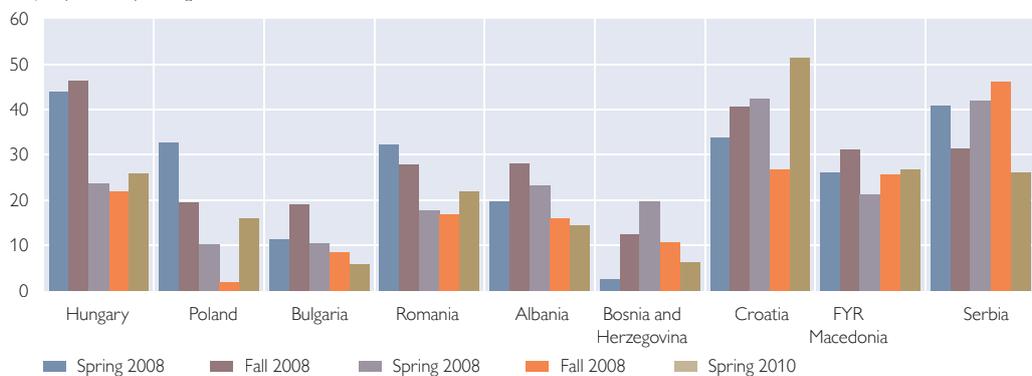
Concerning the denomination of foreign currency loans, monetary statistics reveal that they are predominantly taken out in euro in all of the Southeastern European (SEE) countries. In Poland and Hungary, between 35% and 60% of loans to households are denominated in foreign currency other than the euro, in particular in Swiss francs.

More detailed survey results confirm a predominant role of the euro also in planned foreign currency loans in CESEE countries. Until mid-2010, Hungary used to be an exception, reporting a high share of Swiss franc-denominated loans. When the ban on loans in Swiss francs was announced in June 2010, there was a

Chart 4

#### Share of Respondents Planning to Take Out a Foreign Currency Loan

% of respondents planning to take out a loan



Source: OeNB Euro Survey.

Note: Excluding respondents answering "Don't know / no answer."

<sup>5</sup> Respondents' plans could also reflect an awareness that banks tightened lending standards and limited foreign currency lending as a consequence of the financial crisis (Brzoza-Brzezina et al., 2010), i.e. that plans reflect supply factors. However, in the most recent survey respondents were asked whether banks had become very strict in granting foreign currency loans over the last two years. 65% of respondents said that banks had become very strict, and among those who planned to take out a foreign currency loan, 72% said so. This indicates that the awareness of reduced foreign currency loan supply does not translate into reduced demand and therefore favors interpreting planned loans as demand driven.

<sup>6</sup> This is consistent with evidence presented in the EBRD's Transition Report 2010, which presents cumulative net credit flows, distinguishing between foreign and local currency lending to households between September 2008 and June 2010. While in Croatia and Romania net credit flows turned negative because of a decline in local currency lending, net credit flows remained positive in Bulgaria and Hungary (due to foreign currency loans), the FYR Macedonia and Serbia (due to local currency loans). In Poland net credit flows cumulated to over 6% of 2008 GDP, 2.5 percentage points of which were owing to foreign currency loans.

marked shift towards the euro: While in fall 2007, 90% of respondents planning to take out a foreign currency loan wanted to take it out in Swiss francs, in spring 2010, 85% of respondents in this group were planning to take out a loan in euro (at that time, euro loans were still allowed).

Overall, survey results indicate that both existing foreign currency loans and households' foreign currency borrowing plans were temporarily affected by the financial crisis. Moreover, only a relatively small share of foreign currency loans has been converted into domestic currency loans. Throughout the crisis, demand for foreign currency loans was subdued; however, there is some indication that the effect of the crisis is wearing off.

#### 4 Unraveling the Motives for Taking out Foreign Currency Loans

The thriving popularity of foreign currency loans raises questions about the underlying reasons for this phenomenon. The question of whether supply effects or demand effects drive foreign currency lending evidently is of significant importance to regulators. The literature has established important results, although some issues are still poorly understood. One of the most uncontroversial findings is that foreign currency loans are more prevalent in countries with a high degree of asset substitution, which suggests that banks push foreign currency lending in order to balance the currency composition of their balance sheets; this is a clear supply effect (e.g. Basso et al., 2007; Luca and Petrova, 2008). On the demand side, a higher interest rate spread between loans in domestic currency and loans in foreign currency and a higher volatility of inflation relative to that of the real exchange rate stimulates foreign currency lending (e.g. Basso et al., 2007; Ize and Levy-Yeyati, 2003). Typically, these studies are based on the analyses of macroeconomic data, which do not allow determining whether supply or demand effects are more important. In this context, micro data seem more informative as supply and demand effects can be identified through direct survey information.<sup>7</sup>

There is a number of unresolved issues: (1) The robust finding that interest rate differentials matter raises the question whether households are myopic with respect to the risk of depreciation.<sup>8</sup> (2) Does (prospective) EU membership and the potential introduction of the euro increase foreign currency lending in CESEE? Some authors argue in this direction (Rosenberg and Tirpak, 2009; Neanidis, 2010); however, the evidence supporting this argument is built on aggregate time series only. (3) It is well documented that some CESEE countries are heavily dollarized, or, more precisely, euroized (Scheiber and Stix, 2009), and hence, foreign currency lenders could be able to hedge against exchange rate changes, for instance because they have income or asset holdings in euro. Does this play a role?

<sup>7</sup> We are aware of only two studies which use micro data to identify the importance of supply effects. Brown et al. (2010) present evidence for firm loans in Bulgaria, clearly pointing towards the importance of a supply effect. Fidrmuc et al. (2010) estimate models which relate "supply effects" to a set of economic and socio-demographic control variables. Their analysis is based on the same data set as the one used in this study. Some of our discussion of motives builds on results of Fidrmuc et al. (2010).

<sup>8</sup> In some countries, especially those with volatile exchange rates, the spread between short-term lending rates for loans in domestic currency and those for loans in foreign currency is sizeable (averaging about 10 percentage points in Hungary and 7 to 8 percentage points in Poland and Romania between 2007 and 2010). Countries with currency boards have much smaller interest rate differentials (2 percentage points on average in Bulgaria and about zero in Bosnia and Herzegovina).

### Evidence about Respondents' Motives

In the surveys of spring 2008 and spring 2010, respondents who had a foreign currency loan were provided with a list of possible motives for taking out a foreign currency loan and were asked to indicate their stance on each motive, as summarized in table 1. We start by assuming that motives 1 and 2 represent typical demand factors and motives 3 and 4 are typical supply factors and neglect, for the moment, the other three motives. Then we compare the relative importance of motives 1 and 2 with the importance of motives 3 and 4. The finding that motives 1 or 2 are ranked as more important than motives 3 or 4 would indicate that demand effects are more important than supply effects.<sup>9</sup>

Table 1

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### Motives for Taking Out Foreign Currency Loans

I hold a foreign currency loan because ...

1. a foreign currency loan is cheaper than a loan in [domestic currency]
2. the interest rate in the foreign currency is more stable
3. my bank advised me to take out a foreign currency loan
4. I would not have gotten the required amount in [domestic currency]
5. [My country] will introduce the euro sooner or later
6. I receive payments in euro
7. I hope the [domestic currency] will appreciate/strengthen

Source: OeNB Euro Survey.

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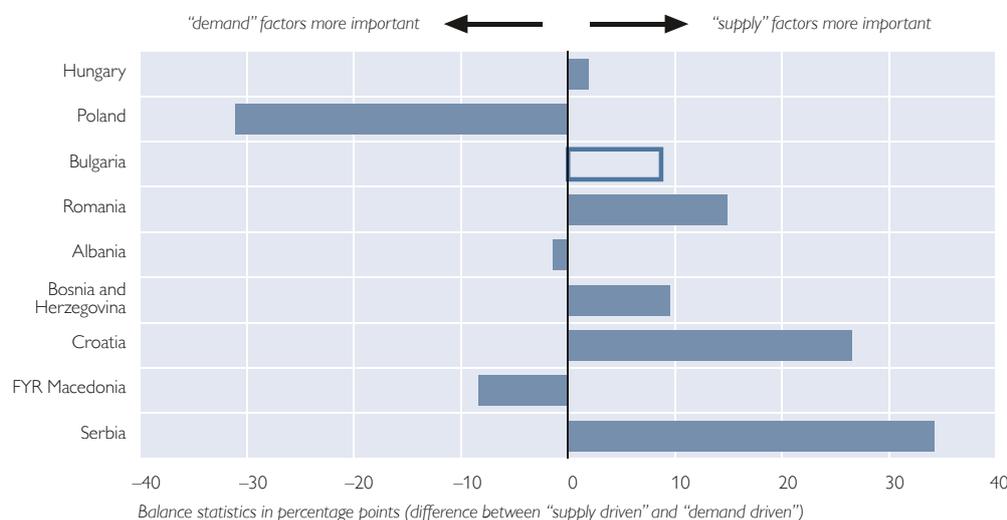
Chart 5 depicts the relative ranking of motives obtained from this exercise: Positive values indicate that a higher share of respondents with a foreign currency loan rank “supply” factors as more important than “demand” factors.<sup>10</sup> It is important to point out that these results reflect a relative ranking, i.e. a positive value does not necessarily imply that demand factors are not important, they are just relatively more important than supply factors. The results indicate a differentiated picture across countries. Supply factors seem to be of greater importance than demand factors in SEE, with the exception of Albania and the FYR Macedonia. Estimation results in Fidrmuc et al. (2010) show that this is consistent with the macroeconomic situation as supply factors have a higher relative importance than demand factors in countries with a larger extent of asset substitution. Moreover, their results suggest that supply motives (i.e. the motive “bank advice”) are regionally concentrated, which would be consistent with the interpretation that banks used foreign currency loans to compete for market share.

<sup>9</sup> We have chosen the graphical approach (see chart 5) mainly for the purpose of exposition to avoid depicting the relative importance of seven motives for nine countries. Furthermore, we analyze as many demand factors as supply factors in order to avoid additionally arbitrary weighting. As the list of motives only contains two supply factors we need to choose two demand factors. Prior inspection indicates that motives 1 and 2 are appropriate candidates, since respondents regard them as important in all the countries surveyed. Nevertheless, this choice leaves some degree of arbitrariness. The results of Fidrmuc et al. (2010) demonstrate that many of the results obtained here can be confirmed in a more formal econometric model.

<sup>10</sup> Because of the low number of observations for Bulgaria, this country is omitted from a more detailed analysis.

Chart 5

### Relative Importance of “Supply” vs. “Demand” Factors



Source: OeNB Euro Survey 2008 spring and 2010 spring waves.

Note: “Supply” = sum of answers agreeing with the statements “I have a foreign currency loan because my bank advised me to take out a foreign currency loan” and “...because I would not have gotten the required amount in local currency;” “Demand” = sum of answers agreeing with the statements “I have a foreign currency loan because it is cheaper than a loan in local currency” and “...because the interest rate in the foreign currency is more stable.” For instance, for Poland, where 57% of respondents with a foreign currency loan rank supply factors to be the most important and the respective value for demand factors is 88%, we depict the difference of -31 percentage points. Values for Bulgaria are not reliable because they refer to the spring wave 2010 only and because of the small number of observations.

A closer scrutiny of the two motives on which our artificial “demand” measure is based shows that the stability of interest rates (motive 2) tends to be more important than the mere perceived cost advantage (motive 1) in SEE, whereas the opposite can be observed in Hungary and Poland. This could signify that foreign currency borrowers in SEE have some doubts about the stability of their domestic currencies in terms of prices.<sup>11</sup> Alternatively, one could argue that respondents’ concern over interest rate variability results from the monetary authorities’ “fear of floating” rather than inflation, as argued by Csajbók et al. (2010). However, in our sample of countries we consider the first explanation more appropriate.

As regards our artificial “supply” measure, it is striking that the motive that respondents would not have received the required amount in domestic currency is at least as important or more important than “bank advice” in four of the nine countries – all of them SEE countries. In Poland supply motives do not seem to be important, and in Hungary supply motives are as important as demand motives.

With respect to those motives which were not included in our artificial supply and demand measures, we see that income in euro is ranked rather low in comparison to other motives. Nevertheless, in absolute figures, 45% of Albanians and 33% of respondents from Bosnia and Herzegovina rank this motive among the most important ones. In Serbia, the FYR Macedonia, Romania and Poland this

<sup>11</sup> This more detailed analysis also reveals that the predominance of demand factors in the FYR Macedonia obtained in chart 5 is mainly driven by the result that respondents rank the stability of interest rates as the predominant reason for foreign currency borrowing.

motive is considered to be most important by 18% to 24%. In contrast, the comparable figure is between just 3% and 5% in Hungary and Croatia, respectively.<sup>12</sup>

The motive “I hope the [domestic currency] will appreciate/strengthen” ranks rather low in SEE, whereas in Poland it ranks second (45% of Polish foreign currency borrowers rank this motive as the most important one).

Finally, the perspective of euro introduction seems to be significantly more important than the natural hedge argument. In Romania, the former is ranked equally with the demand motives as the second most important motive, in all other countries it is less important than the supply or the demand motive.

### Can Households Choose the Denomination of Their Loans?

The question whether respondents had the chance to choose the currency of their loan can also help resolve the question whether supply or demand effects dominate. For this reason, respondents with a foreign currency loan were asked in spring 2010 whether it would have been possible to get the loan in domestic currency and respondents with a domestic currency loan were asked whether it would have been possible to get the loan in foreign currency.

The results are summarized in table 2. The number of respondents who refused to answer this question is sizeable in some countries, significantly reducing the number of observations. Therefore, we deleted all entries which are based on fewer than 50 observations. For those countries for which figures were reported, between 49% and 60% of foreign currency borrowers answered that they had a choice. The comparable percentages for those with a domestic currency loan are lower, with the exception of Croatia. Possibly some of those with a domestic currency loan wanted a foreign currency loan but did not get it.

Table 2

### Can Households Choose the Currency of Their Loans?

|                        | Respondents with a foreign currency loan who answered that they had a choice (%) | Respondents with a domestic currency loan who answered that they had a choice (%) |
|------------------------|--|---|
| Hungary                | 49   | 19  |
| Poland                 | x  | 37  |
| Bulgaria               | x  | 52  |
| Romania                | 55   | 34  |
| Albania                | x  | x   |
| Bosnia and Herzegovina | x  | 42  |
| Croatia                | 49   | 57  |
| FYR Macedonia          | 60   | 32  |
| Serbia                 | 52   | x   |

Source: OeNB Euro Survey.

Note: The table summarizes the results concerning the choice of currency in which the loan is denominated. For instance, in Hungary, 49% of respondents with foreign currency loans answered that they had a choice (51% answered that they had no choice), and 19% of Hungarian respondents with a domestic currency loan had a choice. x = no entries because of fewer than 50 observations.

<sup>12</sup> Presumably, this is related to remittances in some countries. According to the 2010 spring wave of the OeNB Euro Survey, 22% of Albanian respondents, 17% of FYR Macedonian respondents and 13% of Bosnian respondents reported to receive money from abroad. A closer analysis of this connection, however, is beyond the scope of this paper.

One could presume that the choice respondents have is related to the size of the loan. We do not have direct information on loan amounts but information about loan types. Comparing the answers to the question whether they could choose the currency of their loans provided by those with a housing loan with the replies by those with other types of loan does, however, not reveal any significant differences.

Overall, the analysis of the motives yields a rather differentiated picture and the presented evidence suggests that both supply and demand factors are important determinants of foreign currency loans. Supply-side effects seem to dominate in SEE whereas demand is more important in Hungary and Poland. This is consistent with the fact that asset substitution is more prevalent in the former group of countries than in the latter. However, our results also suggest that a significant share of foreign currency borrowers – also in SEE – in fact did have a choice of currency when taking out their loans. They choose a foreign currency loan because of its perceived cost advantage (mainly in Hungary and Poland) and because of more stable interest rates (mainly in SEE countries). On the other hand, a significant share indicates not to have had a choice because they would not have received the required amount.

## 5 Has the Crisis Affected the Behavior of Households?

Fidrmuc et al. (2010) analyze the factors driving foreign currency loans in CESEE. On the demand side, they identify interest rate differentials and the variance of the financial portfolio as important factors. Applying the minimum variance rationale implies that households choose the currency composition of their loan portfolio with the aim of minimizing variation in the instalments. The choice is determined mainly by expectations of future inflation and real exchange rate variability. In the context of the financial crisis the question arises whether this risk assessment with respect to foreign currency borrowing has changed, and, if it did, whether the effect is sufficiently large to reduce the demand for foreign currency loans.

In this section we investigate how and to what extent the crisis affected households' risk assessment. We employ a proxy measure derived from a question about whether foreign currency loans have become riskier because of exchange rate depreciations. This measure would establish a direct link between risk perception and crisis-related exchange rate changes. Households' risk assessment could be affected through other channels as well. We provide evidence on whether people's perception of risk changed in cases where respondents knew somebody who had got into difficulties with their foreign currency loans. Another question focuses on the general assessment of the attractiveness of euro loans relative to that of domestic currency loans.<sup>13,14</sup>

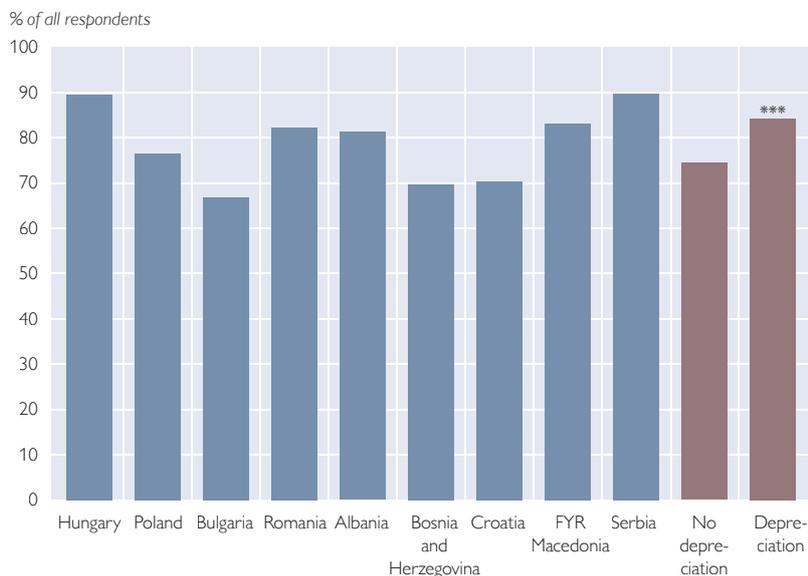
In all the nine countries surveyed, the majority of respondents answered that foreign currency loans had become riskier because of exchange rate depreciations.

<sup>13</sup> Respondents were asked whether they agree or disagree on a scale from 1 to 6 with the following two statements: 1) "Over the last 2 years, taking out a loan in euro has become riskier because of possible exchange rate depreciations." 2) "I know someone who has gotten burned on a foreign currency loan because repayments became much higher than expected." 3) "Taking everything into account, loans in euro are more attractive than local currency loans."

<sup>14</sup> The survey questions discussed in this section have been asked only once so far; a comparison over time is not possible yet. The overall assessment of the attractiveness of euro loans relative to domestic currency loans cannot be employed as a crisis indicator.

Chart 6

### Share of Respondents Perceiving Foreign Currency Loans as Riskier



Source: OeNB Euro Survey 2010 spring wave.

Note: Excluding respondents answering "Don't know / no answer." The values represent the percentage shares of respondents who agree with the statement "Over the last two years, taking out a loan in euro has become riskier because of possible exchange rate depreciations."

\*\*\* denotes that the difference between depreciation and non-depreciation countries is significant at the 1% level.

Notably, the lowest percentage (67%) was recorded for Bulgaria. As the country is operating a currency board, it is still a surprisingly high percentage of respondents who consider a possible depreciation as an important factor. In countries where the exchange rate actually depreciated (Hungary, Poland, Romania, Albania, Serbia), the percentage of respondents who agree that foreign currency loans have become riskier is 10 percentage points higher than in countries where no depreciation took place (chart 6).

Furthermore, in countries which experienced the strongest depreciations, risk awareness tends to be higher (chart 7, left-hand panel).<sup>15</sup> This can also be tested more formally in a regression context. In particular, table 3 summarizes the results of binomial probit regressions which relate respondents' assessment of the riskiness of euro loans to (1) an individual crisis indicator (discussed below), (2) country dummies and (3) a set of control variables consisting of socio-demographic characteristics as well as variables reflecting exchange rate and inflation expectations.

The marginal effects of the individual country dummies (relative to Hungary) are sizeable and show substantial variation. Our presumption that the perceived increase in the risk of euro loans is higher in countries which have seen depreciations is confirmed in column 2 – i.e. the share of respondents who saw an increase in risk is lower by 6 percentage points in countries with fixed exchange rates. In column 3 we differentiate further between countries with large depreciations (by at least 5%) since January 2007 (Hungary, Romania, Poland) and medium

<sup>15</sup> Poland is an outlier in the left-hand panel of chart 7. Its exchange rate depreciated sharply against the euro after fall 2008 but later appreciated again. Moreover, trust in the zloty has always been comparatively high among the countries surveyed (Dvorsky et al., 2009). Poland was also particularly effective in curbing foreign currency lending to households by its "Recommendation S" introduced as early as June 2006 (Zettelmeyer et al., 2010).

Table 3

### Perceived Risk of Foreign Currency Loans

| Dependent variable  | Perceived increase in risk of foreign currency loans |                      |                      |  |
|---|--|----------------------|----------------------|--|
|   | 1  | 2                    | 3                    | 4  |
|   | All respondents                                      | All respondents      | All respondents      | Respondents planning to take out a foreign currency loan |
| Acquaintance had bad experience with foreign currency loan                                | 0.192 ***<br>(0.045)                                 | 0.212 ***<br>(0.050) | 0.212 ***<br>(0.050) | 0.323 ***<br>(0.056)                                     |
| <b>Country dummies (relative to Hungary)</b>  |  |                      |                      |  |
| Poland  | -0.137 ***<br>(0.021)                                |                      |                      |  |
| Bulgaria  | -0.262 ***<br>(0.028)                                |                      |                      |  |
| Romania   | -0.047 **<br>(0.020)                                 |                      |                      |  |
| Albania   | -0.058 ***<br>(0.014)                                |                      |                      |  |
| Bosnia and Herzegovina  | -0.172 ***<br>(0.031)                                |                      |                      |  |
| Croatia   | -0.161 ***<br>(0.023)                                |                      |                      |  |
| FYR Macedonia   | -0.037 ***<br>(0.009)                                |                      |                      |  |
| Serbia  | 0.005<br>(0.010)                                     |                      |                      |  |
| Dummy for countries with recent depreciations (Hungary, Poland, Romania, Albania, Serbia) |  | 0.062 *<br>(0.033)   |                      | 0.084 **<br>(0.037)                                      |
| Dummy for countries with large depreciations (Hungary, Poland, Romania)                   |  |                      | 0.071 **<br>(0.029)  |  |
| Dummy for countries with medium depreciations (Albania, Serbia)                           |  |                      | 0.054 *<br>(0.032)   |  |
| Control variables included  | Yes  | Yes                  | Yes                  | Yes  |
| Observations  | 5,624  | 5,624                | 5,624                | 541  |
| Pseudo R <sup>2</sup>   | 0.1083   | 0.0926               | 0.0928               | 0.2114   |

Source: OeNB Euro Survey 2010 spring wave.

Note: Marginal effects from a binomial probit model, standard errors (adjusted for clustering at the country level) in parentheses. The model in columns 1, 2 and 3 comprises all respondents. The model in column 4 is restricted to respondents who are planning to take out a loan within the next 12 months. Results from socio-demographic variables (age, education, income and ownership of financial assets) and variables reflecting exchange rate and inflation expectations are not shown. A detailed discussion of these control variables is provided in Fidrmuc et al. (2010). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% levels respectively.

depreciations (Albania, Serbia). In the former countries the share of respondents who saw an increase in risk is higher by 7 percentage points and in the latter group by 5 percentage points than in the countries where no depreciations took place. For countries with medium depreciations, the effect is only statistically significant at the 10% level.

These results are based on assessments provided by all respondents, i.e. including those who are not considering a loan and may therefore be uninformed about financial issues. Therefore, we also summarize the results for those respondents who answered that they planned to take out a loan within the next year (column 4).

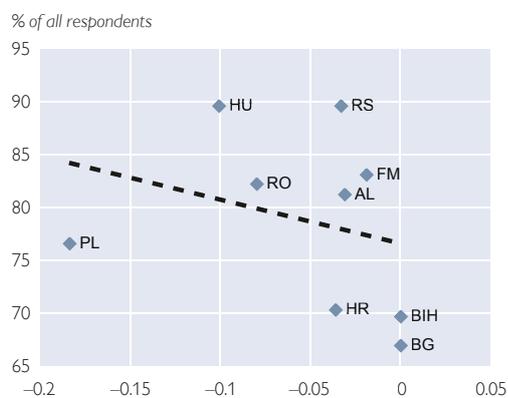
The survey also contained a question about whether the respondents have acquaintances that had a bad experience with their foreign currency loans. It is a stylized fact that the number of nonperforming loans increases during recessions. The country dummies in table 3 are likely to reflect not only differences with respect to exchange rate movements but also differences in terms of other country specifics (e.g. output growth, regulatory framework). The socio-demographic variables control for heterogeneity between individuals which is unrelated to the crisis. Therefore, knowing somebody who has run into difficulties with their foreign currency loan could be interpreted as a foreign currency loan-related crisis indicator which represents crisis-related heterogeneity among individuals. In fact, this variable has a very sizeable impact on the perceived increase in risk, in particular for those who plan to take out a loan: The share of respondents who agree that the risk of foreign currency loans increased is higher by 20 percentage points (32 percentage points for respondents who are planning a loan) for those who have acquaintances with a bad experience with their foreign currency loans. The effect does not depend on particular countries – it is sizeable and significant both in countries with floating and with fixed (pegged) exchange rates. The results imply that the crisis had a clear bearing on respondents’ perceptions of the risk associated with foreign currency loans. Does this suffice to render foreign currency loans unattractive?

