

# FOCUS ON EUROPEAN ECONOMIC INTEGRATION

Q1/14

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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 2014 for Scientific Work on European Economic Integration

In 2000, the Oesterreichische Nationalbank (OeNB) established an award to commemorate Olga Radzyner, former Head of the OeNB's Foreign Research Division, who pioneered the OeNB's CESEE-related research activities. The award is bestowed on young economists for excellent research on topics of European economic integration and is conferred annually. In 2014, 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 or 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 either by electronic mail to [eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at) or by postal mail – with the envelope marked “Olga Radzyner Award 2014” – to the Oesterreichische Nationalbank, Foreign Research Division, Otto-Wagner-Platz 3, POB 61, 1011 Vienna, Austria. Entries for the 2014 award should arrive by September 19, 2014, at the latest. Together with their submissions, applicants shall provide copies of their birth or citizenship certificates and a brief CV.

For detailed information, please visit the OeNB's website at [www.oenb.at/en/About-Us/Research-Promotion/Grants/Olga-Radzyner-Award.html](http://www.oenb.at/en/About-Us/Research-Promotion/Grants/Olga-Radzyner-Award.html) or contact Ms. Eva Gehringer-Wasserbauer in the OeNB's Foreign Research Division (write to [eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at) or phone +43-1-40420-5205).

# Call for Applications: Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers for participation in a Visiting Research Program established by the OeNB's Economic Analysis and Research Department. The purpose of this program is to enhance cooperation with members of academic and research institutions (preferably post-doc) who work in the fields of macroeconomics, international economics or financial economics and/or with a regional focus on Central, Eastern and Southeastern Europe.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. Visiting researchers are expected to collaborate with the OeNB's research staff on a prespecified topic and to participate actively in the department's internal seminars and other research activities. They will be provided with accommodation on demand and will, as a rule, have access to the department's computer resources. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. Research visits should ideally last between 3 and 6 months, but timing is flexible.

Applications (in English) should include

- a curriculum vitae,
- a research proposal that motivates and clearly describes the envisaged research project,
- an indication of the period envisaged for the research visit, and
- information on previous scientific work.

Applications for 2014 should be e-mailed to [eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at) by May 1, 2014.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2014.



Studies

# Do the Drivers of Loan Dollarization Differ between CESEE and Latin America?

## A Meta-Analysis

Mariya Hake,  
Fernando Lopez-  
Vicente,  
Luis Molina<sup>1</sup>

*In this paper we compare the determinants of loan dollarization in two emerging market regions, namely Central, Eastern and Southeastern Europe (CESEE) and Latin America, through a meta-analysis of 32 studies that provide around 1,200 estimated coefficients for six drivers of foreign currency lending. As a common pattern, we find macroeconomic instability (as expressed by inflation volatility) and banks' funding in foreign currency to play a significant role in explaining loan dollarization in both regions. In contrast, the interest rate differential appears to be a key determinant only in Latin America, while the positive impact of exchange rate volatility on dollarization implies a more prominent role for supply factors in the CESEE region. While the robustness of the results has been verified, our meta-analysis shows that estimates reported in the literature tend to be influenced by study characteristics such as the methodology applied and the data used.*

*JEL classification: C5, E52, F31, O57, P20*

*Keywords: foreign currency loans, CESEE, Latin America, metaregression, random effects maximum likelihood*

During the 1980s and 1990s, high levels of inflation, wide interest rate spreads, local currency depreciation and the low credibility of domestic economic policies as well as chronic monetary financing of budget deficits prompted massive portfolio shifts into dollar-denominated assets and liabilities in most Latin American countries (Galindo and Leiderman, 2005). One decade later, a similar process resulting in a buildup of large stocks of financial assets and liabilities in foreign currency was observed in the European transition economies. While such dollarization<sup>2</sup> may help reduce capital flight, curb inflation expectations and induce macroeconomic stabilization, it may also limit the independence of monetary policy and create systemic vulnerabilities in financial and nonfinancial sectors. The potential adverse effects of dollarization are amplified when firms and households hold unhedged liabilities, in particular bank loans, in foreign currency: this exacerbates credit default risk and currency mismatch and thus creates potential threats to financial stability. Moreover, evidence from emerging economies in general and from Latin America and CESEE in particular reveals that, unless addressed, dollarization tends to be a persistent phenomenon. Yet to be able to