In line with what one would expect, the average perception of foreign currency loans as riskier is negatively correlated with the perceived attractiveness of foreign currency loans (chart 7, right-hand panel). Overall, in six out of nine countries, the majority of respondents agreed that, taking everything into account, foreign currency loans in euro are more attractive than domestic currency loans. Hungary has the lowest share of respondents considering euro currency loans as more

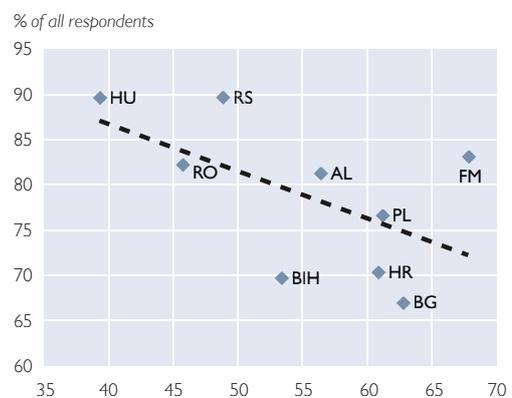
Chart 7

### Perceived Risk of Foreign Currency Loans

#### Perceived Risk and Maximum Depreciation



#### Perceived Risk vs. Relative Attractiveness of Euro Loans



Source: OeNB Euro Survey 2010 spring wave.

Note: Excluding respondents answering “Don’t know / no answer.” Y-axis values represent percentage shares of respondents who agree with the statement “Over the last two years, taking out a loan in euro has become riskier because of possible exchange rate depreciations.” Maximum depreciation in the left-hand panel between January 2007 and April 2010 is calculated using end-of-month exchange rates compared to January 2007. X-axis values in the right-hand panel represent percentage shares of respondents who agree with the statement “Taking everything into account, loans in euro are more attractive than local currency loans.”

attractive than domestic currency loans at about 40% – still a remarkably high value given that close to 90% of respondents regarded foreign currency loans as having become riskier. Obviously, the perception of higher risk was not sufficient to significantly outweigh the presumed advantages of foreign currency loans (e.g. lower interest rates).

The perceived attractiveness of foreign currency loans is also affected by depreciations. In countries that did not see depreciations, foreign currency loans are regarded as attractive by 63% while the respective value is 52% in countries which experienced depreciations (table 4). Again, analyzing the answers from all respondents might yield a biased picture. For instance, the sample contains retirees who would not plan to take out a loan. To account for this, we separately analyze the answers provided by respondents who are holding a loan and by respondents who are planning to take out a loan.

This analysis reveals two noteworthy results. First, a majority of those holding a foreign currency loan still consider euro loans more attractive than domestic currency loans. Clearly these values differ across exchange rate regimes, but even in countries where depreciations took place, 52% regard a euro loan as more attractive. Second, among those who plan a loan, 55% consider euro loans more attractive than domestic currency loans. Although we find, again, a statistically significant difference with respect to the exchange rate regime, the observed value of 47% in countries that saw depreciations seems rather high. Thus, households' plans to take out foreign currency loans seem to be relatively unaffected by crisis-induced increases in the exchange rate risk. This is also confirmed in more formal empirical models reported in Beckmann and Stix (2010), showing that the decrease in plans to take out foreign currency loans which is attributable to this risk effect is rather small.

Both the results from the descriptive analysis and from the cited regression results suggest that other factors – presumably interest rate differences, inflation volatility and supply effects – are more important for foreign currency loan demand than exchange rate risk.

Table 4

### Euro Loans Remain Attractive

|   | All countries | Countries where currencies did not depreciate | Countries where currencies depreciated | Test of equal proportions |
|---|---------------|---|--|---------------------------|
|   | 1             | 2   | 3                                      | H0: (2)=(3)               |
| All respondents                         | 59%           | 63%   | 52%                                    | ***                       |
| Respondents holding a loan              | 53%           | 56%   | 47%                                    | ***                       |
| of which: in foreign currency           | 56%           | 59%   | 52%                                    | *                         |
| Respondents planning to take out a loan | 55%           | 60%   | 47%                                    | ***                       |

Source: OeNB Euro Survey.

Note: Values represent the percentage shares of respondents who agree with the statement "Taking everything into account, loans in euro are more attractive than domestic currency loans." For example, among respondents holding a loan, 56% of respondents agreed with the above statement in countries where the exchange rate did not depreciate (44% disagreed), whereas the respective value is 47% in countries where the exchange rate did depreciate. \*\*\*, \*\* and \* denote that the difference between depreciation and non-depreciation countries is significant at the 1%, 5% and 10% levels respectively (one-sided test).

A final indication of how households view the attractiveness of foreign currency loans can be deduced from the answers to the statement “So far, I have done well with my foreign currency loan” (table 5). Respondents holding foreign currency loans were confronted with this statement in spring 2008 and spring 2010. Overall, the share of respondents reporting a good experience is rather high and slightly increased to 70% over the crisis period. Again, the patterns differ depending on whether the respective domestic currency depreciated. In countries which maintained a (relatively) stable exchange rate, the share of respondents reporting a good experience increased significantly whereas a decrease can be observed in countries which experienced depreciations.<sup>16</sup> It is remarkable that in the latter group of countries, 60% still report a good experience with their foreign currency loans.

Overall, these results suggest that the crisis has clearly affected the perceived riskiness and the perceived attractiveness of euro loans vis-à-vis domestic currency loans. However, even in countries which experienced depreciations, 52% of respondents continued to perceive euro loans as more attractive than domestic currency loans. In addition, a majority of respondents reports an overall positive experience with their foreign currency loans. This suggests that after the crisis households continue to accept the risk of depreciation rather than paying a higher real interest rate as an “insurance premium” (EBRD, 2010). Therefore, one cannot expect demand for foreign currency loans to vanish due to the observed exchange rate fluctuations during the crisis. Neither is it likely that a large share of households will voluntarily convert their foreign currency loans into domestic currency, considering that the perceived advantages of foreign currency loans clearly seem to be smaller after the crisis, but still persist.

Table 5

### Majority Reports Good Experience with Foreign Currency Loans

|  | Agreement with the statement “So far, I have done well with my foreign currency loan” |             |               |
|--|---|-------------|---------------|
|  | Spring 2008   | Spring 2010 | H0: 2008=2010 |
| All respondents  | 67%   | 70%         |               |
| Respondents from countries where currencies did not depreciate | 59%   | 74%         | ***           |
| Respondents from countries where currencies depreciated        | 77%   | 60%         | ***           |

Source: OeNB Euro Survey.

Note: Values represent the percentage shares of respondents who agree with the statement “So far, I have done well with my foreign currency loan.” For example, of all respondents, 67% agreed in spring 2008 and 70% agreed in spring 2010. The respondents from Bulgaria are excluded from the sample because of the small number of observations. \*\*\*, \*\* and \* denote that the difference between spring 2008 and spring 2010 is significant at the 1%, 5% and 10% levels respectively (one-sided test).

## 6 Summary and Policy Implications

Financial stability in CESEE is strained due to a high share of lending denominated in foreign currency. Determining appropriate policy responses crucially depends on knowledge about (1) the sources of thriving foreign currency borrowing and

<sup>16</sup> In table 5 all individual observations are weighted by the country size. Weighting countries equally does not alter our main findings.

(2) the impact of the crisis on the demand for foreign currency loans. Our analysis sheds light on these two issues regarding the behavior of households.

Do banks push customers to take out foreign currency loans or do customers demand them? Our evidence suggests that the underlying causes seem to be manifold and both factors are important. First, banks play an active part: Foreign currency lending is higher in highly euroized economies suggesting that banks try to shift the currency risk to borrowers. A relatively high share of households said that they did not have a choice between a foreign currency loan and a domestic currency loan. Some borrowers would not have received the required amount in domestic currency. Second, households also actively demand foreign currency loans because of favorable interest rate differentials or more stable interest rates.

A majority of foreign currency borrowers report that they “have done well with their foreign currency loans” even in countries which experienced depreciations after fall 2008. Accordingly, it is unlikely that a large share of foreign currency borrowers will voluntarily convert their loans into domestic currency.

The global economic and financial crisis has affected households in the sense that foreign currency loans are now perceived as riskier, above all in countries which experienced depreciations during the crisis. Will this wipe out demand for foreign currency loans? Survey evidence suggests that the crisis has not done the job.

Despite the increase in the perceived riskiness, loans in euro are still regarded as more attractive than loans in domestic currency by a majority of respondents. In countries which experienced depreciations, in spring 2010 a remarkable average 50% of the population still considered euro loans more attractive. Analyzing individual countries reveals a clear majority in favor of euro loans in Poland, Bulgaria, Albania, Bosnia and Herzegovina, Croatia and the FYR Macedonia. In Serbia we observe a balance of opinions, and in Hungary and Romania, the shares of those considering foreign currency loans to be more attractive are lower than 50%.

These findings are consistent with how households’ plans regarding the denomination structure of their loans have changed: Foreign currency borrowing plans were dampened by the crisis, however they did not disappear completely. A majority of households planning to take out a loan within the next year still perceive loans in euro as more attractive than loans in domestic currency.

The rather inelastic reaction of foreign currency loan demand to changes in the macroeconomic environment in general and to exchange rate fluctuations in particular indicates that for most borrowers, gains from lower real interest on foreign currency loans outweigh the costs associated with a possible and maybe temporary depreciation.

Against this background and in the absence of policy action, one cannot expect that foreign currency borrowing will decline; some countries, in particular countries which maintained (relatively) stable exchange rates, could even experience a rebound of growth in foreign currency loans. Recent monetary statistics confirm that foreign currency lending has been dampened by the crisis, however in some countries a trend towards foreign currency borrowing by households is re-emerging.

The mutual interest of banks and households and the still high attractiveness of foreign currency loans suggest that little will change from market forces alone, at least in the short run.

If foreign currency loans are to be curbed, there will be two avenues for economic policy: (1) regulatory and supervisory measures applicable to banks as well as policy action which reduces such loans' attractiveness to customers already in the short run (e.g. taxes on new foreign currency lending); (2) measures which reduce the attractiveness of foreign currency loans to households in the medium to long run.

In the medium to long run, our results, in accordance with findings in the literature, suggest that a promising response would be to increase macroeconomic and monetary stability and to implement measures which enhance the efficiency and the competitiveness of domestic financial markets. Lower inflation variability or a reduced necessity to defend an exchange rate target would dampen the fluctuation of interest rates in domestic currency. Also, monetary policy aimed at reducing overshooting exchange rate fluctuations would reduce the interest rate differential. However, our own results as well as results from the literature (e.g. Backé et al., 2007) indicate that, at least in the short run, this policy would be a double-edged sword because stable exchange rates and reduced risk premiums are likely to even stimulate foreign currency lending.<sup>17</sup> Nevertheless, strengthening the credibility of macroeconomic and monetary policy would have the beneficial effect that households would increasingly save in domestic currency, which would reduce banks' incentive to lend in foreign currency.

Concerning the short-term horizon, in Hungary, Poland and Romania measures to discourage lending in foreign currency have recently been implemented and there are ongoing discussions at national and EU levels. Our results establish that regulatory and supervisory policy measures are key to initiate short-run reactions by banks and households.

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<sup>17</sup> *Much in a similar vein, a more credible policy could be a victim of its own success also in a different field: Prospective EU membership or euro introduction will become more likely which, in turn, will further foster confidence in the local currency and will lead to an anticipation of a lower currency risk (Neanidis, 2010). This could also have a stimulating effect on foreign currency lending.*

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# The Refinancing Structure of Banks in Selected CESEE Countries

Mathias Lahnsteiner<sup>1</sup>

*In this paper, we present systematic regional and cross-country information about the refinancing structure of the banking sector in selected Central, Eastern and Southeastern European (CESEE) countries. We use the most recent data available (from mid-2008 until end-2009) to focus on the situation of CESEE banking sectors following the intensification of the financial crisis triggered by the collapse of Lehman Brothers. At that time, there were fears of spillover effects, given the strong reliance of most of these countries' banking sectors on foreign funding. Our analysis shows that in the second half of 2008, most CESEE banking sectors received additional funds from abroad, while in the course of 2009, net capital flows to banks turned at least temporarily negative in all countries under review except Poland. However, the size of net outflows on the liability side of banks' balance sheets differed substantially across countries. Looking at the whole period from mid-2008 to end-2009, our findings suggest that outflows affected above all banking sectors that had very high net foreign liabilities at the onset of the crisis (i.e. in the Baltic countries, particularly Latvia and Estonia) and banking sectors with comparatively low levels of foreign ownership (Slovenia, Ukraine and Russia).*

JEL classification: G15, G21, G32, O16, O52

Keywords: Financial stability, banking sector, Central and Eastern Europe, refinancing, capital flows, financial crisis

## 1 Introduction

The refinancing structure of the banking sector is a key aspect of overall macro-financial stability in any country. The financial crisis has highlighted the importance of this issue even further. Earlier work on this topic, in particular Walko (2008), presented systematic regional and cross-country information on the refinancing structure of the banking sectors in selected Central, Eastern and Southeastern European (CESEE) countries up to end-2007 and mid-2008, respectively. His study focused on banks' situation before external funding conditions deteriorated significantly in the fall of 2008 after the collapse of Lehman Brothers. At that time, there were fears of spillover effects, given the strong reliance of most of these countries' banking sectors on foreign financial resources (including foreign parent banks), which had played a major role in financing the rapid expansion of domestic credit during the precrisis years.

Have these spillover effects indeed materialized, or was the integration of CESEE banks in European banking networks an asset when the financial crisis deepened? This is the core issue we address in this study by examining the funding structure of selected CESEE banking sectors. In updating and broadening the analysis presented by Walko (2008), this study examines the impact of the crisis on CESEE banks' refinancing structure with a focus on the period from mid-2008 to end-2009 (in the following referred to as the review period).

While Walko (2008) was based on a country sample comprising Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia, this paper also includes the Baltic countries as well as Ukraine and Russia. The

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inclusion of these countries is of particular relevance as the crisis affected them more strongly and, in the case of the Baltics, sooner than most other countries in the sample. Moreover, the banking sectors of Ukraine and Russia are structurally different from those of the other countries in that the presence of foreign banks is smaller (Ukraine) or much smaller (Russia). Looking at the Baltic states, Estonia and Lithuania rank among the countries with the highest share of foreign-owned banks (almost 100% in Estonia and more than 90% in Lithuania), while in Latvia about 65% of banks' total assets are in the hands of foreign owners. While statistical information on parent bank financing is scarce (no centralized dataset, insufficient information from national sources), this study puts together all available information to provide comprehensive evidence on the foreign funding of CESEE banks during the crisis in a comparative cross-country perspective. Moreover, the paper presents a new proxy for parent bank funding derived from BIS banking statistics.

The paper is structured as follows: Section 2 summarizes the main findings of recent empirical studies on cross-border bank flows during the crisis. Section 3 presents the main features of the refinancing structure of CESEE banking sectors, which is, in most countries, characterized by high net foreign liabilities. Sections 4 and 5 focus on changes in net foreign liabilities since the collapse of Lehman Brothers. Following a detailed discussion of flows on the liability side of balance sheets in section 4, the subsequent section also takes into account asset-side flows that helped accommodate for external financing constraints in many countries under review. The two sections are based on flow data (balance of payments), as stock data are subject to valuation effects and thus more difficult to interpret. Section 6 analyzes developments in gross liabilities with a focus on external liabilities, private sector deposits, capitalization levels and central bank funds. Section 7 examines developments in the structure of external liabilities with a special focus on their maturity. Section 8 sheds light on the important role of parent bank funding, and section 9 summarizes the main findings and suggests policy conclusions.

## 2 Literature Overview

Several recent papers examine cross-border bank flows to emerging economies' banking sectors during the crisis, some of which have a special focus on the role of parent bank funding. Berglöf et al. (2009) as well as EBRD (2009) argue that the integration of most CESEE countries' banking sectors in European banking networks was a crisis-mitigating factor as parent bank financing remained stable, thus attenuating negative capital flow dynamics. Similarly, Vogel and Winkler (2010) conclude that a higher share of foreign banks' assets stabilized cross-border flows in CESEE, in particular bank-to-bank lending, during the crisis. However, the authors argue that foreign banks did not stabilize cross-border bank flows to emerging economies in general during the global crisis. CESEE might have been different in this respect due to its special context of European integration. The authors also find that higher capital inflows prior to the crisis were followed by more pronounced outflows during the crisis. Hermann and Mihaljek (2010) study the nature of spillover effects in bank lending flows from advanced to emerging market economies. They conclude that the decrease in cross-border loans to CESEE was more limited than in Asia and Latin America, largely because of the high degree of financial integration in Europe and comparatively sound banking

systems. Hoggarth et al. (2010) look at international bank flows on a global level and show that the reversal of inflows during the crisis was selective. One of the main conclusions, which is particularly relevant for our paper as well, is that interbank lending has fallen especially sharply, whereas cross-border intra-group lending has held up better.

### 3 Funding Gaps and Net Foreign Liabilities in CESEE Banking Sectors...

#### 3.1 ...before the Collapse of Lehman Brothers

Most CESEE countries entered the crisis with a funding gap, i.e. domestic deposits did not fully cover the stock of domestic credit to the private nonbank sector. In general, the more banks are able or willing to refinance rapid credit growth through other refinancing instruments than retail deposits, the wider the domestic credit and deposit stocks can drift apart. Nondeposit funding sources include equity, domestic debt issuances and external liabilities. It is therefore likely that the deepness of the domestic debt security market and its usage by banks as well as the ability of banks to tap foreign sources of funding (e.g. parent banks, access to international capital markets) play an important role in this regard. Shin and Shin (2010) argue that the size of noncore<sup>2</sup> funding sources on banks' balance sheets provides information on their willingness to increase exposure and can therefore be regarded as a measure for the stage of the financial cycle. A detailed assessment of factors that explain differences of funding gaps in CESEE goes beyond the scope of this paper.

As illustrated in Walko (2008), in the majority of countries funding gaps had led to large or very large net external liabilities by mid-2008 (Croatia: around 8% of GDP; Bulgaria, Hungary, Romania and Slovenia: 13% to 21% of GDP). In Ukraine, net external liabilities were roughly as high as in the latter group in mid-2008 (around 16% of GDP), after having expanded particularly fast in the preceding years (from 2005 until mid-2008, net external liabilities as a percentage of GDP more than quintupled). In Russia, the banking sector also recorded a funding gap, and net external liabilities amounted to about 5% of GDP in mid-2008. As a percentage of assets, the net external liability position of the Russian banking sector was comparable to that in Croatia, but still markedly lower than those observed in Bulgaria, Hungary, Romania, Slovenia and Ukraine. In the Baltic countries, net external liabilities as a percentage of GDP reached the highest levels within the country sample in mid-2008, and the funding gap was even higher in these countries. In Latvia, net external liabilities amounted to 50% of GDP, in Estonia to 35% of GDP and in Lithuania to about 25% of GDP. In fact, only the Czech banking sector recorded net external assets in mid-2008.

In most countries, net external liabilities were approximately the same size or smaller than funding gaps, suggesting that net external liabilities were used predominantly to refinance private sector credit growth. However, there were some exceptions, e.g. Romania, where the net external liability position was substantially larger than the funding gap and where part of external liabilities was chan-

<sup>2</sup> The precise definition of core liabilities appeals to the principle that core liabilities are the claims of the ultimate creditors (the household sector) on the intermediary sector (Shin, 2010).

neled into central bank instruments. The situation was similar in Slovakia (for more details, see Walko, 2008).

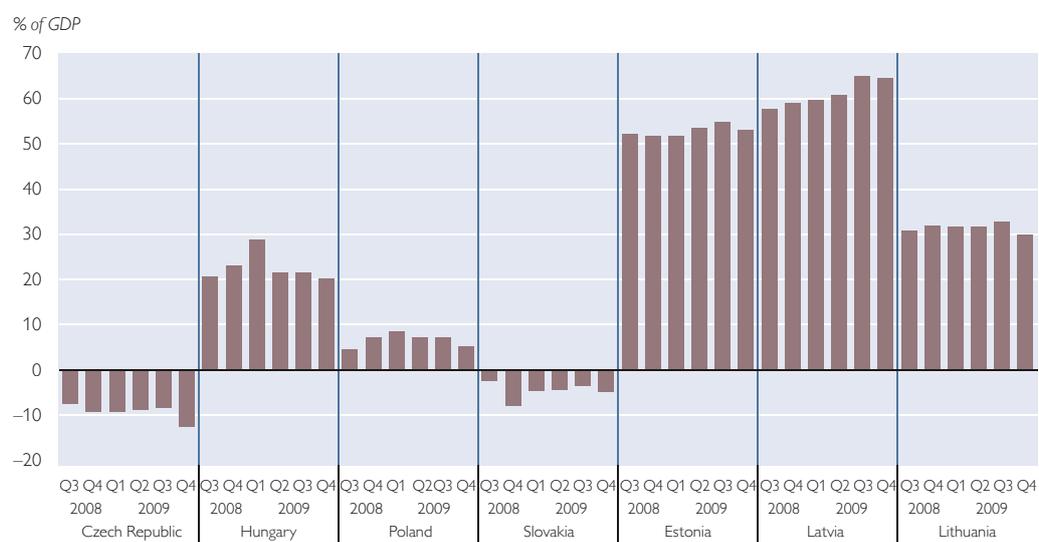
In the framework of the international investment position methodology, external liabilities comprise foreign direct investments (FDI), portfolio investments (equity and debt) and other investments (loans as well as currency and deposits). Excluding liabilities related to FDI (which are part of capital and reserves in banks' balance sheets and which are not available on a sectoral basis for the country sample), foreign liabilities were dominated by currency and deposits and/or loans in all CESEE countries before the collapse of Lehman Brothers. This was also true for the Baltic counties, Russia and Ukraine. In Ukraine and Estonia, portfolio debt securities as a percentage of GDP played a more important role than in the other countries under review. Given the comparably low level of foreign ownership in the banking sectors of Russia, Slovenia and Ukraine, it is likely that a considerable, but (due to a lack of data) not exactly specifiable share of external financing came from nonparent sources (e.g. syndicated loans).

### 3.2 Funding Gaps Remained Elevated in Most Countries since Mid-2008

Over the review period, funding gaps remained elevated in most countries. In late 2008 and early 2009, they even increased, partly due to an exchange rate effect. In countries where the amount of foreign currency loans is larger than the amount of foreign currency deposits, depreciating domestic currencies caused the domestic credit stock to increase more than domestic deposits (Hungary, Poland, Romania, Russia and Ukraine). Moreover, in some cases, temporary deposit outflows contributed to the widening of funding gaps (in particular in Russia, Ukraine, Bulgaria, Romania, Croatia, Lithuania and Latvia). Subsequently, however, funding gaps started to narrow in most countries in the course of 2009 as domestic credit growth declined or even turned negative, CESEE currencies recovered and deposits stabilized or even increased. In the Baltic countries,

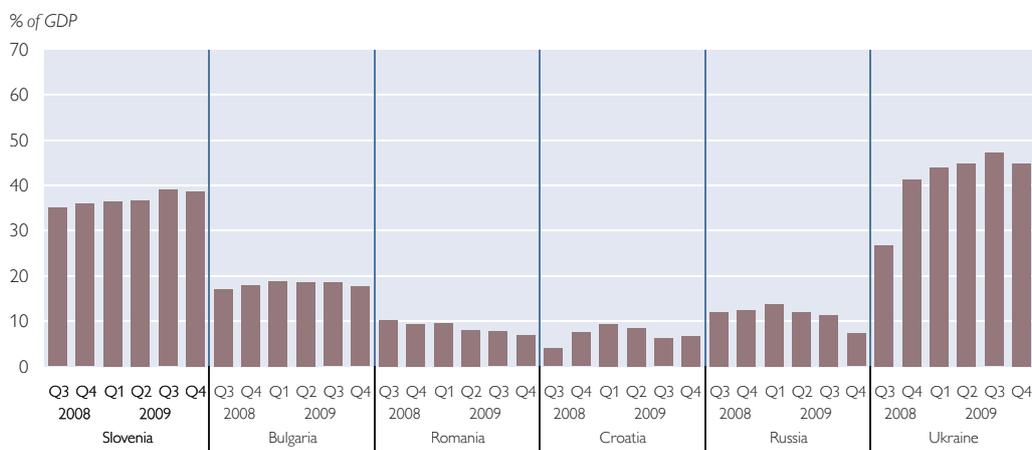
Chart 1a

#### Funding Gaps of CESEE Banking Sectors



Source: National central banks.

### Funding Gaps of CESEE Banking Sectors



Source: National central banks.

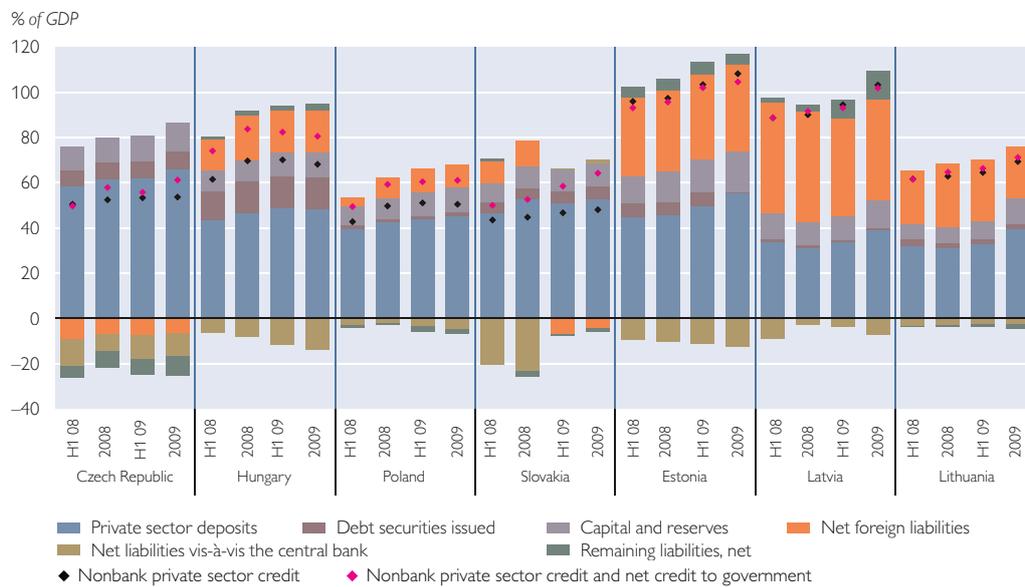
Slovenia and Ukraine, though, the funding gap rose until the third quarter of 2009 before contracting slightly in the final quarter.

Net foreign liabilities continued to be an important refinancing source in most countries during the review period, except for the Czech banking sector, which sustained its net external asset position. More specifically, several major Czech banks were net creditors of the European banking groups to which they are affiliated (CNB, 2009). After net foreign liabilities had continued to increase in the second half of 2008 in most countries, a downward trend was seen in 2009, both in absolute terms and also relative to GDP (which declined in all countries but Poland that year). As a percentage of GDP, the decrease in net external liabilities was most pronounced in Latvia, Lithuania, Slovenia and Ukraine, but was also noticeable in Hungary, Romania and Bulgaria. In Poland and Croatia, net foreign liabilities expanded until mid-2009 before declining only slightly until year-end. In Croatia, this increase came after a gradual decline from 2007 until the third quarter of 2008 – a development that was related to the central bank's measures to contain bank lending based on foreign borrowing, which were lifted in 2008 and 2009. In Estonia, net external liabilities increased slightly during 2009.

By contrast, in Slovakia and Russia, the net foreign liability position turned into a net foreign asset position. In Slovakia, this was mainly due to a reduction of funds held in sterilization instruments of Národná banka Slovenska (NBS) following the country's entry into the euro area. Since the money banks had deposited with the NBS comprised mainly surplus funds received from foreign banks, the decrease in sterilization operations with the NBS in 2009 was reflected on the liability side in a decline in deposits and loans received from foreign banks (NBS, 2009). In Russia, the banking sector became a net external creditor due to external financing constraints after the collapse of Lehman Brothers and an accumulation of external assets during the crisis.

Chart 2a

### Domestic Credit and Its Financing



Source: National central banks.

Chart 2b

### Domestic Credit and Its Financing



Source: National central banks.

To better understand to what extent the developments of banking sectors' net external position were driven by liability- and asset-side flows on the one hand and valuation effects (including exchange rate effects and other adjustments) on the other hand, we will analyze balance of payments data (i.e. flows) first before turning to changes in the structure of external liabilities.

## 4 External Funding Declined, Disruptions on Swap Markets

### 4.1 Typically (Still) Positive Net Inflows Shortly after Lehman, Turnaround in 2009

First, we take a closer look at capital flows to CESEE banking sectors' liability side during the post-Lehman crisis (charts 3a and 3b). The balance of inflows and outflows on the liability side of most CESEE banking sectors was positive in the third and fourth quarters of 2008, with other investments being the dominant source of inflows. Summing up the last two quarters of 2008, net outflows on the liability side were seen only in Slovenia and Russia, i.e. the two countries with the lowest level of foreign bank ownership, as well as in Latvia and the Czech Republic. In Ukraine, liability-side net flows turned negative in the final quarter of 2008. In 2009, capital flows on the liability side turned or remained negative in all countries with the exception of Poland. From the third quarter of 2008 until the fourth quarter of 2009, average other investment and portfolio outflows as a percentage of quarterly GDP on the liability side were particularly large in Latvia (11%), Slovenia, Estonia and Ukraine (4% to 5%). Without government-guaranteed bond issuances in the third quarter of 2009, average outflows in Slovenia would have amounted to 8% of GDP. After Russia and the Czech Republic had experienced continued outflows in the first quarter of 2009, the negative dynamics lost momentum in the course of 2009. In the final quarter of 2009, the refinancing situation showed signs of improvement, as the Czech Republic, Hungary, Poland, Bulgaria and Croatia reported either a positive balance of portfolio and other investment liability flows or only marginal net outflows.

### 4.2 Why Did the Latvian Banking Sector Experience Very Large Outflows?

In Latvia, the large capital outflows from the banking system were due to multiple factors (IMF, 2009a): Domestically owned banks were largely not in a position to roll over maturing syndicated loans. In addition, nonresidents' deposits (a major funding source of domestically owned banks) were withdrawn on a large scale. Moreover, writedowns on euro-denominated loans were worsening banks' net open foreign exchange positions, which they had to offset by buying foreign exchange assets or by decreasing foreign exchange liabilities (including repaying loans to parent banks). Furthermore, shrinking loan portfolios enabled foreign-owned banks to repay liabilities to their parents. This was, however, almost fully compensated by recapitalization measures (IMF, 2010a), so that altogether, parent banks honored their commitment to maintain their exposure as agreed in the context of the IMF-EU support package that was granted to Latvia in late 2008 (inflows related to recapitalization are not included in charts 3a and 3b as they are recorded as FDI flows).

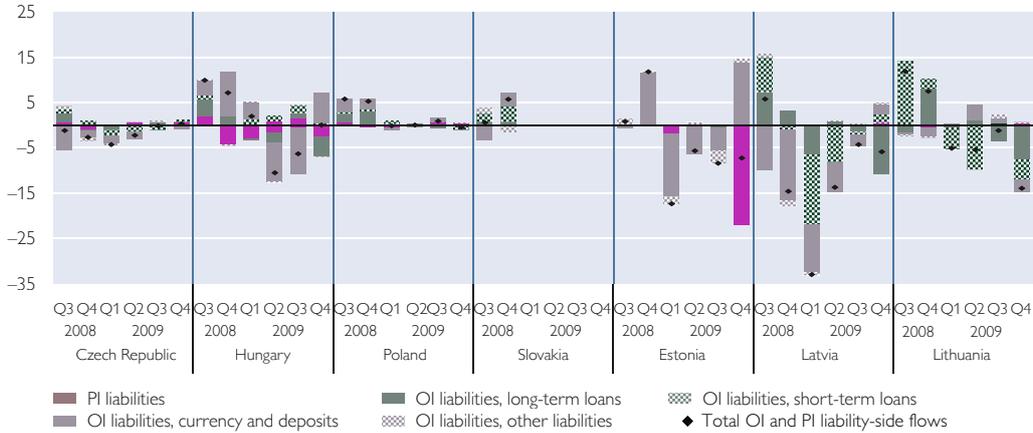
### 4.3 Rollover of Short-Term Loans Held Up Well in a Number of Countries

A more detailed analysis reveals that short-term loans contributed relatively strongly to total outflows only in Latvia, Lithuania, Slovenia, Russia and Ukraine, suggesting that banks in these countries were less able to roll over maturing short-term loans than banks in the other CESEE countries under review. For example, the fact that in Bulgaria a large part of short-term debt is from Bulgarian subsidiaries to their parent banks reduced the rollover risk (IMF, 2010b). Also, the mainly foreign-owned Hungarian, Polish and Estonian banking sectors were able to roll

Chart 3a

### Liability Side: Portfolio and Other Investment Flows to Banking Sectors

Quarterly BOP flows in % of quarterly GDP (using four-quarter moving averages to smooth out GDP seasonality)



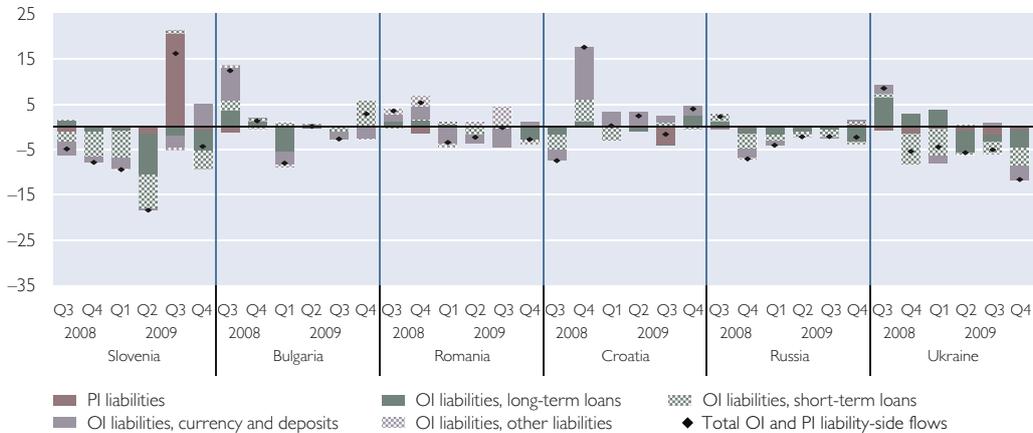
Source: National central banks.

Note: PI = portfolio investment comprising equity and debt, OI = other investment. FDI-related flows are not included due to lack of data.

Chart 3b

### Liability Side: Portfolio and Other Investment Flows to Banking Sectors

Quarterly BOP flows in % of quarterly GDP (using four-quarter moving averages to smooth out GDP seasonality)



Source: IMF.

Note: PI = portfolio investment comprising equity and debt, OI = other investment. FDI-related flows are not included due to lack of data.

over maturing short-term loans to a large extent. In Hungary, Estonia, Latvia, Romania and the Czech Republic, currency and deposits was a major source of outflows. The (net) redemption of long-term loans caused substantial outflows in Hungary, Latvia, Lithuania, Slovenia, Bulgaria, Russia, and – from the second quarter of 2009 – also in Ukraine. Given the low reliance on portfolio investments in most countries under review, this component also played a less important role in the crisis period, but still caused noticeable outflows in Hungary, Ukraine and Estonia.

#### 4.4 Foreign Exchange Swap Markets Partially Dried Up

In addition to tightening external funding conditions, negative spillovers of financial market turbulences to international foreign exchange swap markets put the funding strategies of the banking sectors in Hungary and Poland to a test, as highlighted in Mák and Páles (2009) as well as in NBP (2009a and 2009b). In recent years, part of foreign currency-denominated lending was funded by liabilities in domestic currency. Banks often hedged the resulting on-balance sheet open foreign exchange position by using foreign exchange swap transactions, which implied a rollover risk as the maturity of foreign exchange swap transactions was usually shorter than that of loans. The international financial market turbulence, and in particular strains in the U.S. dollar funding markets following the collapse of Lehman Brothers, spread around the globe and resulted in a partial drying-up of foreign exchange swap markets. This made it more difficult for banks in CESEE countries to hedge their foreign exchange positions.

In the case of Hungarian and Polish foreign-owned banks, risks were mitigated by parent banks' provision of further foreign exchange swap transactions. Thus, it was not such a surprise that the first commercial banks facing serious foreign exchange swap rollover problems were majority-owned by residents. In response to this situation, in mid-October 2008, Magyar Nemzeti Bank (MNB) and later on Narodowy Bank Polski (NBP) stepped into the market as counterparties for foreign exchange swaps by introducing several foreign exchange swap instruments to reduce functional market disorders. Their operations received support from the ECB, which concluded repo agreements with the MNB and the NBP in mid-October and early November 2008, respectively. These agreements on repurchase transactions provided for the possibility to borrow up to EUR 5 billion for the MNB and up to EUR 10 billion for the NBP.

In addition to these bilateral provisions of euro liquidity, the Swiss National Bank established temporary EUR/CHF swap arrangements with the MNB and the NBP, by which the SNB provided Swiss francs against euro for a term of seven days or occasionally for a longer term. The availability of central bank facilities and the support by parent banks widely prevented rollover risks from materializing. An inability to roll over foreign exchange swap transactions could have resulted in an even more pronounced devaluation of CESEE currencies (and/or a reduction in central bank foreign currency reserves) as banks would have been forced to buy foreign currencies on the spot market. Alternatively, a widening of banks' open foreign exchange positions would have resulted in additional capital requirements for foreign exchange risk.

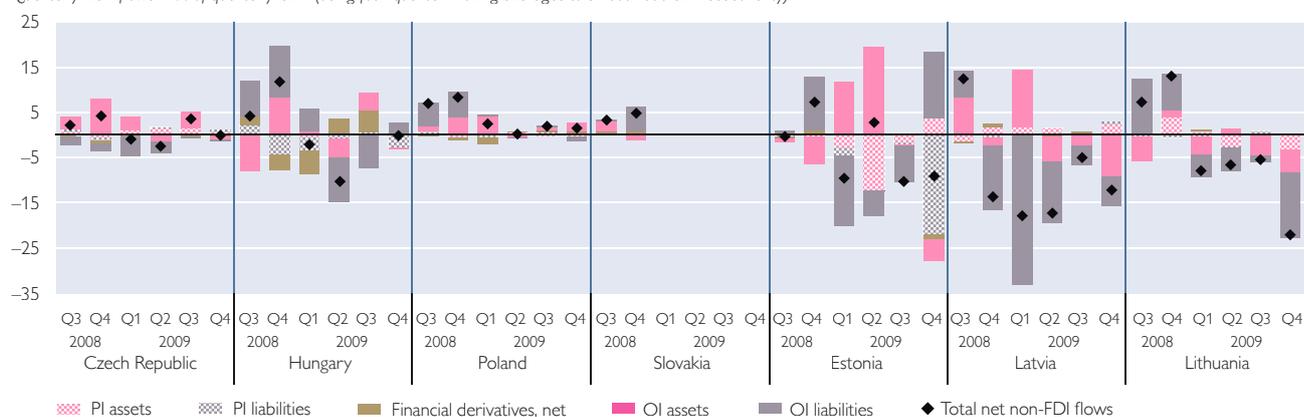
### 5 Some Banking Sectors Used External Asset Buffers to Accommodate Decreasing External Funding

Reducing external assets is one way for banks to accommodate decreasing external funding. In the countries under review, including the Baltics, Russia and (to a lesser extent) Ukraine but with the notable exception of Romania, banks held large volumes of external assets, both as a percentage of GDP and relative to external liabilities, as of mid-2008. In particular in the Czech Republic and Slovenia, banks responded to the reduction of external liabilities by selling external assets after having accumulated them in the first half of 2008. In the third and the fourth quarters of 2008, both countries' banking sectors were able to more than com-

Chart 4a

### Asset- and Liability-Side Flows

Quarterly BOP flows in % of quarterly GDP (using four-quarter moving averages to smooth out GDP seasonality)



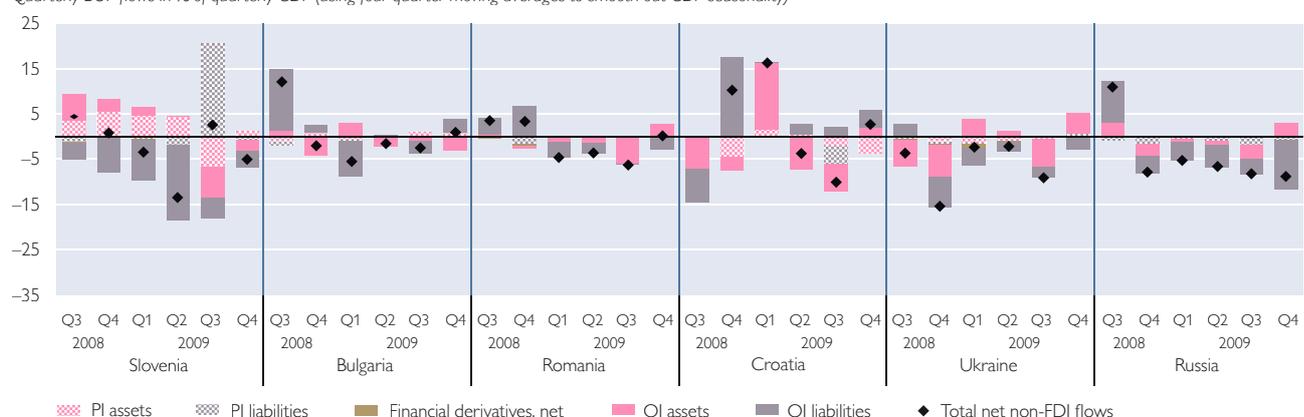
Source: IMF.

Note: PI = portfolio investment, OI = other investment. FDI-related positions are not included due to lack of data.

Chart 4b

### Asset- and Liability-Side Flows

Quarterly BOP flows in % of quarterly GDP (using four-quarter moving averages to smooth out GDP seasonality)



Source: IMF.

Note: PI = portfolio investment, OI = other investment. FDI-related positions are not included due to lack of data.

pensate for liability-side outflows and even recorded positive net capital inflows. The Polish banking sector reduced external assets, even though it received additional funds from abroad. The Hungarian, Estonian, Latvian and Lithuanian banking sectors also ran down external assets in the final quarter of 2008 and/or the first quarter of 2009. This was often followed by a renewed accumulation of external assets in the remainder of 2009. In Croatia, external assets were sold particularly in the first quarter of 2009, but were then gradually built up again in subsequent quarters. It is important to note, however, that the relaxation of Hrvatska narodna banka's foreign currency liquidity regulations in February 2009 (to help cover the government's financing needs) led to a temporary recourse to foreign assets at that time (IRC Expert Group, 2010).

Looking at aggregated data, the banking sectors of Russia and Ukraine did not reduce external assets in times of restricted external financing conditions. In

Russia and Ukraine, the banking sectors even accumulated external assets, while at the same time experiencing capital outflows on the liability side. This resulted in sizeable (asset and liability side-induced) outflows from the banking sector. To stem the outflow of capital in late 2008 and early 2009, the Bank of Russia placed temporary restrictions on the balance-sheet currency position and introduced a threshold for the value of foreign assets held by credit institutions that received unsecured loans from the Bank of Russia (Bank of Russia, 2010). External financing constraints together with an accumulation of external assets resulted in the Russian banking sector becoming a net external creditor in the course of 2009.

## **6 Dependence on External Funding Remains Comparatively High, Capital and Reserves Are Being Increased**

In the second half of 2008, the share of external liabilities to total liabilities rose or at least remained unchanged in all banking sectors under review except in Slovenia and Croatia (see charts A1a and A1b in the annex). This rise (together with central bank liquidity) seems to have offset the declining share of private sector deposits in some cases.

Developments were more heterogeneous in the course of 2009: The ratio of external liabilities to total liabilities declined in the Czech Republic, Slovakia, Latvia, Lithuania, Slovenia, Romania, Russia and Ukraine. The reductions were most pronounced in Slovakia (for the specific reasons already mentioned), in Latvia and Lithuania (albeit from extraordinarily high levels) and in Slovenia and Russia. While the Czech and the Slovak banking sectors were able to compensate the decreasing share of external liabilities through private sector deposits, the banking sectors in some other countries had to rely more heavily on government deposits and central bank liquidity as well as, in the case of Slovenia, on government-supported bond issuances.

It is also remarkable that in Hungary, Poland and Croatia, banking sectors' external liabilities increased relative to total liabilities since mid-2008. In Estonia and Bulgaria, the share of external liabilities in total liabilities stayed more or less unchanged over the review period.

As pointed out in Walko (2008), financing by capital and reserves has played a much more important role in several CESEE countries than in the euro area. Since mid-2008, capital and reserves as a percentage of total liabilities has in fact increased, and capital adequacy ratios (i.e. the ratio of capital to risk-weighted assets) have also risen. Foreign banks recapitalized their subsidiaries either through capital injections or through retained earnings and thereby directly supported financial sector stability. Moreover, some governments supported their banking sectors via the recapitalization of state-owned banks and, in Latvia and Ukraine, also by taking control of and recapitalizing domestically owned private banks (for more information on Ukraine, see Barisitz and Lahnsteiner, 2009).

In many CESEE countries, central banks provided additional liquidity to ease banks' liquidity pressures and in some countries (in particular Croatia and Romania) also to facilitate the refinancing of government debt. Liquidity support measures included lowering minimum reserve requirements, broadening eligible collateral and increasing the frequency of auctions. Hungary, Poland and Romania took measures to support foreign exchange markets, including foreign exchange liquidity injections and currency swap arrangements (Gardó and Martin, 2010). In

Slovakia, Russia and Ukraine, the position of the banking sector vis-à-vis the central bank changed from that of a net creditor to a net debtor. In Slovakia, banks' sterilization positions at the NBS were substantially reduced when Slovakia entered the euro area. In 2009, banks increasingly deposited their remaining surplus liquidity with foreign (parent) banks and made greater use of funding from the NBS (NBS, 2009), which resulted in a net debtor position of about 1% of GDP vis-à-vis the central bank.

In Ukraine and Russia, the national authorities stepped in with large-scale liquidity injections (Barisitz et al., 2009; Barisitz and Lahnsteiner, 2009) in response to external financing constraints and private sector deposit withdrawals. The net debtor position vis-à-vis the central bank reached about 7% of GDP in Ukraine (peaking in the third quarter of 2009) and 5% in Russia (reaching its maximum value in the first quarter of 2009). In Ukraine, the banking sector's net debtor position remained at elevated levels until the end of 2009, while in Russia, the banking sector once again became a net creditor vis-à-vis the central bank in the final quarter of 2009.

## **7 The Structure of External Liabilities Has Not Changed Substantially for Most CESEE Banking Sectors**

### **7.1 Maturity Structure Largely Unchanged in the Majority of Banking Sectors**

Some CESEE banking sectors entered the crisis with a large stock of short-term debt (see Walko, 2008). As at mid-2008, short-term instruments had a very high share in banks' total external debt in Slovakia, Bulgaria and the Czech Republic. The share was elevated also in Poland, Estonia and Latvia, but lower in Hungary, Lithuania, Slovenia, Croatia, Romania, Ukraine and Russia.<sup>3</sup> High levels of short-term indebtedness as a percentage of GDP were recorded in Latvia, Estonia, Bulgaria and Slovakia, followed by Slovenia, the Czech Republic and Hungary. The share was rather low in the other countries.<sup>4</sup>

A closer look at the data shows that a high share of short-term debt (on the basis of original maturity) in mid-2008 did not necessarily go hand in hand with large liability-side outflows over the subsequent one-and-a-half years. While a full-fledged analysis is restricted by data limitations (e.g. lack of information on the currency structure of external liabilities), the following developments are still remarkable in a cross-country perspective. The Bulgarian banking sector recorded strong short-term inflows in the second half of 2008 and only a modest decline in 2009. As a result, short-term external debt – which had been very high in mid-2008 both as a percentage of total external debt and of GDP – did not decline in the review period. Measured in euro, short-term debt even increased by 12% from mid-2008 to end-2009, whereas long-term debt declined by 11%. As already noted, in Bulgaria the rollover risk was reduced because a large part of short-term debt was from Bulgarian subsidiaries to their parent banks. In Poland and Croatia,

<sup>3</sup> In mid-2008, the share of short-term debt to total external debt was 85% in Slovakia, about 75% in Bulgaria and the Czech Republic, 45% to 50% in Poland, Estonia and Latvia, and 25% to 35% in Hungary, Lithuania, Slovenia, Croatia, Romania, Ukraine and Russia.

<sup>4</sup> In mid-2008, the share of short-term debt to GDP was 36% in Latvia, 30% in Estonia, nearly 20% in Bulgaria and Slovakia, 13% in Slovenia, about 11% in the Czech Republic and Hungary, and between 4% to 7% in Lithuania, Poland, Croatia, Ukraine and Russia.

Chart 5a

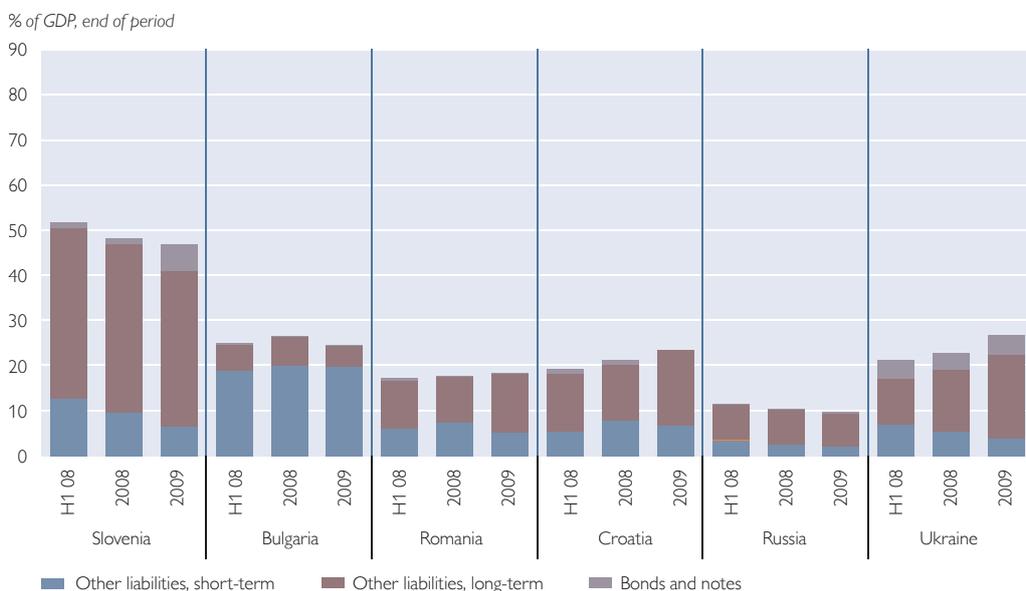
### Structure of Banks' External Debt



Source: IMF, national central banks.

Chart 5b

### Structure of Banks' External Debt



Source: IMF, national central banks.

short-term debt (in terms of euro) increased at an only slightly lower rate than long-term debt. A rather modest decline in short-term debt was seen in Estonia (by 2%, measured in euro), Hungary (3%) and Lithuania (5%). In turn, Russia, Ukraine and Slovenia saw the sharpest declines in short-term debt (50% to 60%), followed by the Czech Republic, Latvia (both around 30%) and Romania (25%).

As a result, the most marked decline in the share of short-term debt in total external debt was observed in Ukraine (by 18 percentage points to 15%). In the Czech Republic, Latvia, Romania, Russia and Slovenia, the ratio of short-term debt to total external debt declined by about 10 percentage points. In Poland, Lithuania, Croatia and Hungary, it stayed almost unchanged, even though Poland had recorded a relatively high ratio in mid-2008. In Bulgaria and Estonia, it even increased slightly. Slovakia represents a special case for the reasons mentioned above, with the share of short-term debt falling sharply to 50% of total external debt (and to 4% of GDP).

## **7.2 Other Investments Still Much More Important than Portfolio Investments**

External liabilities continued to be dominated by loans and deposits during the review period (see charts A2a and A2b in the annex). The dependence on portfolio securities remained relatively unchanged in Ukraine and increased in Slovenia and in Hungary, where the biggest bank, OTP, accounts for a significant portion of this component. In Slovenia, the stock of long-term portfolio debt securities (supported by state guarantees) as a percentage of total external liabilities increased markedly in the second half of 2009, while the share of loans and deposits declined as a consequence of the sizeable outflows recorded since the intensification of the global crisis. In Hungary, foreign holdings of portfolio equity securities became more important in 2009 and, as a percentage of GDP, reached the highest level (5%) in our country sample. Portfolio equity securities remained nonnegligible also in Poland (2% of GDP), but their share in total external liabilities declined due to an increase in long-term loans as well as currency and deposits.

The (still large) currency and deposits as well as loan liabilities positions also include the financing of local subsidiaries by foreign parent banks. However, the lack of systematic data on the share of parent bank funding within these components severely hampers any systematic analysis. Therefore, the next section will provide an overview of information from national central banks on parent bank funding and a proxy for parent bank funding derived from BIS banking statistics.

## **8 Parent Bank Funding Plays an Important Role**

While some observers argue that the integration of CESEE banks into international banking groups attenuated the slowdown in capital inflows (Berglöf et al., 2009; EBRD, 2009), lack of data prevents us from giving concrete figures on parent bank funding for the whole sample. Information available from national central banks and the IMF in general supports the hypothesis that parent bank funding was a positive factor during the crisis, in particular in the third and fourth quarters of 2008, when the global crisis intensified. While the role of parent bank funding is usually seen to be positive, there are still concerns that if an important parent bank experiences persistent financial tensions (which could result from market concerns about sovereign debt sustainability in the home country of that bank), these strains could also spill over to the region (see IMF, 2010b).

### **8.1 Coordinated International Policy Response Bolsters Parent Banks**

The coordinated measures taken by euro area countries to support their respective banking systems proved beneficial for the CESEE region, as most home

country authorities permitted the support of subsidiaries by parent banks (including the use of state capital injections for subsidiaries), i.e. there was no ring-fencing. Apart from the repo arrangements for Poland and Hungary mentioned above, CESEE countries outside the euro area also benefited indirectly from other measures taken by the ECB. In particular, the ECB extended liquidity support to euro area-based banks, which helped these banks continue the refinancing of their CESEE subsidiaries. As part of the euro area, Slovakia and Slovenia benefited directly from those measures. Moreover, Hungary, Latvia and Romania (and other countries in the region not covered in this study), which agreed on a multilateral support package with the IMF and the EU, benefited from the European Bank Coordination Initiative (“Vienna Initiative”), which was successful in coordinating the response of major public and private stakeholders to the financial crisis in CESEE (EBRD, 2009). As part of this initiative, EU-based parent banks pledged to keep their direct and indirect exposures and to recapitalize their CESEE subsidiaries if needed.

## 8.2 Publicly Available Information Points to Positive Role of Parent Banks

Information from national central banks sheds further light on the issue of parent bank financing during the crisis period. According to the MNB (2009 and 2010), foreign parent banks raised the financing of their Hungarian subsidiaries by nearly EUR 3 billion in the last quarter of 2008. In 2009, the volume of external funding began to decline as a result of normalizing liquidity conditions and of balance sheet adjustments. The share of parent bank funds in total external funds rose to 60% by the end of 2009, compared to about 50% in mid-2008. The MNB argues that parent bank commitments mitigated the risks arising from the high rate of short-term foreign funding. In addition, parent banks increased their own subsidiaries’ capital in numerous cases.

The NBP (2009a) reports that the risk of a withdrawal of foreign funding did not materialize in Poland. The largest increase in liabilities to parent entities was recorded in September and October 2008. Moreover, most Polish banks decided to retain 2008 profits in capital, and some banks also received subordinated loans from parent entities. After marked growth in the fourth quarter of 2008, funding from foreign parent entities remained at a stable level in 2009 (NBP, 2009b). Because foreign parent banks continued to renew financing provided in the fall of 2008, the Polish banking sector was able to continue lending despite difficulties in obtaining long-term funding from the domestic interbank market.

According to Banka Slovenije (2009), refinancing risks related to external liabilities primarily affected domestically owned banks, which constitute a considerable part of Slovenia’s banking system. In the second half of 2008, the majority of external borrowing (about three-quarters) was raised by foreign-owned banks. The large domestic banks made debt repayments in the final quarter of 2008. Similarly, in the first two months of 2009, they again raised no new loans from abroad. As funding conditions tightened in the fall of 2008, banks actively competed over interest rates on deposits by the nonbanking sectors for some time, but only partly made up for the loss of funding from foreign banks. The banks compensated for the drop in external funding with government deposits, government-guaranteed bonds and funds raised at the ECB. In 2009, accessing external funding was still easier for foreign-owned banks than for domestically owned banks.

However, the amount of newly raised loans remained below the precrisis level (Banka Slovenije, 2010).

In the case of Bulgaria, the IMF finds that foreign parent banks have broadly maintained their level of funding of their local subsidiaries (IMF, 2010a). In 2008, the Bulgarian National Bank requested commitment letters from foreign parents to ensure that they provide adequate liquidity and capital. (In fact, this concern was not specifically related to Bulgaria but characteristic of the region as a whole.) The IMF also stresses that the decline in total foreign funding resulted in strong competition for domestic deposits in Bulgaria (and other CESEE countries).

In Croatia, foreign credit inflows, mostly from parent banks, were important for maintaining bank liquidity during the most severe turbulence in international financial markets. In the first nine months of 2009, banks continued to rely on foreign sources, above all deposits of their foreign owners, to compensate for the sluggish collection of residents' deposits. Stronger owner support in the form of deposits together with a slight increase in residents' deposits and reliance on previously accumulated liquidity reserves enabled banks to continue their lending activities in 2009 (HNB, 2009 and 2010).

According to Lietuvos Bankas (LB, 2009), Lithuania avoided liquidity problems in the fourth quarter of 2008 as parent banks fully compensated the decline in domestic deposits in the case of foreign-owned banks. By contrast, domestically owned banks responded to the liquidity shock by offering substantially higher deposit interest rates. In 2008, the banking sector's debt to parent banks soared by 38% to 43% of total balance sheet liabilities, which corresponds to about 94% of the banking sector's external liabilities. During 2009, financial flows generated by a shrinking loan portfolio and by the deposits attracted were used to reduce liabilities to parent banks (see chart A3 in the annex). The amount of funds provided by parent banks decreased to 39% of total balance sheet liabilities at end-2009 (LB, 2010). However, as a percentage of external liabilities, the share of parent bank funds increased to 98%. At the same time, domestically owned banks actively competed in the deposit market by offering high interest rates (LB, 2010).

Eesti Pank reports that in the fall of 2008, Estonian banks were able to compensate the slight decrease in deposits by drawing additional funds from parent banks where necessary (Eesti Pank, 2008). At a later stage, the funding needs of banks decreased in line with demand for new lending. Furthermore, Eesti Pank states that the parent banks of larger market participants had sufficient access to wholesale funding and were able to provide funding to their subsidiaries in Estonia. Nevertheless, the competition for domestic deposits increased (Eesti Pank, 2010). In February 2009, Eesti Pank entered into a precautionary arrangement with the Swedish central bank to enhance its capabilities to provide liquidity under the currency board regime in place in Estonia. According to Eesti Pank, the arrangement was a step to complement the high liquidity and capital buffers of Swedish banks' branches and subsidiaries operating in Estonia.<sup>5</sup>

The financial stability reports of Latvijas Banka give interesting insights into the role of parent bank funding in Latvia, since they contain explicit information on the development of assets and liabilities of the subsidiaries of both foreign-owned and domestically owned banks (Latvijas Banka, 2009 and 2010). In the

<sup>5</sup> See [www.eestipank.info/pub/en/press/Press/pressiteated/pt2009/\\_02/pt0227](http://www.eestipank.info/pub/en/press/Press/pressiteated/pt2009/_02/pt0227).

fourth quarter of 2008, foreign-owned banks received additional funds from their parent banks. At that time, domestically owned banks were confronted with large-scale outflows of nonresidents' deposits (their dominant funding source) and repayments of syndicated loans. Deposit outflows had to be compensated by central government deposits (deposited at Parex banka, the country's second-largest bank, which the state had to take over during the crisis). In 2009, liabilities of foreign-owned banks to their parent banks decreased mainly on account of a contraction of the loan portfolio and an increase of paid-up and subordinated capital. For domestically owned banks, the structure of funding was notably affected by a further decrease in deposits as well as by repayments of syndicated loans. The amount of Treasury deposits with Parex banka stayed largely constant over the year 2009.

In Russia, banks on an aggregate level experienced sizeable outflows. Large government-controlled banks were hardly in a position to access external funding markets in 2009 but subsidiaries of foreign banks raised additional funds from their parent institutions. Banks with foreign stakeholdings in authorized capital proved more resilient to the financial crisis due to their conservative strategies and support from parent banks (Bank of Russia, 2010).

Ukraine faced severe balance-of-payments pressures but, according to the IMF, foreign-owned banks were able to secure funding from their parents (IMF, 2009b).

### 8.3 A Proxy for Parent Bank Funding

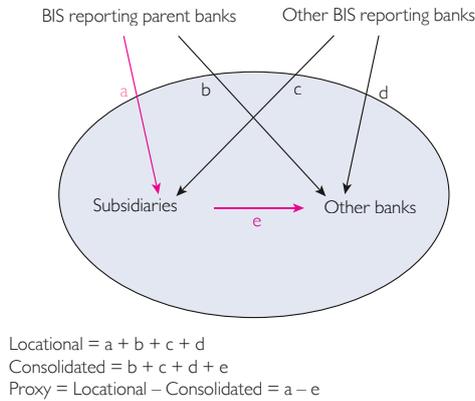
BIS banking statistics also confirm that parent banks have continued to support their subsidiaries and branches in CESEE and have been a more stable source of funding than other external sources. As BIS banking statistics do not include a direct measure for claims of parent banks vis-à-vis their CESEE subsidiaries, we construct a proxy by using the difference between BIS locational statistics on an immediate borrower basis (which do not net out intragroup lending) and BIS consolidated statistics (which do). This proxy no doubt has certain shortcomings and has to be used with caution because first, the population sample of locational and consolidated statistics is different,<sup>6</sup> and second, foreign currency lending from subsidiaries to other banks<sup>7</sup> cannot be singled out, which means that the proxy underestimates the claims of parent banks on their subsidiaries. Thus, when looking at developments over time, the proxy is particularly biased if subsidiaries of foreign parent banks are to a large extent involved in interbank foreign currency lending and this component shows strong fluctuations. Third, locational statistics include cross-border claims of BIS reporting banks vis-à-vis central banks while consolidated statistics do not. However, the amount of these claims is usually negligible. Fourth, the proxy underestimates parent bank funding if parents partly finance their CESEE subsidiaries via nonrelated entities located in a financial center (round-tripping of funds).

<sup>6</sup> *BIS locational statistics comprise 42 reporting countries, while BIS consolidated statistics cover only 30 countries. The following countries are included in the locational statistics but not in the consolidated statistics: the Bahamas, Bahrain, Bermuda, the Cayman Islands, Cyprus, Guernsey, the Isle of Man, Macao SAR, Malaysia, the Netherlands Antilles, South Africa and South Korea.*

<sup>7</sup> *Item e in chart 6.*

Chart 6

**A Proxy for Parent Bank Funding on the Basis of Positions vis-à-vis Banks**



Source: Author's considerations based on BIS 2008a, 2008b and 2009.  
 Note: e comprises only foreign currency interbank lending.

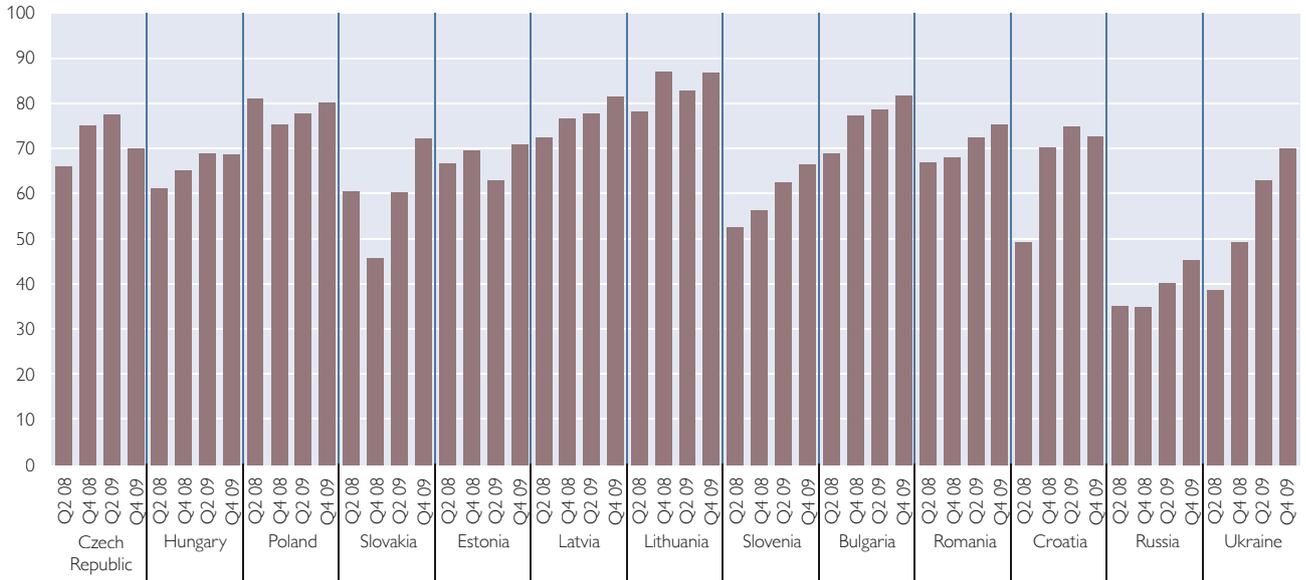
Despite its shortcomings, this proxy is to our knowledge and assessment the best option available. Interestingly, Chart 7 shows that the share of intragroup lending to subsidiaries in total external claims of BIS reporting banks increased vis-à-vis all CESEE banking sectors from mid-2008 until end-2009. It is also remarkable that this increase (from comparably low levels) was particularly strong in Slovenia, Russia and above all in Ukraine, i.e. in banking sectors which experienced severe total outflows. Only in the case of Poland does the proxy indicate that the share of parent bank lending to domestic subsidiaries in total external claims of BIS reporting banks

declined in the second half of 2008, which does not appear to be in line with the observations reported by the NBP (see above). According to the NBP, parent bank funding increased markedly in the fourth quarter of 2008.

Chart 7

**Proxy for the Share of Parent Bank Lending to CESEE Subsidiaries**

% of total external claims of BIS reporting banks



Source: BIS, OeNB calculations.

## 9 Concluding Remarks

In this paper, we present systematic regional and cross-country information about the refinancing structure of the banking sectors in 13 CESEE countries, namely the CESEE EU Member States as well as Croatia, Ukraine and Russia. Our goal was to present the most recent data available (covering the period from mid-2008 until end-2009) and to focus on the situation following the intensification of the financial crisis.

Sizeable net external liabilities that had accumulated in the years prior to the crisis in most CESEE countries under review raised concerns that liquidity and refinancing risks for banking sectors in this region could materialize in an environment of deteriorating global funding conditions. We examined whether these risks actually materialized.

Our analysis shows that, notwithstanding the severe global financial turbulences, the majority of CESEE banking sectors received additional funds from abroad (in net terms) in the third and fourth quarters of 2008. Taking together these two quarters, outflows were seen only in Russia, Slovenia, the Czech Republic and Latvia. Yet, in the course of 2009, liability-side net capital flows to banks (at least temporarily) turned negative (or remained negative) in all countries except Poland. However, the size of these outflows differed considerably across banking sectors.

Looking at the whole review period, our findings suggest that the outflows affected above all banking sectors that had very high net foreign liabilities at the onset of the crisis (i.e. in the Baltic countries, particularly Latvia and Estonia) and banking sectors with comparatively low levels of foreign ownership (Slovenia, Ukraine and Russia). Moreover, external assets helped cope with external financing constraints in all countries except Russia and Ukraine.

Information available from national central banks as well as a proxy for parent bank funding, which we derived from BIS banking statistics, suggest that foreign-owned banks were indeed supported by their parent institutions (mostly euro area-based banks). In particular, there is substantial evidence that foreign ownership reduced the rollover risk in those cases in which short-term loans were mostly from parent banks.

As a result, the maturity structure of external debt did not change substantially across the country sample during the review period. Hence, it seems that creditors (and their relationship with debtors) are at least as important for the stability of funding as the maturity structure of refinancing. These findings – larger outflows in case of initially larger net foreign liabilities and the positive role of parent bank funding – are confirmed by the results of other recent studies reviewed in section 2.

In some countries, the provision of additional funds from parent banks helped compensate for temporary deposit withdrawals or a stagnation of the deposit base (particularly in Lithuania, Estonia and Croatia). In other countries, the banking sectors – on an aggregate level – were confronted with external funding constraints and deposit withdrawals at the same time (Russia, Ukraine). It should be noted, however, that disaggregated information in countries with a low level of foreign ownership suggests that foreign-owned banks found it easier to obtain external funds than domestically owned banks. As a consequence of external funding constraints (in particular wholesale funding), the competition for domes-

tic deposits increased. Some national central banks report that particularly domestically owned banks actively competed for deposits by offering higher rates, while in other countries all banks intensified their efforts to attract deposits irrespective of their ownership.

Against the background of still relatively high net external liabilities, most CESEE banking sectors will remain confronted with considerable rollover needs over the next few years. In fact, some of them remain highly dependent on external financial resources. Those banking sectors that were able to roll over most of their short-term debt during the last two years obviously still have a large share of short-term external debt on their balance sheets. The nature of the refinancing structure (i.e. strong capital base, low dependence on capital markets, substantial funding from parent banks with a strong commitment to the region) is likely to mitigate refinancing risks, as it has so far in the financial crisis, in particular as long as parent banks remain in a position to fund their subsidiaries.

It is unlikely that the precrisis levels of new external financing in the form of parent bank and wholesale funding will be reached again for some time. On the supply side, large refinancing needs in the global banking sector, especially in the euro area, over the coming years (BIS, 2010; IMF, 2010c) might constrain the provision of additional funds to affiliated and nonaffiliated banks abroad and/or make these funds more costly. On the demand side, low private sector credit demand in the early stage of the still fragile recovery implies that the need for external funds by banks active in CESEE will remain subdued as well, in particular in the short run. This seems especially relevant for countries lagging behind in economic recovery. Nevertheless, net external liabilities will remain an important refinancing item, given that their levels are still high – for most CESEE countries, a shift to a larger share of domestic funding can only be expected to be gradual.

What do our results suggest in terms of policy implications? Generally, from a funding perspective, the strategy of integrating CESEE banking sectors in European banking groups was successful in mitigating the impact of external shocks during this particular crisis episode. Public assistance (multilateral support packages for several CESEE countries as well as access to government support mechanisms and ECB liquidity by euro area parent banks) certainly helped parent banks to support their subsidiaries. Moreover, the Vienna Initiative reduced the risks of a negative equilibrium because it ensured that banks had incentives to stay in the region and the reassurance that other banks would not withdraw, either.

The commitment of parent banks vis-à-vis their subsidiaries rests on several underlying factors. Parent banks perceive the CESEE region as extended home markets, not least because of the expected higher long-term profitability in these countries. Moreover, parent banks are eager to avoid endangering their reputation by suddenly withdrawing funds from subsidiaries (reputational risk). These factors can be expected to remain in place, suggesting that parent banks are likely to play a positive role also in possible future crises in the region as a whole or in individual countries.

This experience of the more advanced CESEE countries may be relevant for other emerging economies, in which not all major banks have been privatized so far. However, Vogel and Winkler (2010) come to the conclusion that foreign banks did not keep cross-border bank flows stable to emerging markets in general and that the CESEE countries have been different due to their special context of Euro-

pean integration. Moreover, the strategy of integrating national banking sectors into cross-border banking networks is not without risk. Financial strains can spill over to the host country if an important parent bank faces major financial difficulties.

Our findings also show that overly high net external liabilities were usually associated with more pronounced capital outflows from banking sectors (in particular wholesale funding) during the crisis. This is one of the reasons why it would seem useful to consider policy measures to limit net external liabilities in phases of dynamic growth and financial sector development. While this study focused on liability-side risks, proposals for regulatory measures will also have to take into account the asset side (in particular, the question of which kinds of loans banks refinance by using the various funding sources available) and, more generally, overall macrofinancial stability (e.g. the question of whether domestic credit growth goes hand in hand with large external imbalances).

A direct way to address the issue of overly high net external liabilities in the banking sector would be to introduce a maximum ratio of net external liabilities to banking assets.<sup>8</sup> The observation of such a ratio, which would not include equity provided by foreign investors, would ensure that banks limit the size of external liabilities and/or build up sufficient external asset buffers. Such a measure could be particularly useful in limiting the build-up of external liabilities for the purpose of funding domestic foreign currency loans to households, which typically cannot borrow cross-border. In a similar vein, Shin (2010) proposes to introduce a non-core liabilities tax as a tool to dampen the procyclicality of the financial system especially for emerging economies (core liabilities are essentially retail deposits and money market funds). In banking sectors in which noncore liabilities mainly consist of external liabilities this measure would have similar implications as the introduction of a maximum net external liability ratio. In fact, the latter could be interpreted as a special case of noncore liability tax where the tax rate is zero up to a permitted threshold (which then would have to be defined in net terms) and infinite beyond that threshold. Alternatively, authorities could introduce a ratio of banks' liquid foreign currency claims to foreign currency liabilities – a measure that is already in place in Croatia. Another option would be to tax or limit (via prudential measures) foreign currency lending to reduce the need for external funds.

In turn, measures that aim to reduce lending in foreign currency should be accompanied by the build-up or further development of local currency and capital markets. In fact, the EBRD already launched a Local Currency and Local Capital Markets Initiative in May 2010 (for more details, see EBRD, 2010). This initiative aims at supporting and complementing the actions of many governments to build up local sources of funding and reduce the use of foreign exchange in the domestic financial system. These policy measures will have an impact on the refinancing structure of banking sectors in the region over time as they will most likely induce CESEE banks to raise more domestic deposits and/or to issue more local currency-denominated bonds.

<sup>8</sup> To avoid circumventions, this ratio could also include local currency bonds issued by banks domestically through private placements that are acquired by foreign investors. Moreover, the ratio could also include domestically issued foreign currency bonds.

Overall, the financial crisis has put CESEE banking sectors and their refinancing strategies to a severe test. Despite considerable differences across countries, CESEE banking sectors have weathered this shock without experiencing any meltdowns. Our study confirms that the integration of many CESEE banks into European banking networks proved to be a stabilizing factor at the height of the crisis – a finding that is also supported by other most recent papers. However, the experience gained from the crisis also suggests that, looking forward, policy-makers should consider measures to avoid an overly high build-up of net external liabilities.

While the situation of CESEE banking sectors started to stabilize more recently, the overall situation continues to be diversified, and some fragilities remain. Therefore, to safeguard overall macrofinancial stability in the CESEE region, the refinancing developments of CESEE banking sectors still need to be monitored and analyzed regularly.

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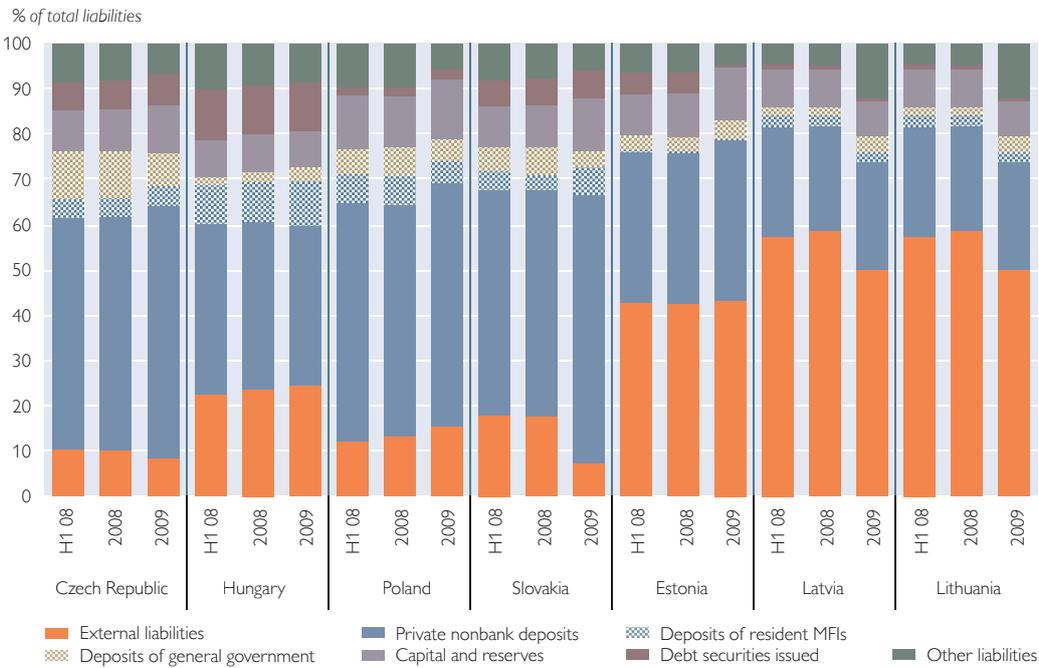
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Annex

Chart A1a

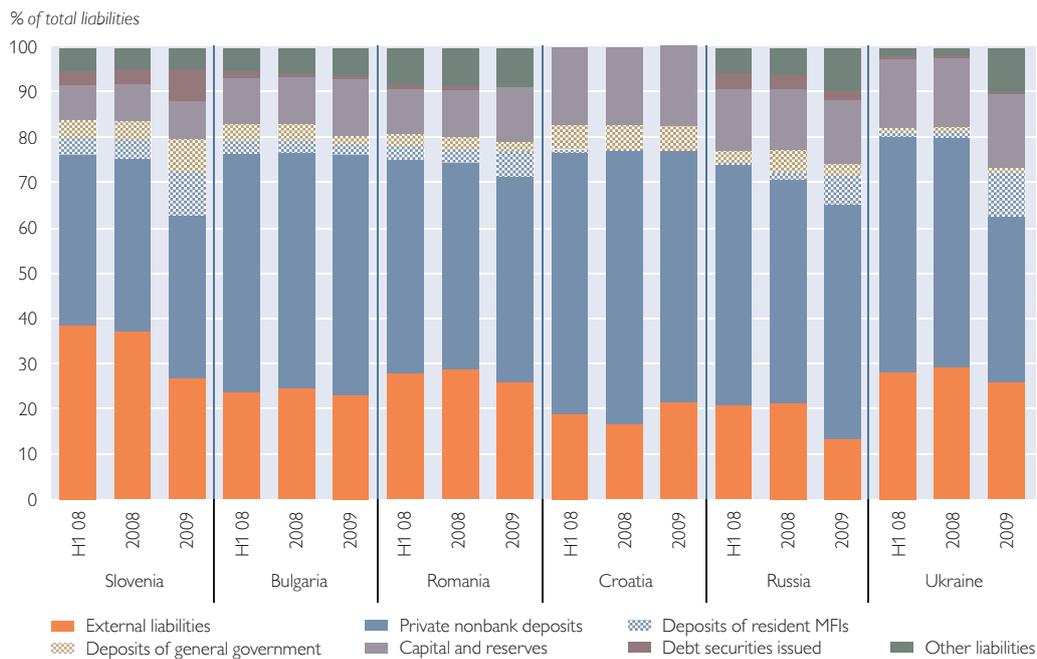
Gross Liabilities of CESEE Banking Sectors



Source: National central banks.

Chart A1b

Gross Liabilities of CESEE Banking Sectors

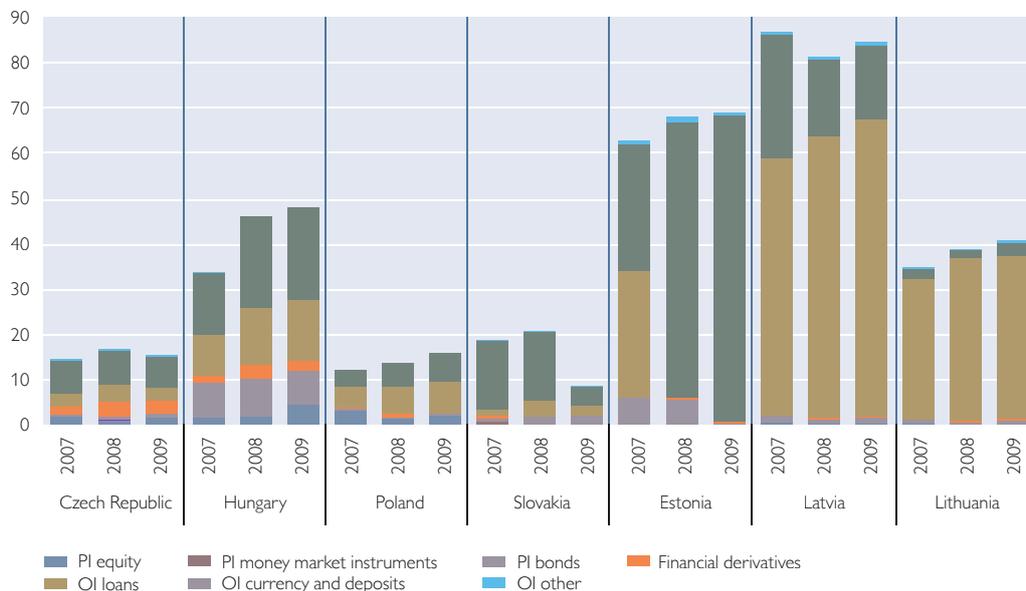


Source: National central banks.

Chart A2a

### Structure of Banks' External Liabilities

% of GDP, end of period



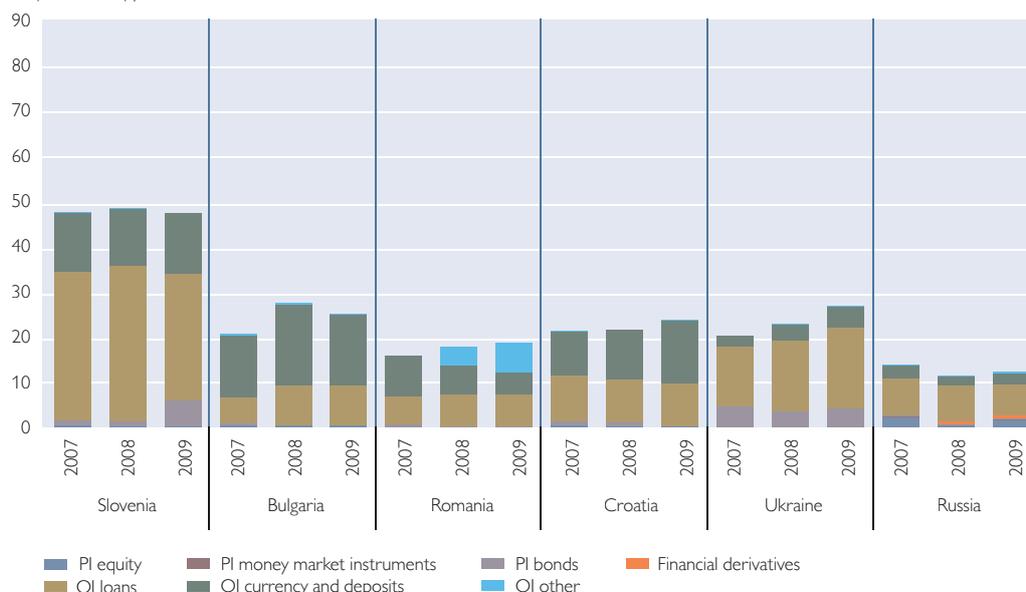
Source: IMF, national central banks.

Note: PI = portfolio investment, OI = other investment. FDI-related positions are not included due to lack of data.

Chart A2b

### Structure of Banks' External Liabilities

% of GDP, end of period



Source: IMF, national central banks.

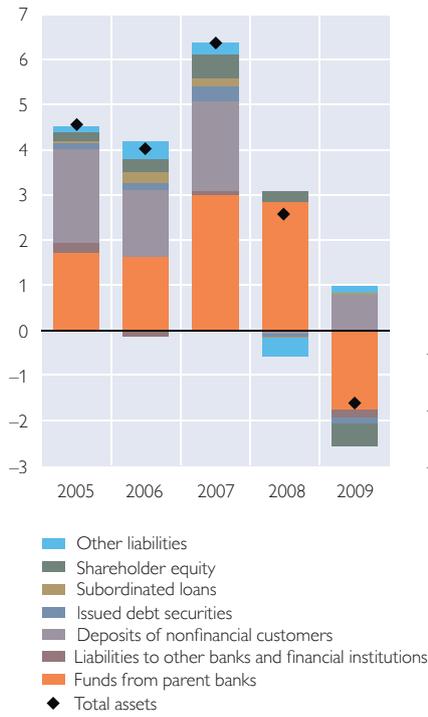
Note: PI = portfolio investment, OI = other investment. FDI-related positions are not included due to lack of data.

Chart A3

### Parent Bank Funding: The Case of Lithuania

#### Shifts in Funding Sources of Banking System Assets

EUR billion, annual rate of change



#### Changes in Selected Balance Sheet Items of Foreign-Owned Banks

LTL billion



Source: Lietuvos Bankas.

# FDI, Trade and Growth in CESEE Countries

Jarko Fidrmuc,  
Reiner Martin<sup>1</sup>

*Central, Eastern and Southeastern Europe (CESEE) had experienced an export boom as well as a surge in capital inflows up to the outbreak of the economic and financial crisis, which had a major negative impact on these two facets of the CESEE growth model. Did the long-term growth prospects of the CESEE countries deteriorate, too? To answer this question, we estimate the long-run relationship and test the causality between capital flows, exports and industrial production. Vector error correction models show that exports and the stock of FDI in the CESEE region are positively related to industrial production and thus economic growth. By contrast, portfolio investment is only weakly related to the region's industrial growth performance. These findings imply that the CESEE countries should pursue two objectives: remain attractive locations for inward FDI and enhance their export prospects.*

*JEL classification: F43, F21, C32*

*Keywords: Export-led growth, FDI, capital inflows, heterogeneous firms, cointegration, weak exogeneity test*

## 1 Introduction and Motivation

Most of the countries in Central, Eastern and Southeastern Europe (CESEE)<sup>2</sup> are seen as good examples of the growth-enhancing effect of downhill capital flows, i.e. capital flows from relatively capital-rich to relatively capital-poor countries. In addition, they are good examples for an export-led growth strategy. Especially in more recent papers on growth in the region, it is, however, often emphasized that in the years before the recent economic and financial crisis, growth had been overly consumption driven (EBRD, 2010). These two facets of the CESEE region's recent growth experience – substantial capital inflows and a very strong export performance – are closely interrelated. Besides, they need to be seen in the context of the region's gradual EU integration, which, in 2004 and 2007, culminated in the accession of ten CESEE countries to the EU. First, a large share of the capital flows into the region originated from the EU. These inflows, in particular inward FDI, arguably helped build up the capital stock in the CESEE countries, which was expected to facilitate export growth. Second, EU integration provided a major boost for the CESEE exporting industries by opening up a large market at the region's doorstep.

The economic and financial crisis, which started in 2007 (or 2008 for most of the CESEE region), had a major impact on these two facets of the CESEE growth model.<sup>3</sup> First, capital inflows into the region took a severe hit, yet the worst-case scenario of a financial meltdown did not occur. Second, import demand in Western European countries, the region's main trading partners, decreased significantly, with a marked effect on the trade of the CESEE countries (Francois and Wörz, 2009; Keppel and Wörz, 2010). Taken together, these developments have led to a

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<sup>2</sup> We focus on the following countries: Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

<sup>3</sup> For more details on the impact of the crisis on the region, see e.g. Gardó and Martin (2010).

rise in uncertainty about the region's medium- and long-term growth prospects. In particular, a possible permanent decline of capital flows (Jevčák, Setzer and Suardi, 2010) is seen as a potential cause of concern for the long-term growth prospects of the region. In addition, there is considerable uncertainty about the long-term prospects of external demand.

In this paper, we address the medium-term growth prospects for the CESEE region by estimating the long-run relationship between FDI, exports and growth. More specifically, in the framework of vector error correction models, we test whether growth is determined by the external variables. In particular, we present the pair-wise weak exogeneity tests between growth and FDI or exports, which are associated with the investment-led growth hypothesis and the export-led growth hypothesis. Trade and FDI are often mentioned in the literature as the most important elements of the CESEE growth model. However, to the best of our knowledge, they have not been tested formally to date. Therefore, we believe that a rigorous quantitative cross-country examination of the interlinkages between capital flows, exports and industrial production can help assess the possible long-term implications of the economic and financial crisis for the countries in the region.<sup>4</sup>

The paper is organized as follows. In section 2, we review the relevant literature. Section 3 provides stylized facts on the key variables of our analysis, and section 4 describes the estimation strategy as well as the empirical results. In section 5, we present our conclusions and propose some policy recommendations.

## 2 Literature Overview

### 2.1 Foreign Activities and Economic Growth

There is a long tradition of economic theories relating exports and other foreign activities to economic growth. Basically, these arguments go back to mercantilism and classical trade theories as presented by Adam Smith and David Ricardo. The importance of economic openness for growth gained popularity again when a number of Southeastern Asian emerging market economies (EMEs), e.g. Hong Kong, South Korea, Taiwan and Singapore, posted very rapid growth, especially between 1960 and 1980.<sup>5</sup> This was generally seen as a result of these countries opening up their economies, reducing trade barriers and attracting FDI. More generally, these explanations for rapid growth in a number of very open economies resulted in the development of the export-led growth hypothesis (Balassa, 1978; Marin, 1992). This theory, in turn, was also one of the intellectual arguments in favor of a rapid economic opening up of the CESEE countries after the end of the cold war and their integration into the EU.<sup>6</sup> Similarly, Herzer, Klasen and Nowak-Lehmann (2008) discuss FDI and growth in developing countries. For Eastern European countries, the relationship between FDI and growth is often addressed in earlier literature. Damijan and Rojec (2007) show that FDI contributed to the

<sup>4</sup> Besides addressing this important policy question, the paper also extends the existing literature in this field as more recent empirical approaches, such as cointegration analysis and weak exogeneity tests, are used.

<sup>5</sup> For a critical discussion with a focus on South Korea and Taiwan, see Rodrik (1995).

<sup>6</sup> More recently, the dynamic growth in China and India is often also seen from this perspective (Herrerias and Orts, 2010).

catching-up in CESEE countries. Campos and Kinoshita (2002) show that FDI was an important channel of technology transfer. Correspondingly, FDI had a significant and positive impact on growth in CESEE countries. Badinger and Tondl (2002) stress also the importance of capital accumulation and technology transfer for catching-up in Eastern Europe.

Nevertheless, the theoretical explanation of the export-led growth hypothesis remained rather weak. Several authors proposed models including learning-by-exporting effects (Krugman, 1980; Grossman and Helpman, 1991; Bernard et al., 2003; Damijan and Kostevc, 2006), but the empirical evidence supporting these models remained weak.<sup>7</sup> More recently, foreign trade theory based on heterogeneous firms (Melitz, 2003; Helpman, Melitz and Yeaple, 2004) stressed the relationship between productivity and different modes of international activities. In this strand of the literature, the productivity of firms at the domestic level is regarded as a major determinant of activities abroad. Once a firm achieves a certain productivity threshold, it starts to export to foreign markets. The most productive firms also set up subsidiaries abroad, which inherit the high productivity from their parent companies. This link (“pecking order”) between activities abroad and the relative level of productivity is due to the relationship between transport costs or the fixed costs of market entry and the variable costs of serving foreign markets from the home location. Only firms with a sufficiently high productivity level can export and compete with local firms. The productivity differential must be so high that products are competitive although they are subject to transport costs. Furthermore, only the most productive firms can afford to invest abroad, which is the microeconomic explanation why such inward investment flows increase the aggregate productivity level in the receiving country. In the new trade literature, this “self-selection channel” (Wagner, 2002) between foreign activity and productivity is referred to as the extensive margin of trade and FDI. At the macroeconomic level, the access of the most productive firms to foreign markets causes a link between foreign activity and growth, which is at the core of both the export- and the investment-led growth hypothesis.

## 2.2 Capital Inflows and Growth

The second facet of the CESEE growth model that we address in this paper – the substantial capital inflows in recent years – triggered a large amount of research that focused on its determinants and economic implications. Starting with the determinants for downhill capital flows, Lane (2008) emphasizes that EU accession implied lifting all capital controls at the time of accession at the latest and resulted in a range of institutional provisions that arguably fostered capital inflows. In addition, the region’s increasing financial integration with the EU, in particular the widespread foreign ownership of the CESEE banking sector, also contributed to capital inflows (Herrmann and Winkler, 2008).<sup>8</sup>

<sup>7</sup> While some authors found that exports had a positive impact on firms’ productivity (Baldwin and Gu, 2003; Blalock and Gertler, 2004), others found no such impact (Bernard and Jensen, 1999; Arnold and Hussinger, 2005).

<sup>8</sup> On the determinants of capital flows, see also e.g. Gibson and Tsakalotos (2004).

Turning to the economic implications of capital inflows into the region, Mileva (2008) finds that during the period from 1995 to 2005, FDI into 22 transition countries added to the capital stock and stimulated additional investment in the host countries, at least in less advanced transition economies. By contrast, loans (often from parent banks to local subsidiaries) are found to have only a significant positive effect on other investment in advanced transition economies, notably the new EU Member States and candidate countries. Mileva finds no significant effect for portfolio capital inflows. In another cross-country study, Gheeraert and Malek Mansour (2005) use a structural econometric model based on earlier work by Islam (1995) and find a significantly positive relationship between private capital flows and economic growth in 45 EMEs, including five CESEE countries as well as Russia. The results for FDI are, however, considerably more significant than for portfolio and equity investment.

Generally speaking, the academic debate on capital inflows into CESEE tended to be less skeptical of possible negative effects than it was for other emerging market regions (von Hagen and Siedschlag, 2008). This was partly because a relatively large share of capital inflows was FDI, which is seen as less volatile and more beneficial for economic development than short-term capital flows (Abiad, Leigh and Mody, 2009). Lane and Milesi-Ferretti (2006) argue, for example, that the large capital inflows to the CESEE countries had a positive impact on convergence and stress that FDI provided “attractive risk-sharing and technological benefits.” Other authors emphasize that the sustainability of the rapid convergence process in these countries also depends on the use of capital inflows. For instance, Bems and Schellekens (2007) argue that the recent rapid financial deepening process in emerging Europe disproportionately benefited the nontradable sector including real estate and construction rather than exports.<sup>9</sup> Following the same line of reasoning, Atoyán (2010) maintains that future growth in the CESEE countries should be supported more by exports rather than domestic demand and more by domestic savings rather than foreign capital. Another hotly debated issue related to recent capital inflows into the region is whether credit growth is still an equilibrium phenomenon. Zumer, Égert and Backé (2009) argue that the ratio of private sector credit stocks to GDP reached, and in a few cases surpassed, its estimated equilibrium level by early 2009 in most countries of the region.

Looking at EMEs outside the CESEE region, Sethi and Patnaik (2007) find long-run equilibrium relationships between private capital inflows into India, economic growth and the exchange rate for the period from 1995 to 2006. More specifically, they find that FDI and, to a smaller extent, portfolio investment have a positive impact on economic growth, while foreign institutional investment (FII) has a negative effect.<sup>10</sup> The BIS Committee on the Global Financial System (BIS, 2009) finds cross-country evidence that equity flows, especially FDI, are beneficial for growth because they diversify risk abroad and are often linked with a transfer of valuable expertise. By contrast, the benefits from debt flows are found to be ambiguous. In fact, this BIS report suggests that the opening up of capital

<sup>9</sup> Supporting this argument, Brixiova, Vartia and Wörgötter (2010) found that the massive recent capital inflows into Estonia had led to an excessive allocation of resources in the nontradable sector.

<sup>10</sup> Kim and Yong Yang (2008) find that inflows into South Korea led to a rise in stock prices but not in land prices.

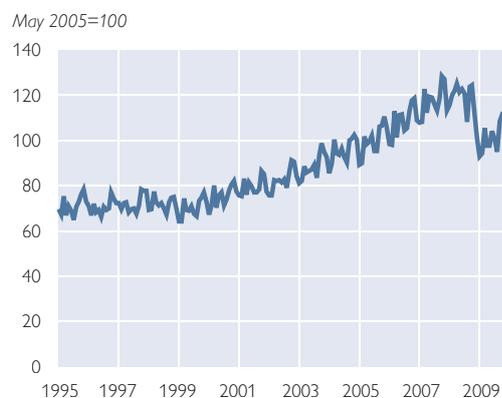
accounts only exerts a positive impact on the level of real income via the broadening and deepening of domestic financial markets, the strengthening of local financial institutions and the improvement of macroeconomic policies. The liberalization of capital flows is actually found to entail economic dangers if these elements are absent. Sabarowski (2009) looks at the appreciation of the real exchange rate due to capital inflows and the resulting possible destabilization of the macroeconomic situation. In line with the BIS report, he argues that this effect can be partly mitigated by developing a deep financial sector. Moreover, he finds that flexible exchange rate regimes help reduce the negative impact of capital inflows on the real exchange rate.

The long-term implications of the crisis for the growth prospects of the region have been discussed widely since the global economic and financial crisis started to affect the CESEE region, *inter alia* via a considerable decrease in capital imports and a collapse in export demand. Furceri and Zdzienicka (2010), looking at 11 European transition economies, find a stronger negative long-term effect on output in smaller transition countries with a relatively higher dependence on

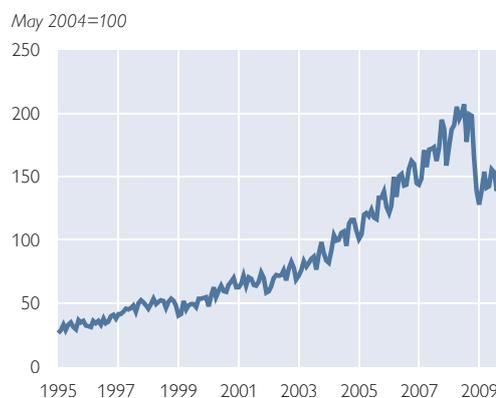
Chart 1

### Stylized Facts on Industrial Production, Exports and Capital Stocks in CESEE Countries, 1995–2009

#### Industrial Production



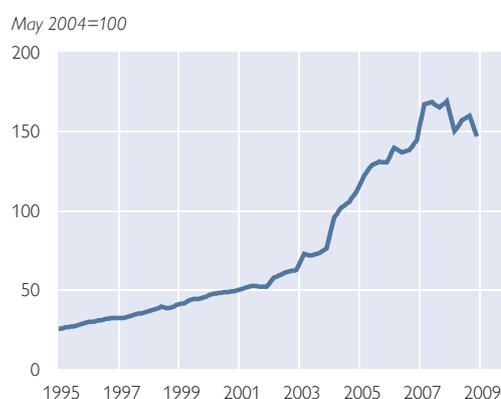
#### Exports



#### FDI Stocks



#### Portfolio Investment Stocks



Source: IMF, ECB, OeNB.

Note: Unweighted average of 11 CESEE countries (Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia).

external financing. They also find that this negative effect is much stronger in transition countries than in more advanced EU economies.<sup>11</sup>

To what extent external financing will resume remains to be seen, however. In the fall of 2009, the IMF (2009) assumed that FDI inflows to emerging Europe would decline by 49% in the period from 2008 to 2014 compared with the period from 2004 to 2007. Based on this and other assumptions, the IMF predicted a substantial drop in medium-term growth for emerging Europe. By spring 2010, capital inflows to some – but not all – of these countries had resumed, and the focus of the debate shifted back to making the best use of capital inflows, and notably to finding an appropriate balance between the tradable and nontradable sector (IMF, 2010).

### 3 Stylized Facts

In this section, we provide some stylized facts about the key variables used in the empirical analysis conducted in section 4 of the paper, namely industrial production (excluding construction), exports and the stocks of FDI and portfolio investment in the CESEE countries for the period 1995–2009. Looking first at the index of industrial production (excluding construction), a rather steady increase can be observed both in the CESEE aggregate (chart 1) and the individual CESEE countries (chart A1 in the annex). In addition, the impact of the 2008 crisis is clearly visible in almost all countries under review.

Turning to exports, the (unweighted) CESEE aggregate also shows an upward trend over time until the international economic and financial crisis hit the region in 2008 (chart 1). The rate of growth for the regional aggregate accelerated around 2003, i.e. just before the EU accession of eight CESEE countries. A look at the development of exports country by country (chart A2 in the annex) shows some country-specific differences, for example with regard to the severity of the impact of the 2008 crisis, but the overall picture is rather homogeneous.

A closer look at the scaling of the indices shows, however, that the growth rate of industrial production was much less pronounced than that of exports. Whereas a number of countries in the sample, e.g. Bulgaria, Croatia, Lithuania, Latvia and Romania, managed to increase their exports from around 50% of the 2004 level, measured at the beginning of the observation period, to almost 300% of that level just before the crisis, the corresponding growth pattern for industrial production seems much more modest and ranges generally from around 80% of the 2004 level in the late 1990s to around 150% of that level before the start of the crisis. The differences in the relative development of these indicators suggest that the CESEE economies became substantially more open over time.

The development of the stocks of FDI and portfolio investment also shows a strong increase over time. For these stock variables, the impact of the 2008 economic and financial crisis is, however, less visible than for exports and industrial production. By contrast, the step change in growth around the time of EU accession in 2004 is more noticeable for the stocks of FDI and portfolio investment than for the other two indicators. The country-specific panels in the annex (chart A3

<sup>11</sup> In a related analysis on a much larger sample of countries, Abiad et al. (2009) find that output tends to be substantially depressed following banking crises with no rebound to the pre-crisis trend. The recent international economic and financial crisis did not, however, result in “classic” banking crises in the CESEE region, thus limiting the applicability of these findings.

and chart A4) show that cross-country differences are also more pronounced than for the other two variables. With May 2004 again being the base level, the FDI stock in some CESEE countries, such as Bulgaria, Hungary and Romania, had increased by a factor of around five to six by 2009.

Overall, the stylized facts about the key variables we use in the analysis below suggest some strong similarities, in particular a dynamic growth pattern up until the outbreak of the economic and financial crisis in the CESEE region in 2008, the (more or less pronounced) positive change in the rate of growth around the time of EU accession and different degrees of heterogeneity across countries.

## 4 Empirical Analysis

### 4.1 Tests of Export- and FDI-Led Growth

In this part we analyze the determinants of industrial production. We are aware that the theoretical literature concentrates on the relationship between trade, FDI and productivity. However, productivity growth is generally associated with growth of industrial production. Moreover, we use levels of production in order to distinguish between productivity and efficiency changes. The latter, also referred to as jobless growth (Onaran, 2007), have played an important role in CESEE countries. By using growth of industrial production, we adjust productivity growth for employment reductions in industry.

A major problem for the empirical analysis relates to the availability and quality of the necessary data. Because standard quarterly time series are relatively short, we use monthly proxies including industrial production and exports. Stocks of FDI are interpolated into monthly data because there are no monthly proxies for these time series. Given the high persistence of FDI stocks, this is not likely to bias the results. All variables are in logs and are seasonally adjusted by means of the standard X12 seasonal filter. Standard unit root tests confirm that all variables can be considered as integrated variables.<sup>12</sup>

The modern literature on trade, FDI and productivity concentrates on the analysis of individual firm data. However, this introduces also several limitations on empirical analysis. Most importantly, consistent microeconomic data are usually not available for longer periods and on a cross-country basis. This applies in particular to microdata for CESEE countries. Therefore, we concentrate on aggregate data for industrial production, exports and FDI for 11 CESEE economies (Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia). For most countries, the data start in 1995. For some countries data are only available from the end of the 1990s.

We use the stock of inward FDI, because outward FDI is generally not important in CESEE. On the one hand, this corresponds with the investment-led growth hypothesis. On the other hand, outward FDI may have ambiguous effects. In particular, it can support domestic production by supplying cheap intermediate materials. It can also increase the demand potential for domestic products. However, outward FDI can also have a negative effect on domestic production if it is related to the outsourcing of labor-intensive parts of the production process. The CESEE countries lend themselves to testing the investment-led growth hypothesis, because only a few large firms in the region are also active as investors abroad.

<sup>12</sup> Detailed results are available upon request from the authors.

Output, exports, and the stock of FDI are expected and found to be nonstationary. We therefore estimate the following vector error correction (VEC) model:

$$\Delta X_t = \alpha\beta X_{t-1} + \sum_{i=1}^p A_i \Delta X_{t-i} + \varepsilon_t \quad (1)$$

where vector  $X$  includes output and the selected variable of foreign activity (exports or FDI). Furthermore, the long-run relationship includes also the deterministic components (intercept and – if necessary – a trend). Moreover, we include several dummy variables, which cover special factors. Growth improved in nearly all CESEE countries after EU accession in 2004 and 2007. Early reform periods were often characterized by a deterioration in economic performance, which is significant especially in Poland, Romania and Slovakia. The recent financial crisis put a damper on growth in nearly all CESEE countries whereas the Russian crisis of 1998 and 1999 reduced growth especially in the Baltic States, Poland and the Czech Republic. In addition, there was a country-specific financial crisis in the Czech Republic in 1997. Finally, the euro's introduction in Slovenia and Slovakia in 2007 and 2009, respectively, is expected to have had an impact on economic developments in these countries.

While the cointegration approach corresponds to the time series properties of the analyzed data, this approach also reflects that all variables are possibly endogenous. On the one hand, exports or investment abroad are expected to react to productivity growth. On the other hand, output might catch up as a result of exports and investment, which enhance productivity (the theoretical literature does not discuss this channel, though). The coefficients estimated on the error correction term, which are the elements of the vector  $\alpha$ , show how important these channels are for specific variables. In particular, we present the likelihood ratio test on the restriction that  $\alpha$  equals zero,

$$H_0: \alpha_i = 0 \quad (2)$$

For the previous analysis on growth determinants Granger causality tests are often used (e.g. Marin, 1992). However, as these tests are based on differenced data, they provide insights into the short-run dynamics between the variables. Therefore, the concept of long-run weak exogeneity is more appropriate for cointegrating time series (Ericsson, Hendry and Mizon, 1998).

#### 4.2 Empirical Results and Weak Exogeneity Tests

We start with the estimation of the export-led growth hypothesis (table A1 in the annex). Panel B shows that a robust cointegrating relationship between industrial production and exports can be found for all the selected countries. In other words, the null of no cointegration is clearly rejected by both of the presented cointegration tests. Panel A reports the estimated cointegration relationships. In general, we see a strong relationship between exports and production. The coefficients are very close to unity in all countries, with the exception of the Czech Republic and Slovenia. A surprisingly high coefficient is only found for Estonia (1.9). The cointegration tests confirm that the estimated relationship is a cointegrating relationship for all countries.

When we compare these results with the results for the relationship between industrial production and FDI (table A2), we see that this relationship is slightly weaker. In particular, the cointegration tests present weaker evidence on the existence of a cointegrating relationship between industrial production and FDI for Bulgaria, the Czech Republic and Slovakia. This outcome may, however, also reflect data restrictions, given that the stock of FDI relates to the whole economy and not only to the industrial sector.

Despite these problems, we get cointegrating relationships between FDI and industrial production in all countries. FDI seems to be a highly significant determinant of industrial production in all CESEE countries (and particularly so in Lithuania and Slovakia), which broadly confirms the FDI-led growth hypothesis for the countries in the region.

Table A3 presents the results for portfolio investment, which performs much worse than the previous specifications. This is – also in view of some empirical studies mentioned above – not really surprising, because portfolio investments are less related to technology transfers than FDI. More specifically, a cointegration relationship appears to exist only for Latvia, Lithuania and Poland. However, the coefficient for portfolio investment in the growth equation for Lithuania is negative and the coefficient for Latvia is low compared to previous FDI-based estimations.<sup>13</sup> Overall, the results do not provide much support for possible growth effects of portfolio investments in the CESEE region.

Further insights can be gained from the inspection of the estimated coefficients for the correction terms. In particular, the last panels of tables A1 and A2 present the results of the weak exogeneity tests, i.e. the likelihood ratio tests of the restriction that a particular adjustment coefficient is set to zero. This constraint should be rejected if a particular variable adjusts to deviations from the common trend. The results of the estimations with portfolio investments are not presented, because we did not find stable cointegrating relationships for these specifications.

The weak exogeneity tests show that in many cases either production or external activity is important for long-run growth. For approximately one-third of countries we confirm that both variables are endogenous. For Bulgaria, Croatia, Estonia (only for exports), Hungary, and Lithuania (only for FDI), the weak exogeneity tests indicate that industrial production is not influenced by the external variable in the long run. As a result, the export-led growth and/or FDI-led growth hypothesis is rejected in these cases. Instead, foreign activity appears to have adjusted to growth in these countries. In turn, output growth in Poland, Romania, Slovakia and Slovenia profited highly from exports and FDI. The remaining economies do not show a clear pattern of growth.

We tested the robustness of the presented results in several ways. First, we excluded observations before 2000. Similarly, we excluded observations after the Lehman crisis in September 2008. Both tests confirmed the stability of the main findings, but they reduced the number of observations. We also estimated a specification with industrial production, exports and FDI. For the majority of countries we received similar results as in the previous cases. In some countries

<sup>13</sup> For the remaining countries, the estimated long-run relationships are often insignificant (e.g. Slovakia), low in comparison to previous FDI coefficients (e.g. Slovenia) or negative (e.g. Croatia).

(e.g. Croatia), cointegration tests indicated two cointegrating relationships, which were more difficult to interpret. Therefore, we present only the pair-wise results.

## 5 Conclusions and Policy Recommendations

As of 2008, the CESEE economies were strongly affected by the economic and financial crisis, with the effects being mainly transmitted through the trade and financial channel (Gardó and Martin, 2010). All countries of the region suffered from severe declines of external demand and much lower (at times even negative) capital inflows. The growth implications for the region were dramatic. In fact, the CESEE region was more seriously affected than any other region worldwide, with performance being especially low when compared to other EMEs, notably China and India (Fidrmuc and Mayer, 2010).

The main question addressed in this paper is whether the long-term growth prospects of the CESEE countries are likely to have deteriorated as well. To answer this question – even though the prospects for external demand and capital inflows are still unknown – we look at the interlinkages between capital flows, exports and industrial production. Our results indicate that exports and the stock of FDI in the CESEE region are positively related to industrial production and thus economic growth. In nearly all CESEE countries under review, exports and FDI have a significant impact on industrial growth performance. Exports seem to be more important than the stock of FDI, but this may at least partly reflect statistical problems. By contrast, portfolio investment seems to be only weakly related to the industrial growth performance of the CESEE countries.

Finally, our results show that the relationship between trade, FDI and growth is highly complex. We confirm that both variables are endogenous. Output growth in Poland, Romania, Slovakia and Slovenia profited highly from exports and FDI. However, the weak exogeneity tests indicate that in the long run industrial production was not influenced by the external variables in Bulgaria, Croatia, Estonia, Hungary and Lithuania. As a result, the export-led growth and/or FDI-led growth hypothesis is rejected in these cases.

A number of policy implications can be derived from this analysis. First, the positive link between the FDI stock and industrial production implies that the CESEE countries should strive to remain attractive locations for inward FDI. To this end, they may apply a diverse set of policy measures ranging from macroeconomic stability including sound fiscal policy to microeconomic (structural) reforms, e.g. to create a business-friendly regulatory environment and flexible labor markets. Second, our results indicate that a reduction of portfolio investments is unlikely to have significant repercussions for the growth prospects of the region. In fact, the literature on capital inflows suggests that large portfolio inflows may at times entail economic risks. Third, the CESEE countries should undertake suitable policies to enhance their export prospects, both specific measures, such as export promotion, and more general macro- and microeconomic policy reforms, which are often closely related to action that helps support countries' attractiveness for FDI inflows.

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## Annex

Table A1

## Industrial Production and Exports in Selected CESEE Countries

|                                 | Bulgaria                    | Czech Republic                      | Croatia        | Estonia                   | Hungary        | Latvia          |
|---------------------------------|-----------------------------|-------------------------------------|----------------|---------------------------|----------------|-----------------|
| Period                          | 2000:3–2009:12              | 1995:4–2009:12                      | 1995:4–2009:12 | 1998:4–2009:11            | 1995:4–2009:10 | 1999:1–2009:11  |
| <b>A. Estimation Results</b>    |                             |                                     |                |                           |                |                 |
| Lags                            | 1                           | 2                                   | 2              | 2                         | 2              | 2               |
| No. of observations             | 118                         | 177                                 | 177            | 140                       | 175            | 131             |
| Exports                         | 1.135                       | 0.472                               | 0.694          | 1.933                     | 0.779          | 0.916           |
| t-stat                          | 12.997                      | 8.651                               | 19.348         | 5.996                     | 18.852         | 8.599           |
| Intercept                       | 1.481                       | 1.133                               | 1.989          | –3.564                    | –2.601         | 3.941           |
| Included dummies                | eu07, fincrisis, fincrisis2 | czcrisis, rucrisis, eu04, fincrisis |                | rucrisis, eu04, fincrisis | eu04           | fincrisis, eu04 |
| <b>B. Cointegration Tests</b>   |                             |                                     |                |                           |                |                 |
| Trace statistics                | 18.140 **                   | 18.321 **                           | 37.734 ***     | 18.911 **                 | 28.359 ***     | 15.536 **       |
| p-value                         | 0.020                       | 0.018                               | 0.000          | 0.015                     | 0.000          | 0.049           |
| ME statistics                   | 17.968 **                   | 18.174 **                           | 36.589 ***     | 16.815 **                 | 24.829 ***     | 14.669 **       |
| p-value                         | 0.012                       | 0.012                               | 0.000          | 0.019                     | 0.001          | 0.043           |
| <b>C. Weak Exogeneity Tests</b> |                             |                                     |                |                           |                |                 |
| Industrial production           | 0.485                       | 15.513 ***                          | 3.045 *        | 1.469                     | 1.774          | 4.229 **        |
| p-value                         | 0.486                       | 0.000                               | 0.081          | 0.226                     | 0.183          | 0.040           |
| Exports                         | 14.974 ***                  | 1.765                               | 27.109 ***     | 13.837 ***                | 7.018 ***      | 4.172 **        |
| p-value                         | 0.000                       | 0.184                               | 0.000          | 0.000                     | 0.008          | 0.041           |

Source: Authors' estimations.

Note: The following dummy variables are not reported: eu04 (2004:5–2009:12), eu07 (2007:1–2009:12), czcrisis (1997 Czech financial crisis), rucrisis (1998–1999 Russian financial crisis), fincrisis (financial crisis 2008:9–2009:12), fincrisis2 (2009:1–2009:12). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.

Table A1 continued

## Industrial Production and Exports in Selected CESEE Countries

|                                 | Lithuania      | Poland              | Romania             | Slovakia                      | Slovenia       |
|---------------------------------|----------------|---------------------|---------------------|-------------------------------|----------------|
| Period                          | 1997:4–2009:12 | 1995:4–2009:10      | 1995:4–2009:12      | 1995:3–2009:11                | 1995:4–2009:12 |
| <b>A. Estimation Results</b>    |                |                     |                     |                               |                |
| Lags                            | 2              | 2                   | 2                   | 2                             | 2              |
| No. of observations             | 153            | 175                 | 177                 | 177                           | 177            |
| Exports                         | 0.675          | 0.761               | 0.875               | 0.820                         | 0.368          |
| t-stat                          | 16.093         | 10.920              | 7.620               | 9.950                         | 18.587         |
| Intercept                       | 2.338          | 0.549               | 1.038               | –0.775                        | 1.688          |
| Included dummies                |                | early reforms, eu04 | early reforms, eu07 | eu07, skeuro, delayed reforms |                |
| <b>B. Cointegration Tests</b>   |                |                     |                     |                               |                |
| Trace statistics                | 16.507 **      | 20.521 ***          | 24.608 ***          | 21.062 ***                    | 22.695 ***     |
| p-value                         | 0.035          | 0.008               | 0.002               | 0.007                         | 0.004          |
| ME statistics                   | 16.089 **      | 20.377 ***          | 21.381 ***          | 19.312 ***                    | 21.209 ***     |
| p-value                         | 0.026          | 0.005               | 0.003               | 0.007                         | 0.003          |
| <b>C. Weak Exogeneity Tests</b> |                |                     |                     |                               |                |
| Industrial production           | 11.853 ***     | 13.567 ***          | 10.922 ***          | 5.882 **                      | 19.359 ***     |
| p-value                         | 0.001          | 0.000               | 0.001               | 0.015                         | 0.000          |
| Exports                         | 1.235          | 0.903               | 4.089 **            | 3.072 *                       | 5.481 **       |
| p-value                         | 0.266          | 0.342               | 0.043               | 0.080                         | 0.019          |

Source: Authors' estimations.

Note: The following dummy variables are not reported: eu04 (2004:5–2009:12), eu07 (2007:1–2009:12), early reforms in Poland (1995–1999), early reforms in Romania (1995–1997), delayed reforms in Slovakia (1995:1–1998:10), skeuro (euro introduction in Slovakia, 2009:1–2009:12). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.

## Industrial Production and FDI in Selected CESEE Countries

|                                 | Bulgaria        | Czech Republic                      | Croatia       | Estonia             | Hungary       | Latvia                    |
|---------------------------------|-----------------|-------------------------------------|---------------|---------------------|---------------|---------------------------|
| Period                          | 2000:3–2009:9   | 1995:4–2009:9                       | 1995:4–2009:9 | 1998:4–2009:9       | 1995:4–2009:9 | 1999:1–2009:9             |
| <b>A. Estimation Results</b>    |                 |                                     |               |                     |               |                           |
| Lags                            | 1               | 2                                   | 2             | 2                   | 2             | 2                         |
| No. of observations             | 115             | 174                                 | 174           | 138                 | 174           | 129                       |
| FDI                             | 0.457           | 0.268                               | 0.451         | 0.516               | 0.789         | 0.314                     |
| t-stat                          | 8.759           | 4.767                               | 8.509         | 12.494              | 9.379         | 2.413                     |
| Trend                           |                 |                                     |               |                     |               | –0.013                    |
| t-stat                          |                 |                                     |               |                     |               | –5.254                    |
| Intercept                       | 2.138           | 2.010                               | 1.933         | 1.142               | –4.328        | –4.859                    |
| Included dummies                | eu07, fincrisis | czcrisis, fincrisis, rucrisis, eu04 |               | rucrisis, fincrisis | eu04          | rucrisis, eu04, fincrisis |
| <b>B. Cointegration Tests</b>   |                 |                                     |               |                     |               |                           |
| Trace statistics                | 15.384*         | 16.369**                            | 50.073***     | 29.905***           | 54.505***     | 36.030***                 |
| p-value                         | 0.052           | 0.037                               | 0.000         | 0.000               | 0.000         | 0.002                     |
| ME statistics                   | 15.380**        | 13.598*                             | 48.160***     | 27.708***           | 53.839***     | 34.136***                 |
| p-value                         | 0.033           | 0.064                               | 0.000         | 0.000               | 0.000         | 0.000                     |
| <b>C. Weak Exogeneity Tests</b> |                 |                                     |               |                     |               |                           |
| Industrial production           | 2.474           | 10.140***                           | 3.814*        | 17.936***           | 0.514         | 26.825***                 |
| p-value                         | 0.116           | 0.001                               | 0.051         | 0.000               | 0.473         | 0.000                     |
| FDI                             | 13.895***       | 1.971                               | 43.846***     | 9.503***            | 50.107***     | 8.075***                  |
| p-value                         | 0.000           | 0.160                               | 0.000         | 0.002               | 0.000         | 0.004                     |

Source: Authors' estimations.

Note: The following dummy variables are not reported: eu04 (2004:5–2009:12), eu07 (2007:1–2009:12), czcrisis (1997 Czech financial crisis), rucrisis (1998–1999 Russian financial crisis), fincrisis (financial crisis 2008:9–2009:12). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.

Table A2 continued

## Industrial Production and Exports in Selected CESEE Countries

|                                 | Lithuania     | Poland  | Romania         | Slovakia                             | Slovenia                |
|---------------------------------|---------------|---|-----------------|--------------------------------------|-------------------------|
| Period                          | 1997:4–2009:9 | 1995:4–2009:9                                 | 1998:1–2009:9   | 1995:4–2008:12                       | 1996:5–2009:9           |
| <b>A. Estimation Results</b>    |               |   |                 |                                      |                         |
| Lags                            | 2             | 2   | 2               | 2                                    | 2                       |
| No. of observations             | 150           | 174   | 141             | 165                                  | 172                     |
| FDI                             | 1.715         | 0.685   | 0.342           | 0.976                                | 0.157                   |
| t-stat                          | 4.878         | 6.386   | 9.257           | 3.694                                | 5.727                   |
| Trend                           |               |   |                 | –0.019                               |                         |
| t-stat                          |               |   |                 | –2.995                               |                         |
| Intercept                       | –3.980        | –0.737  | 2.302           | 1.614                                | 3.107                   |
| Included dummies                |               | d95, early reforms, rucrisis, eu04, fincrisis | eu07, fincrisis | eu04, delayed reforms, skerm, skeuro | eu04, sleuro, fincrisis |
| <b>B. Cointegration Tests</b>   |               |   |                 |                                      |                         |
| Trace statistics                | 18.493**      | 19.664**                                      | 29.485***       | 29.454**                             | 19.508**                |
| p-value                         | 0.017         | 0.011   | 0.000           | 0.017                                | 0.012                   |
| ME statistics                   | 15.309**      | 19.158***                                     | 28.982***       | 18.987*                              | 16.999**                |
| p-value                         | 0.034         | 0.008   | 0.000           | 0.057                                | 0.018                   |
| <b>C. Weak Exogeneity Tests</b> |               |   |                 |                                      |                         |
| Industrial production           | 2.447         | 11.414***                                     | 21.085***       | 7.779***                             | 14.196***               |
| p-value                         | 0.118         | 0.001   | 0.000           | 0.005                                | 0.000                   |
| FDI                             | 9.462***      | 6.282**                                       | 11.718***       | 0.696                                | 0.278                   |
| p-value                         | 0.002         | 0.012   | 0.001           | 0.404                                | 0.598                   |

Source: Authors' estimations.

Note: The following dummy variables are not reported: eu04 (2004:5–2009:12), eu07 (2007:1–2009:12), rucrisis (1998–1999 Russian financial crisis), fincrisis (financial crisis 2008:9–2009:12), d95 (dummy for 1995), early reforms in Poland (1995–1999), early reforms in Romania (1995–1997), delayed reforms in Slovakia (1995:1–1998:10), skerm (Slovakia's ERM participation, 2005:11–2008:12), skeuro (euro introduction in Slovakia, 2009:1–2009:12), sleuro (euro introduction in Slovenia, 2007:1–2009:12). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.

Table A3

## Industrial Production and Portfolio Investment in Selected CESEE Countries

|                               | Bulgaria        | Czech Republic                      | Croatia       | Estonia             | Hungary       | Latvia                    |
|-------------------------------|-----------------|-------------------------------------|---------------|---------------------|---------------|---------------------------|
| Period                        | 2000:3–2009:9   | 1995:4–2009:9                       | 1995:6–2009:9 | 1998:4–2009:9       | 1995:4–2009:9 | 1999:1–2009:9             |
| <b>A. Estimation Results</b>  |                 |                                     |               |                     |               |                           |
| Lags                          | 1               | 2                                   | 2             | 2                   | 2             | 2                         |
| No. of observations           | 115             | 174                                 | 172           | 138                 | 174           | 129                       |
| PI                            | 0.952           | 1.020                               | –0.209        | 6.596               | 1.514         | 0.573                     |
| t-stat                        | 2.593           | 3.832                               | –1.717        | 3.017               | 7.207         | 5.621                     |
| Trend                         | 0.012           |                                     |               |                     |               |                           |
| t-stat                        | 6.091           |                                     |               |                     |               |                           |
| Intercept                     | 1.433           | –3.907                              | 5.643         | –30.100             | –12.066       | 3.729                     |
| Included dummies              | eu07, fincrisis | czcrisis, fincrisis, rucrisis, eu04 |               | rucrisis, fincrisis | eu04          | rucrisis, eu04, fincrisis |
| <b>B. Cointegration Tests</b> |                 |                                     |               |                     |               |                           |
| Trace statistics              | 17.640          | 14.349*                             | 15.726**      | 12.267              | 14.366*       | 23.605***                 |
| p-value                       | 0.369           | 0.074                               | 0.046         | 0.145               | 0.073         | 0.002                     |
| ME statistics                 | 14.714          | 12.238                              | 13.337*       | 9.602               | 13.389*       | 20.739***                 |
| p-value                       | 0.210           | 0.102                               | 0.070         | 0.239               | 0.068         | 0.004                     |

Source: Authors' estimations.

Note: The following dummy variables are not reported: eu04 (2004:5–2009:12), eu07 (2007:1–2009:12), czcrisis (1997 Czech financial crisis), rucrisis (1998–1999 Russian financial crisis), fincrisis (financial crisis 2008:9–2009:12). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.

Table A3 continued

## Industrial Production and Portfolio Investment in Selected CESEE Countries

|                               | Lithuania     | Poland  | Romania         | Slovakia                             | Slovenia                |
|-------------------------------|---------------|---|-----------------|--------------------------------------|-------------------------|
| Period                        | 1997:4–2009:9 | 1995:4–2009:9                                 | 1998:1–2009:9   | 1995:4–2008:12                       | 1995:4–2009:9           |
| <b>A. Estimation Results</b>  |               |   |                 |                                      |                         |
| Lags                          | 2             | 2   | 2               | 2                                    | 2                       |
| No. of observations           | 150           | 174   | 141             | 165                                  | 174                     |
| PI                            | –0.031        | 1.829   | 0.703           | 0.028                                | 0.193                   |
| t-stat                        | –0.506        | 6.494   | 4.151           | 0.256                                | 4.315                   |
| Trend                         |               |   |                 | 0.003                                |                         |
| t-stat                        |               |   |                 | 2.258                                |                         |
| Intercept                     | 4.527         | –8.450  | 1.404           | –4.016                               | 2.967                   |
| Included dummies              |               | d95, early reforms, rucrisis, eu04, fincrisis | eu07, fincrisis | eu04, delayed reforms, skerm, skeuro | eu04, sleuro, fincrisis |
| <b>B. Cointegration Tests</b> |               |   |                 |                                      |                         |
| Trace statistics              | 19.954***     | 33.413***                                     | 12.874          | 9.620                                | 24.463***               |
| p-value                       | 0.010         | 0.000   | 0.120           | 0.940                                | 0.002                   |
| ME statistics                 | 16.886**      | 33.019***                                     | 12.787*         | 8.063                                | 13.312*                 |
| p-value                       | 0.019         | 0.000   | 0.085           | 0.816                                | 0.070                   |

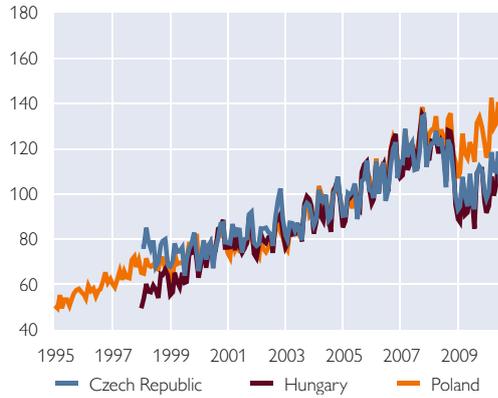
Source: Authors' estimations.

Note: The following dummy variables are not reported: eu04 (2004:5–2009:12), eu07 (2007:1–2009:12), rucrisis (1998–1999 Russian financial crisis), fincrisis (financial crisis 2008:9–2009:12), d95 (dummy for 1995), early reforms in Poland (1995–1999), early reforms in Romania (1995–1997), delayed reforms in Slovakia (1995:1–1998:10), skerm (Slovakia's ERM participation, 2005:11–2008:12), skeuro (euro introduction in Slovakia, 2009:1–2009:12), sleuro (euro introduction in Slovenia, 2007:1–2009:12). \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively.

**CESEE Industrial Production (excluding Construction)**

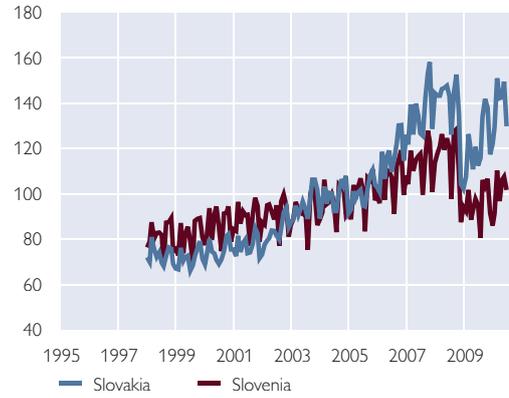
**Central and Eastern Europe I**

May 2004=100



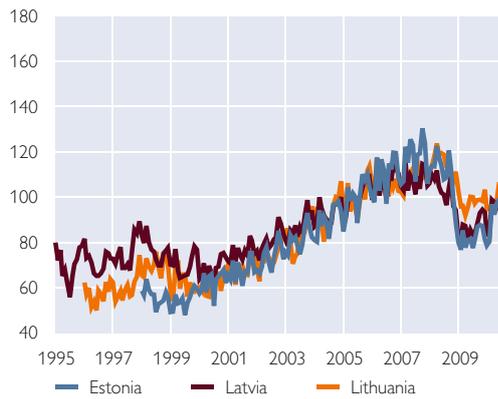
**Central and Eastern Europe II**

May 2004=100



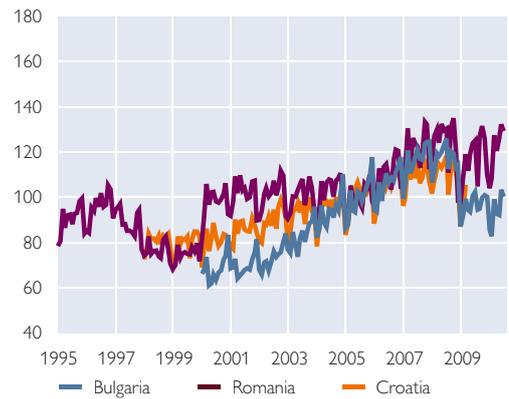
**Baltic States**

May 2004=100



**Southeastern Europe**

May 2004=100



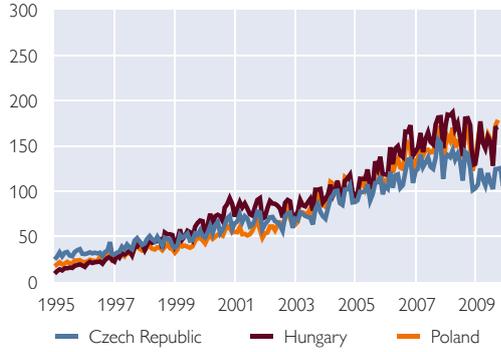
Source: IMF, ECB, OeNB.

Chart A2

### CESEE Exports

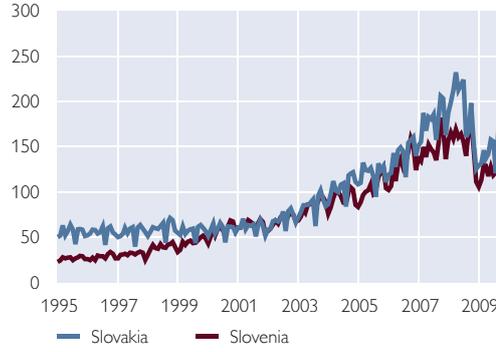
#### Central and Eastern Europe I

May 2004=100



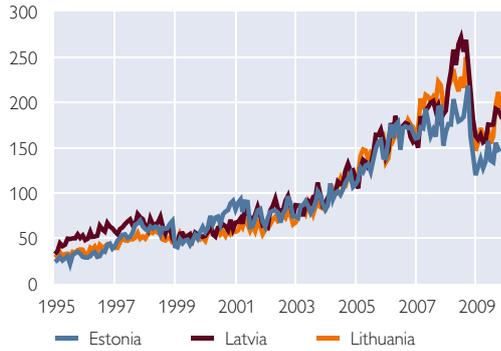
#### Central and Eastern Europe II

May 2004=100



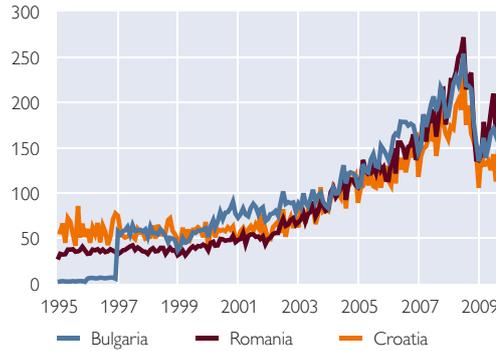
#### Baltic States

May 2004=100



#### Southeastern Europe

May 2004=100



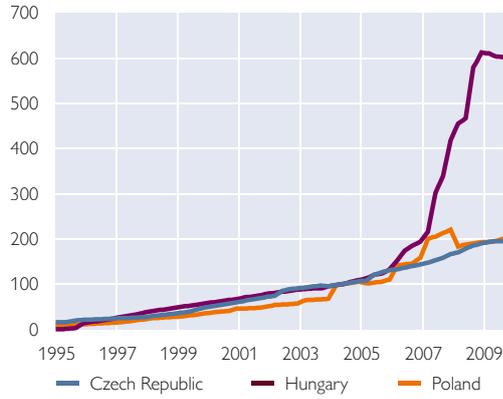
Source: IMF, ECB, OeNB.

Chart A3

### FDI Stock in CESEE

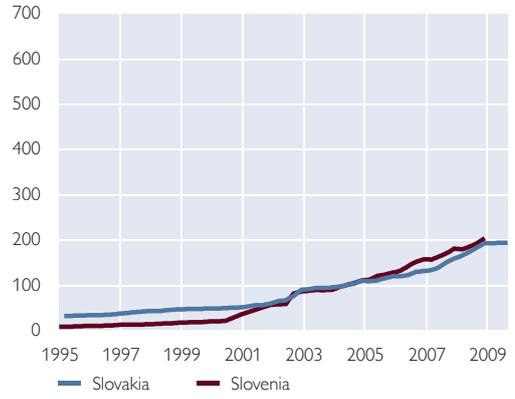
#### Central and Eastern Europe I

May 2004=100



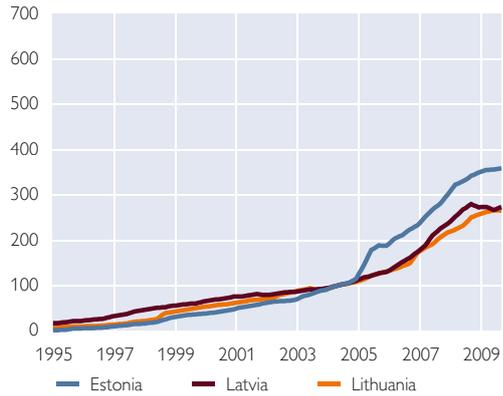
#### Central and Eastern Europe II

May 2004=100



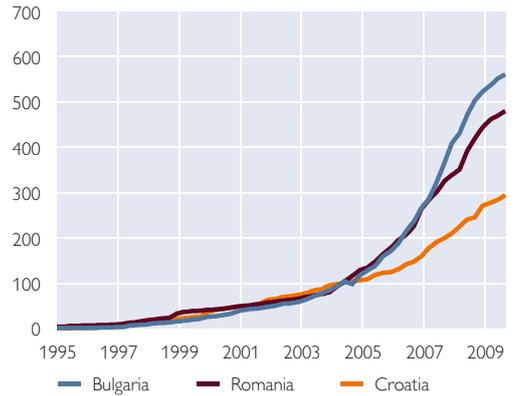
#### Baltic States

May 2004=100



#### Southeastern Europe

May 2004=100



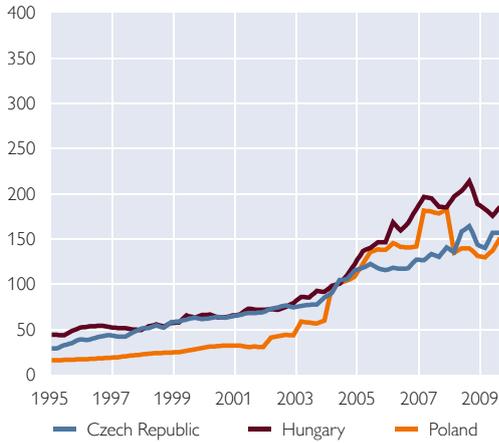
Source: IMF, ECB, OeNB.

Chart A4

**Portfolio Investments in CESEE**

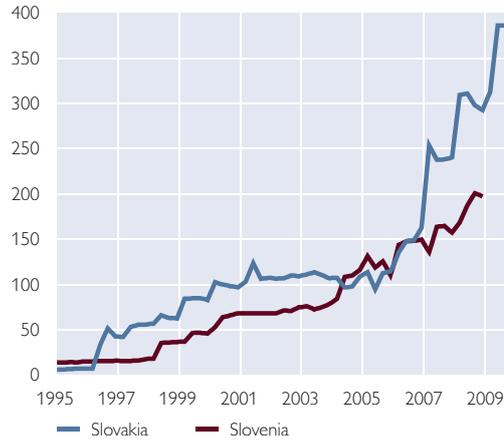
**Central and Eastern Europe I**

May 2004=100



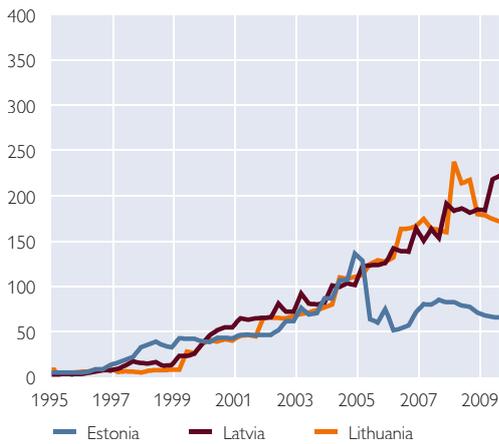
**Central and Eastern Europe II**

May 2004=100



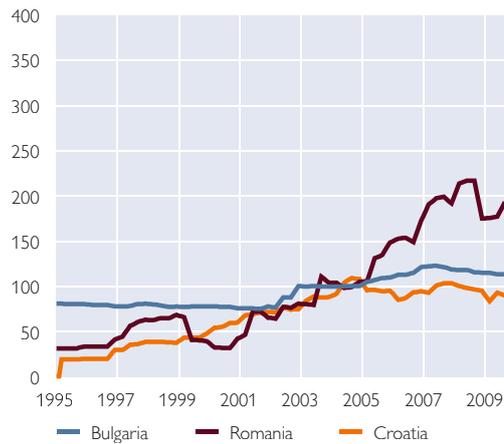
**Baltic States**

May 2004=100



**Southeastern Europe**

May 2004=100



Source: IMF, ECB, OeNB.

# Determinants of Migrants' Earnings and Remittances: Evidence from Kosovo

Sokol Havolli<sup>1</sup>

*This paper is an attempt to find the main determinants of migrants' earnings and analyze what makes migrants remit money to their home countries. We use the dataset on migrants compiled by the Riinvest Institute<sup>2</sup> in 2006. Ordinary least squares (OLS) and interval regression methods are used to estimate the migrants' earnings model, while for the remittances model we use OLS and Tobit estimation methods. The results suggest, inter alia, that the returns to education are positive for migrants; also, migrants in countries with higher per capita GDP have higher family earnings. Among the most important determinants of remittances are migrants' investments in their home countries, migrants' perceptions of the business environment, migrants' earnings, gender and the duration of migration. This paper tries to fill the gap in the literature, especially for the case of Kosovo, by exploring what determines the earnings of migrants and what makes migrants remit part of these earnings.*

*JEL classification: D31, F22, F24*

*Keywords: Remittances, migration, personal income*

## 1 Introduction

Migration from Kosovo has both political and economic reasons. It peaked in the 1990s, when more than 60% of migrants left the country, especially during the war of 1998–1999. A large number of Kosovan refugees settled in Western Europe and the U.S.A. Given the income gap between Kosovo and Western countries, a significant number of migrants did not return home after the war. According to a survey conducted by the Riinvest Institute in 2006, migration is seen as the solution to economic problems by around 30% of households in Kosovo, as the country's unemployment level is considered to be very high. The current number of migrants' lies somewhere between 20% and 25% of Kosovo's total population, which is estimated to be 2.1 million.<sup>3</sup> Remittances are highly important both for Kosovo's economy and for the entire region. For instance in 2008, the inflow of remittances to Kosovo was EUR 535 million or around 14% of GDP (CBK, 2008). Remittances are also very important for Albania and Bosnia and Herzegovina, where they account for around 17% and 19% of GDP, respectively (Schipou and Siegfried, 2007). What are the motives to remit money is a commonly asked question in migration literature. There is still no systematic theory that explains remittance behavior, and evidence is also scarce.

## 2 The Determinants of Migrants' Earnings

Human capital theory recognizes several factors which determine the level of earnings for individuals. Among the most rewarded attributes in this context is the level of education level and labor market experience (Becker, 1975; Mincer, 1958). Even though there is a general consensus in the literature, Chiswick and

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<sup>2</sup> Riinvest Institute for Development Research ([www.riinvestinstitute.org](http://www.riinvestinstitute.org)).

<sup>3</sup> Given that the last census was in 1981, population and migration figures are estimates (see [www.ks-gov.net/ESK/](http://www.ks-gov.net/ESK/)).

Miller (2005, 2007) suggest that migrants face difficulties in transferring their skills to more developed economies. The findings of Chiswick and Miller (2007) suggest that education is likely to be more easily transferable across international labor markets than experience, since the skills obtained at school are less specific compared to practical working experience. An additional year of education for migrants would help increase earnings by around 4% to 6%, while for native-born workers returns to an additional year of education are a 5% to 10% rise in earnings. This could be attributed to the lower transferability of labor market experience as well as to the fact that migrants tend to perform low-skill jobs. Schools in less developed countries are not able to match the requirements of the destination countries. Similarly, technical skills are nontransferable since the technology in developed countries is more advanced than that in developing countries. Chiswick and Miller (2007) suggest that the longer migrants stay in the respective host country, the better are the jobs they are offered since, over time, they obtain new skills, become more familiar with the host country's language and culture and, most importantly, gain experience in the host country's labor market.

In the situation of Kosovo, additional factors are relevant in explaining the possible lower transferability of skills. One very important factor is the education system which was in place in Kosovo until 1999. The so-called "parallel"<sup>4</sup> system was not recognized by other European countries (with a few exceptions). The facilities used for education were frequently of low quality. The experience and training of Kosovan migrants is not expected to have a significant effect on their earnings. This is because formal training in Kosovo may not fulfill the requirements of developed economies.

However, in order to empirically investigate the determinants of Kosovan migrants' earnings, we develop a model similar to those introduced in the literature. In addition to the number of years of education (Sch), we also control for some characteristics such as the number of years since a person first migrated (YSM), which is a proxy of host-country labor market experience. However, earnings are expected to have a decreasing marginal return on experience (Chiswick and Miller, 2007; Becker, 1974). For this reason, we include in the model the squared value of YSM. The destination country is also important in determining earnings, meaning that migrants who go to more developed countries, i.e. countries with higher levels of GDP per capita, are likely to have higher earnings reflecting the higher standards of living and the scarcity of low-skilled workers.

Regarding the difference between migrants who originate from urban and rural areas, we expect migrants from rural areas to be employed in agriculture-related sectors and hence have lower earnings compared to their counterparts from urban areas. Variables such as the age of the respondent migrants (Age), their marital status (Ma), legal status (C), employment status (E) and gender (G) will be taken into account.

<sup>4</sup> Education in Kosovo was organized separately from the former Serbian institutions and funded by Kosovan Albanians and the diaspora of Kosovo.

From the above, the following model is specified to find what determines the earnings of Kosovan migrants:

$$\begin{aligned}
 LnY = & \beta_0 + \beta_1 Age + \beta_2 Sch + \\
 & + \beta_3 YSM + \beta_4 GDP_{Capita} + \\
 & + \beta_5 G + \beta_6 Ma + \beta_7 C + \beta_8 NoEm + \\
 & + \beta_9 U + \beta_{10} E + \beta_{11} Age^2 + \beta_{12} YSM^2 + u_i
 \end{aligned} \tag{1}$$

Furthermore, as the earnings reported in the Riinvest survey are those of entire families in migration, in this model we also controlled for employment of other family members (*NoEM*). The unobserved factors will be represented by the error term  $u_i$ . The data used in this study are obtained from a Riinvest Institute survey with migrants conducted in December 2006. Migrants between the ages of 17 and 76 were interviewed at the borders of Kosovo. Measures of per capita GDP for the 25 identified host countries in 2006 were obtained from the IMF World Economic Outlook.

## 2.1 Results on Earnings Determinants

As in most earnings functions, residuals are not normally distributed; therefore, transforming earnings to  $\log(y)$  provides less heteroscedastic variance and the results are closer to normal distribution. The similarity of the results of ordinary least squares (OLS) and interval regression is an indication of their robustness. As we controlled for the age and education of the head of household in our model, the results may be distorted since we do not know whether the head of household generates the majority of income and neither do we know the size of social and/or retirement benefits which might have been included in the family earnings.

The results presented in table 1 are mostly in line with the literature on earnings models for migrants. We can see that migrants' earnings increase at a slower pace than their age. It is also estimated that at the age of 63, migrants will see their earnings reach a peak while afterwards, earnings decrease with every additional year. The education of Kosovan migrants was expected to be an insignificant determinant of earnings in the respective host countries due to its nontransferability to foreign labor markets; however, the results suggest a positive relationship. As expected, the per capita GDP of the host country has a significant effect on migrants' family earnings: Family earnings are higher in countries where the standard of living is higher. Contrary to expectations and statistically significant is the influence of the marital status of the head of household, suggesting a significant negative effect on family earnings for households that are married-couple families. A possible explanation may be that an unmarried migrant may be working overtime and generate more income, whereas married migrants may be spending time with their families and hence work less. The results also suggest that if more than one person from the same family worked, earnings then would be double. The dataset used here also covers migrants who are not employed. They reported some earnings from either retirement benefits or state unemployment benefits. We therefore included a variable for migrants' employment status which suggests that

Table 1

### Determinants of Migrants' Earnings

| Variable: Migrants' earnings         | OLS         |             | Interval regression |             |
|--------------------------------------|-------------|-------------|---------------------|-------------|
|                                      |             |             |                     |             |
| Constant                             | 5.9 *       | 5.2 *       | 5.3 *               | 5.2 *       |
|                                      | (19.3)      | (14.1)      | (15.8)              | (12.4)      |
| Age                                  | 0.03 **     | 0.03 **     | 0.03 **             | 0.04 **     |
|                                      | (2.4)       | (2.3)       | (2.1)               | (2.1)       |
| Age squared                          | -0.0003 *** | -0.0004 *** | -0.0004 ***         | -0.0004 *** |
|                                      | (-2.0)      | (-1.9)      | (-1.8)              | (-1.8)      |
| Years of education                   | 0.04 *      | 0.05 *      | 0.04 *              | 0.04 *      |
|                                      | (3.6)       | (3.0)       | (2.8)               | (2.6)       |
| Gender                               | 0.04        | 0.1         | 0.04                | 0.1         |
|                                      | (0.8)       | (1.4)       | (0.9)               | (1.4)       |
| GDP per capita (host country)        | 0.00002*    | 0.00002*    | 0.00002*            | 0.00002*    |
|                                      | (7.4)       | (5.8)       | (6.8)               | (5.8)       |
| Marital status                       | -0.1 **     | -0.2 ***    | -0.1 **             | -0.2 **     |
|                                      | (-2.2)      | (-1.9)      | (-2.4)              | (-2.0)      |
| Citizenship (host country)           | 0.1         | 0.02        | 0.06                | 0.02        |
|                                      | (1.6)       | (0.4)       | (1.5)               | (0.4)       |
| Employed                             | 0.3 *       | 0.4 *       | 0.3 *               | 0.4 **      |
|                                      | (4.0)       | (4.0)       | (3.9)               | (4.2)       |
| More than one family member employed | 0.6 *       | 0.5 *       | 0.6 *               | 0.5 **      |
|                                      | (13.1)      | (10.2)      | (13.3)              | (10.4)      |
| Location                             | 0.1 ***     | 0.04        | 0.08 ***            | 0.03        |
|                                      | (1.9)       | (0.8)       | (1.9)               | (0.7)       |
| Years since migration                |             | -0.02       |                     | -0.02       |
|                                      |             | (-0.8)      |                     | (-0.7)      |
| Years since migration squared        |             | 0.001       |                     | 0.001       |
|                                      |             | (1.2)       |                     | (1.0)       |
| Number of observations               | 974         | 663         | 974                 | 663         |
| Log likelihood                       | n/a         | n/a         | -1,330.4            | -896.3      |
| Within R-squared                     | 0.255       | 0.241       | n/a                 | n/a         |

Source: Author's calculations.

Note: T-ratios and Z-statistics in brackets. \*, \*\* and \*\*\* denote significance at the 1%, 5% and 10% level, respectively.

earnings are much higher for employed migrants compared to their counterparts. The variable which controls for pre-migration location (i.e. urban or rural) is positive and significant, suggesting that migrants originating from urban areas earn more; though when the variable “years since migration” is included in the model, the location variable loses its significance. The explanation for the lower payoff for migrants originating from rural areas may be the agriculture-related sector jobs they are likely to be engaged in. Surprisingly, the effect of the variable “years since migration” is statistically insignificant. This may suggest that labor market experience in the host country does not pay off for Kosovan migrants.

In conclusion, our results are in general consistent with the literature. Human capital variables explain a significant proportion of differences in income: The higher the number of years of education, the higher are earnings. Age, used here as a proxy of labor market experience, has a positive effect on earnings. Years spent abroad do not have a statistically significant effect on earnings. Not surprisingly, the number of employees per family plays a highly significant role in determining family earnings; we also find that families that originate from urban areas earn more. Another highly significant determinant of earnings is the host country's per

capita GDP; our evidence suggests that migrants working in countries with higher per capita GDP earn significantly more than those working in countries where per capita GDP is lower (a more detailed description on estimation methods and results can be found in Havolli, 2007, available upon request).

### 3 Determinants of Remittances

Some authors suggest that migration itself is a strategy households use to minimize income risk while others suggest that it is an individual strategy to maximize income (Garip, 2006). If the latter holds, migrants will not be motivated to remit (part of) their earnings to their home countries. By contrast, if the argument of minimizing households' income risk holds, one would expect remittance flows from the migrants in question. The main theories on the motives to remit money distinguish between two general motives: the altruistic motive and the exchange motive.

Altruistic migrants are those who enjoy sending money to relatives in their country of origin (Funkhouser, 1995; Lucas and Stark, 1985; Rapoport and Docquier, 2005; Carling, 2008). Even though the altruistic motive is often considered the least important factor in determining remittances, it is of importance because it is likely to be one of the few motives that can guarantee the stability of remittances over time (Bougha-Hagbe, 2006). The exchange motive mostly applies to migrants who are motivated by one, or several, of the following motives: inheritance considerations, maintaining links, investments, and the implicit loan repayment motive. Migrants motivated by inheritance considerations are those who send remittances to support their families in order to ensure the right of inheriting assets in their country of origin. The maintaining links theory implies that migrants are likely to remit funds when they are willing to return to their country of origin. They send remittances so that they can show their intentions to return and to maintain links with their family; the longer they stay in the host country, the more their willingness to maintain links with their relatives decreases and hence, remittances decrease in the long term. However, if migrants are expected to return to their home countries, this possibly generates investments, such as land or house purchases.

However, this group of self-interested migrants sends remittances to “buy” what Lucas and Stark (1985) call “social assets” – the relationship with their family members and friends. Lucas and Stark (1985) explain the investment theory as follows: Migrants remit money so they can ensure the maintenance of the assets they have invested in or plan to invest in. Related to this, Garip (2006) and Rapoport and Docquier (2005) suggest that investment conditions in the home country play an important role for the decision to send remittances and for the amount of these remittances. If migrants consider business conditions in their home country favorable, the amount of remittances is higher. Implicit loan repayment theory offers another explanation for remittance. Under this theory, migrants send remittances as a repayment of previous implicit loans from their families for expenses made in developing their human capital (i.e. their education).

An increase in migrants' income would affect remittances positively since earnings are the source of remittances. The distance between the host and home countries and the number of years since migrants left their home countries have a

negative effect on migrants' intentions to return, and hence on remittances, as a result of weakened links.

Finally, the number of dependants and other relatives living in the home country positively affects remittances, which is explained by the altruistic motive (e.g. investment in children's education) and maintaining links.

The general model that will be used here to examine the determinants of remittances for Kosovan migrants is:

$$\begin{aligned}
 R = & \beta_0 + \beta_1 Y + \beta_2 Age + \beta_3 Sch + \\
 & + \beta_4 Be + \beta_5 I + \beta_6 M + \beta_7 Dep + \\
 & + \beta_8 Cr + \beta_9 YSM + \beta_{10} G + \\
 & + \beta_{11} L + \beta_{12} D + \beta_{13} Age^2 + \\
 & + \beta_{14} YSM^2 + u_i
 \end{aligned} \tag{1}$$

where  $R$  is the monthly amount of remittances,  $Y$  is the reported migrants' income in euro, which is treated as exogenous,<sup>5</sup> and  $Sch$  is the number of years of migrants' education,  $Be$  stands for migrants' perceptions of the business environment in their home country, coded 1 if favorable and 0 otherwise. Whether migrants have invested in any property or business in their country of origin will be taken into account by variable  $I$ .  $M$  is a control variable for migrants' marital status,  $Dep$  controls for the number of dependants (spouse and/or children) in the home country,  $Cr$  shows whether the migrant has other close relatives residing in the country of origin.  $YSM$  is the duration of migration. The distance from the home country is represented by  $D$ . We also control for migrants' age ( $Age$ ) and gender ( $G$ ), while  $L$  represents their location of origin (1 for urban migrants and 0 otherwise). The term  $u_i$  represents the error term.

The same source of data as in the earnings model will be used for the remittances model. Migrants initially were asked whether they remit money or not, and in case they did, they were asked about the amount. Within this dataset, about 14% of migrants said they did not make remittances. The determinants of the size of remittances will initially be estimated by OLS. However, around 14% of migrants said they did not send remittances. Hence, the Tobit method is appropriate for estimating the respective model (Wooldridge, 2006). Since the sign and significance of the results from both methods should be comparable, we will apply both OLS and Tobit.

### 3.1 Model Results on Determinants of Remittances

In this model, two estimation methods are used to check the robustness of the results. The explanatory variables proved to be jointly significant suggesting that the model is correctly specified in all estimation methods. It was also tested for the normality problem regarding the Tobit estimation method, and the results

<sup>5</sup> The reason why earnings may be endogenous to remittances is that there may be some migrants who would like to work more to be able to remit higher amounts.

Table 2

**Determinants of Remittances**

| Variable: Remittances                  | OLS      |           | Tobit     |          |
|--|----------|-----------|-----------|----------|
|  | EUR      |           |           |          |
| Constant                               | -472.9 * | -460.3 *  | -739.8 *  | -652.5 * |
|  | (-3.7)   | (-2.1)    | (-4.7)    | (-3.4)   |
| Age                                    | 11.9 **  | 5.7       | 23.6 *    | 15.5 **  |
|  | (2.4)    | (1.0)     | (3.7)     | (2.0)    |
| Age squared                            | -0.2 **  | -0.1      | -0.3 *    | -0.2 **  |
|  | (-2.7)   | (-1.0)    | (-4.0)    | (-2.2)   |
| Log income                             | 41.8 *** | 46.3 ***  | 49.2 ***  | 58.1 *** |
|  | (3.6)    | (3.4)     | (3.5)     | (3.5)    |
| Gender                                 | 72.0 *   | 61.9 **   | 102.3 *   | 91.8 *   |
|  | (3.9)    | (2.9)     | (4.4)     | (3.5)    |
| Years of education                     | 5.4      | 8.0       | 1.4       | 1.2      |
|  | (1.2)    | (1.5)     | (0.2)     | (0.2)    |
| Perceived business environment         | 58.5 *   | 90.65*    | 50.8      | 91.3 *   |
|  | (3.3)    | (4.5)     | (2.4)     | (3.7)    |
| Investment                             | 38.8 **  | 40.0 ***  | 72.2 *    | 61.6 *   |
|  | (2.1)    | (1.9)     | (3.2)     | (2.4)    |
| Marital status                         | 18.7     | 15.5      | 23.8      | 15.6     |
|  | (0.9)    | (0.6)     | (0.9)     | (0.4)    |
| Close relatives                        | 87.1 *   | 101.9 *   | 113.1 *   | 112.2 *  |
|  | (4.9)    | (5.0)     | (5.1)     | (4.4)    |
| Distance between home and host country | -0.01    | -0.01***  | -0.002    | -0.01    |
|  | (-0.7)   | (-1.9)    | (-0.2)    | (-1.3)   |
| Number of dependants in home country   | 7.3      | -8.9      | 7.8       | -12.5    |
|  | (1.0)    | (-0.8)    | (0.9)     | (-0.9)   |
| Location                               | -22.0    | -31.0 *** | -36.4 *** | -60.8 *  |
|  | (-1.4)   | (-1.8)    | (-1.9)    | (-2.8)   |
| Years since migration                  |          | 11.9 *    |           | 9.4      |
|  |          | (1.8)     |           | (1.1)    |
| Years since migration squared          |          | -0.8 **   |           | -0.7 *** |
|  |          | (-2.5)    |           | (-1.8)   |
| Number of observations                 | 932      | 633       | 945       | 646      |
| Log likelihood                         | n/a      | n/a       | -5,889.2  | -4,046.1 |
| Within R-squared                       | 0.10     | 0.14      | n/a       | n/a      |

Source: Author's calculations.

Note: T-ratios and Z-statistics in brackets. \*, \*\* and \*\*\* denote significance at the 1%, 5% and 10% level, respectively.

suggest that normality fulfills the conditions for the Tobit estimation method. The results of the regressions are presented in table 2.

Even though positive, the effect of age on remittances increases at a slower pace. This is indicated by the negative coefficient of  $Age^2$ . The inclusion of the number of years passed since migration ( $YSM$ ) and its squared value affects the significance of  $Age$ ; it becomes insignificant.<sup>6</sup>

The effect of income on remittances suggests that higher income has a positive effect on the amount of remittances. The gender variable is highly significant in all the models used. Male migrants remit more, which could be explained by inheritance-seeking aspirations rooted in the culture and tradition of Kosovo. In addition to inheritance motives, men are in general more likely to migrate than women. The fact that the number of years of education has a statistically insignificant

<sup>6</sup> This may be due to multi-collinearity; however, it is considered that when testing different theories with variables that might be correlated, it is much more appropriate not to drop variables.

effect on remittances can be viewed as an indicator of the nonrepayment of past implicit loans. One of the main findings of this paper is that investments by migrants in Kosovo and their perceptions about the business environment are of high importance in determining the size of remittances; in fact, if migrants perceive that conditions for business in Kosovo are favorable, this has a positive effect on the size of their remittances. The results also suggest that investments in any property or business in Kosovo have a statistically significant positive effect on remittances. Given the importance of these two variables, the government could create incentives that would directly affect these two aspects. Such incentives could consist of promoting a good environment for investment and of reducing taxes on migrants' investments, hence prompting them to invest more in their home country. Moreover, migrants' perceptions of the situation in their home country can also be influenced by making infrastructure investments and fighting negative issues such as corruption. Such policies would have several implications. First, those who perceive business conditions to be good will be more likely to invest and also to send more remittances. Second, for those who have invested in Kosovo, positive changes in the investment environment would have an effect on the amount of remittances and investments. Third, such policies would make it more likely that migrants return to their home country, investing and bringing new technologies.

Another significant effect on remittances seems to be migrants' relationship to other family members still living in the home country. The variable controlling for close relatives also covers the brothers and/or sisters of migrants' parents who still live in the home country. The dummy variable indicating that a migrant has close relatives in the home country has a significant effect on the size of remittances. This variable can also be a proxy to test the link maintenance hypothesis as well as to indicate the altruism of migrants toward family members living in the home country. The first motive indicates that migrants wish to maintain links to other family members at home, while the second motive can be explained by the fact that the migrants' utility is affected by the welfare of their family members in the home country. We also included a measure for dependent children and spouses, but it turned out to be statistically insignificant in both specifications. The coefficient measuring the distance between home and host country proved to be statistically insignificant in the first specification. In the second specification, it turned out to be statistically significant, but its overall effect on remittances is very low. Regarding migrants' location prior to migration, the result suggests that migrants from rural areas send more remittances than others. Additional years of migration are positively related to remittances; however, this effect grows at a decreasing rate until the ninth year in migration, and then remittances decrease (inverse U-shaped function) as indicated by the squared value of years since migration. This result is consistent with the theory of maintaining links and suggests no intentions to return and the weakening of family ties with the home country.

#### **4 Conclusions and Policy Implications**

This paper provides micro-level evidence for the determinants of remittances for Kosovo. The findings suggest that the longer migrants stay abroad, the higher their remittances are. This relationship is an inverse U-shape function consistent with link maintenance theory. Aspirations to inherit assets in the home country are

another factor that has an effect on remittances. Also, investments of migrants in their home country play a significant role in determining the amount remitted, which is furthermore influenced strongly by their perception of the business environment in their country of origin. Because remittances are important for the economy of Kosovo and because of the high involvement of Kosovo's migrants in the country's economy, policies should be designed to attract more remittances and migrants' investments. Such policies could comprise the improvement of the business environment in the country of origin, the re-assessment of taxation policies for migrant investment as well as an easing of rules governing business procedures, which would facilitate capital inflows, new labor market experiences (brain gain) and the introduction of new technologies. In addition, improving the country's infrastructure and fighting corruption may improve migrants' perception of the business environment in Kosovo. To support the inflow of remittances also in the future, as well as to increase their development impact on the economy, progress in these areas would be highly important.

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# CESEE-Related Abstracts from Other OeNB Publications

The abstracts below alert readers to studies on CESEE topics in other OeNB publications. Please see [www.oenb.at](http://www.oenb.at) for the full-length versions of these studies.

## **Foreign Currency Lending in Central, Eastern and Southeastern Europe: the Case of Austrian Banks**

This paper describes the exposure of Austrian banks to foreign currency loans in Central, Eastern and Southeastern Europe (CESEE) and the CIS and elaborates on its risks to banking sector stability. Austrian banks' foreign currency loan exposure more than doubled between 2005 and 2009, their regional subsidiaries' foreign currency loan exposure continued to be higher than the market average in this period. Our findings confirm the key importance of funding risks and do not contradict the assumption of a nonlinear relationship with regard to credit risk. However, a simple comparison of risk indicators does not unambiguously indicate an overall higher credit risk in the foreign currency loan portfolio. Most recent data suggest that Austrian banks' foreign currency loan exposure is declining. Policymakers are now called upon to use the momentum and strike a balance between restricting foreign currency lending to foster a more sustainable growth path and avoiding negative pro-cyclical effects.

Published in *Financial Stability Report 20*.

Johannes Pann,  
Reinhardt Seliger,  
Julia Übeleis

## **Russian Banks on the Route of Fragile Recovery**

Largely thanks to the recovery of the real economy, the situation of Russian banks has improved again. After month-on-month loan growth had quickly ground to a halt in late 2008, banks contributed to Russia's deep economic slump in 2009. The share of nonperforming loans had tripled to 10% of total loans by late 2009 and has since remained at about this level. An incipient recovery of lending made itself felt only in the second quarter of 2010. However, as the national authorities had delivered a comprehensive policy response which helped sustain or reestablish confidence, Russia did not experience any major bank run or failure. Temporary deposit withdrawals after the collapse of Lehman Brothers were followed by a rapid expansion of deposits, starting from early 2009. Following a modest crisis-triggered rise, the share of foreign currency loans declined again to about one-fifth of total loans. Banks' access to international capital markets improved from late 2009/early 2010. Profitability, having plunged to zero in mid-2009, subsequently recovered but is still modest. Thanks to recapitalization exercises, capital adequacy is satisfactory. The stabilization of the banking sector has allowed the authorities to start exiting from crisis response measures. Banks are faced with a vulnerable environment given the world economy's post-crisis fragility and Russia's undiminished dependence on the oil price and capital flows, which is exacerbated by persisting structural weaknesses. Nonetheless, the existing shock-absorbing factors are sizeable.

Published in *Financial Stability Report 20*.

Stephan Barisitz,  
Mathias Lahnsteiner



## Event Wrap-Ups

# EBRD Transition Report 2010: Focus on Local Currency Finance in Emerging Europe

Compiled by  
Mariya Hake

On January 24, 2011, the Oesterreichische Nationalbank (OeNB) hosted the presentation of the EBRD Transition Report in Vienna. At the press conference (which was chaired by Doris Ritzberger-Grünwald, Head of the OeNB's Foreign Research Division), Jeromin Zettelmeyer, the EBRD's Director of Research, summarized the January update of the EBRD's growth forecasts for emerging Europe and outlined the main findings of the "EBRD Transition Report 2010: Recovery and Reform."<sup>1</sup> In the second part of his presentation, Zettelmeyer focused on country-specific strategies for the development of local currency financial markets to counterbalance the instabilities caused by the widespread use of foreign currency loans in most emerging European countries.<sup>2</sup>

## Part I: From Crisis to Recovery

Notwithstanding the slow recovery of credit growth and FDI inflows as well as austere fiscal consolidation policies in the region, export-led rebounds were well on track in 2010 in most countries under review. As of January 2011, growth in the EBRD region was projected to come to 4.2% on average in 2010 and 2011. Still, the process of recovery is expected to be heterogeneous across countries owing to differences in pre-crisis credit booms and in the degree of financial fragility. In 2011, the recovery of the economies of Central Europe and the Baltic countries is expected to be supported by the rebound in the euro area, with the highest growth projected for Estonia (+3.6%), Slovakia (+3.7%) and Poland (+3.9%). The countries in Southeastern Europe are forecast to still lag behind in 2011, with average GDP growth coming to 1.9% as of January 2011 due to austere fiscal consolidation measures that dampen domestic demand. The economies of Central Asia are expected to grow by 6.6% on average in 2011, those of the Eastern European and Caucasus region by 4%. However, growth prospects in the EBRD region are still overshadowed by (both external and domestic) macrofinancial downside risks, such as capital outflows from EU countries triggered by restrictive monetary policy, negative spillovers from the crisis in the euro area through both real and financial channels, and risky domestic policy actions in response to fiscal and social pressure.

## Part II: Development of Local Currency Finance

In the second part of his presentation, Zettelmeyer elaborated on a country-specific review of the traditional growth model, which is based on trade and financial integration as well as on market-supporting government institutions. Despite the fact that this model proved to be a source of growth and prosperity over the past two decades, its weaknesses – incomplete reforms, unbalanced growth (mainly financed externally) but also financial fragility – became especially evident in the current crisis and need to be addressed. To achieve stronger and safer economic growth, policies should focus on improving the business environment (e.g. by strengthening innovation and human capital), but also on developing domestic

<sup>1</sup> See [www.ebrd.com/pages/research/publications/flagships/transition.shtml](http://www.ebrd.com/pages/research/publications/flagships/transition.shtml) for the full report.

<sup>2</sup> The EBRD region covers 29 countries in Central and Eastern Europe and central Asia, including Turkey. Effective from 2008, the Czech Republic was the first country to graduate from the EBRD.

capital markets and local currency finance. The latter reform area aims at counteracting the instabilities caused by the widespread use of foreign currency loans in the transition economies and would lower the dependence on foreign capital inflows. Moreover, the adequate policy response depends crucially on the country-specific causes for lending in foreign currency. These causes include a lack of macroeconomic stability (i.e. low credibility of monetary and fiscal policy affecting inflation and exchange rate volatility as well as interest differentials), a low level of financial development combined with abundant foreign funding, and the mispricing of foreign currency risk.

Accordingly, the EBRD Transition Report 2010 outlines three main strategies, depending on a country's status quo and the policymakers' preferences. First, countries with a lack of macroeconomic stability should improve the credibility and quality of monetary policy and ensure solid public finances. The EBRD does not recommend the implementation of aggressive regulations that would discourage foreign currency lending but the development of a functioning money market. Second, countries with a reasonable track record of stable inflation and floating exchange rates should implement macroeconomic and regulatory reforms and develop a local capital market. Moreover, policy efforts should also concentrate on the improvement of money and government bond markets. Finally, the third group of strategies considers countries with fixed exchange rate regimes (particularly aspiring euro area countries). The downside risk of foreign currency borrowing in these countries should be managed through a combination of regulatory measures and prudent macroeconomic policies to help them withstand an unanticipated shock to external financing.

In conclusion, Zettelmeyer pointed out that the national regulatory measures to support financial sector reforms in the transition countries, and in particular the development of local currency markets, are complemented by international initiatives such as the "Vienna Initiative" and the "Vienna Initiative Plus." Thus, the main challenge was to not impede these developments as external pressures subsided and fiscal policy issues came to the fore.

# Lucrezia Reichlin Gives 15<sup>th</sup> Global Economy Lecture at the OeNB

Compiled by  
Julia Wörz

On December 1, 2010, Lucrezia Reichlin, Professor of Economics at the London Business School, nonexecutive director of UniCredit Bank and former Director General Research at the European Central Bank (ECB), gave the 15<sup>th</sup> Global Economy Lecture<sup>1</sup> at the OeNB. In her presentation entitled “Monetary Policy in Difficult Times – Lessons and Challenges from the European Central Bank,” Reichlin discussed and evaluated the ECB’s monetary policy response to the recent financial crisis and drew comparisons to the policies undertaken by the Bank of England and the Fed.

In the beginning of her talk, Reichlin pointed toward the complexity of risks as expressed by widening interest rate spreads in a range of dimensions: policy versus market rates, secured versus unsecured rates, long-run versus short-run rates. Having described the evolution of the crisis and the subsequent ECB policy responses, Reichlin went on to present an empirical framework to quantify the effects of the ECB’s standard and nonstandard measures on the aforementioned spreads. In doing so, she drew on her recent research with Domenico Giannone (Université libre de Bruxelles), Michele Lenza and Huw Pill (both ECB). Using a Bayesian Vector Autoregressive Model, she compared the effects of the introduction of nonstandard measures (liquidity policymaking) with two different sets of counterfactuals: In the first exercise, she constructed a nonpolicy scenario without nonstandard measures by assuming an interest rate mark-up on the policy rate. In the second exercise, she compared the actual path of macroeconomic variables with those of model forecasts conditional on the observed path of economic activity.

As a first important result, Reichlin pointed out that the macroeconomic effects of nonstandard monetary policy measures were the same as those of interest rate changes. This suggests that the zero lower bound restriction on nominal interest rates was not an issue in the euro area (unlike in the U.S.A. and the U.K.), which implies that there was no need to substitute nonstandard measures for lower interest rates. Hence, standard and nonstandard measures were used in a complementary way in the euro area, and the monetary transmission process was preserved – again in contrast to the situation prevailing in the U.S.A., the U.K. and Japan. Reichlin further found that the ECB’s monetary policy had been successful in preserving the transmission mechanism during the crisis although there was some evidence that this was not the case for the broader money market. This further corroborates the view that the ECB functioned as an “intermediary of last resort” during the crisis, thus largely replacing the market in providing liquidity. Reichlin concluded by alluding to problems beyond the short run and to the need to understand better long-term interest rate stickiness and its implications for banks’ funding strategies.

The ensuing discussion centered on the role of the ECB in the current situation. Prompted by a question concerning additional risks as imposed by differing credit spreads between individual euro area countries, Reichlin pointed toward institutional and political risks imposed by the ECB’s highly active role in current

<sup>1</sup> *The Global Economy Lecture is an annual event jointly organized by the Oesterreichische Nationalbank (OeNB) and The Vienna Institute for International Economic Studies (wiiw).*

economic policy. According to Reichlin, the ECB is stepping in to compensate for the lack of swift coordination by EU governments. She also agreed to the view that the ECB had made initial policy mistakes in mid-2008, but stressed the ECB's rapid learning process and sound policy responses as from September 2008 onward, which entailed the use of multiple instruments in a complementary fashion. She supported a more active use of collateral as a further policy instrument.



Notes

# Studies Published in Focus on European Economic Integration in 2010

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Could Markets Have Helped Predict the Puzzling Exchange Rate Path in CESEE Countries during the Current Crisis?

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How Did the Global Financial Crisis Affect the CESEE Region and Latin America? A Comparative Analysis

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Trade, Economic Structure and the Great Recession:

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Measuring Competition in CESEE: Stylized Facts and Determinants across Countries and Sectors

*Martin Feldkircher, Reiner Martin, Julia Wörz*

Regional Convergence in Europe and the Role of Urban Agglomerations

*Jesús Crespo Cuaresma, Martin Feldkircher, Peter Mayerhofer*

Trade-Enhancing EU Enlargement and the Resurgence of East-East Trade

*Cecilia Hornok, Olga Radzyner Award winner 2009*

## Issue Q4/10

Crisis Response Policies in Russia, Ukraine, Kazakhstan and Belarus –  
Stock-Taking and Comparative Assessment

*Stephan Barisitz, Hans Holzacker, Olena Lytvyn, Lyaziza Sabyrova*

Euro Survey of Spring 2010: Sovereign Debt Crisis Left Traces  
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Unchanged

*Sandra Dvorsky, Thomas Scheiber, Helmut Stix*

# Periodical Publications of the Oesterreichische Nationalbank

For further details on the periodical publications of the OeNB, see [www.oenb.at](http://www.oenb.at)

## **Monetary Policy & the Economy** quarterly

This quarterly publication, issued both in German and English, offers analyses of current cyclical developments, medium-term macroeconomic forecasts and studies on central banking and economic policy topics. It also provides summary findings of macroeconomic workshops and conferences organized by the OeNB.

## **Focus on European Economic Integration** quarterly

This quarterly English-language publication is a channel for communicating the OeNB's ongoing research on Central, Eastern and Southeastern European (CESEE) countries, thus reflecting a strategic regional research priority of the OeNB. Contributions include peer-reviewed studies dealing primarily with macrofinancial and monetary integration as well as economic country analyses and cross-regional comparisons.

## **Statistiken – Daten & Analysen** quarterly

This publication contains brief reports and analyses focusing on Austrian financial institutions, cross-border transactions and positions as well as financial flows. The contributions are in German, with executive summaries of the analyses in English. The statistical part covers tables and explanatory notes on a wide range of macroeconomic, financial and monetary indicators (these indicators and others are also available online in both German and English). In addition, this series includes special issues on selected statistics topics published at irregular intervals.

## **Research Update** quarterly

This quarterly English-language newsletter is published only on the Internet and informs an international readership about selected findings, research topics and activities of the OeNB's Economic Analysis and Research Department. This publication addresses colleagues from other central banks or international institutions, economic policy researchers, decision makers and anyone with an interest in macroeconomics. Furthermore, the Research Update offers information on publications, studies or working papers as well as events (conferences, lectures and workshops).

For further details, see [www.oenb.at/research-update](http://www.oenb.at/research-update)

## **Financial Stability Report** semiannual

Issued both in German and English, the Financial Stability Report contains first, a regular analysis of Austrian and international developments with an impact on financial stability and second, studies designed to provide in-depth insights into specific topics related to financial market stability.

## **Workshops – Proceedings of OeNB Workshops**

three to four issues a year

The Proceedings of OeNB Workshops were introduced in 2004 and typically comprise papers presented at OeNB workshops at which national and international experts, including economists, researchers, politicians and journalists, discuss monetary and economic policy issues. Workshop proceedings are generally available in English only.

## **Working Papers**

about ten papers a year

The OeNB's Working Paper series is designed to disseminate, and provide a platform for discussing, findings of OeNB economists or outside contributors on topics which are of special interest to the OeNB. To ensure the high quality of their content, the contributions are subjected to an international refereeing process.

## **Annual Report including the Intellectual Capital Report and the Environmental Report (Sustainability Report)**

annual

The Annual Report of the OeNB provides a broad review of Austrian monetary policy, economic conditions, new developments in the financial markets in general and in financial market supervision in particular as well as of the OeNB's changing responsibilities and its role as an international partner in cooperation and dialogue. It also contains the OeNB's financial statements, its Intellectual Capital Report and its Environmental Report.

## **Conference Proceedings of the Economics Conference**

annual

The Economics Conference hosted by the OeNB is an international platform for exchanging views and information on monetary and economic policy as well as financial market issues. It convenes central bank representatives, economic policy-makers, financial market players, academics and researchers. The conference proceedings comprise all papers presented at the conference.

## **Conference Proceedings of the Conference on European Economic Integration**

annual

The OeNB's Conference on European Economic Integration (CEEI) focuses on Central, Eastern and Southeastern European issues and the ongoing EU enlargement process. The Conference Proceedings comprise contributions to the CEEI and are published in English by a renowned international publishing house. For further details, see <http://ceec.oenb.at>

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## Referees for Focus on European Economic Integration 2008–2010

Most of the research papers published in Focus on European Economic Integration are subject to a double-blind peer review process to ensure a high level of scientific quality. The editors in chief wish to thank the following researchers for their work and diligence in reviewing the studies published in Focus on European Economic Integration in the period from 2008 to 2010 (in alphabetical order):

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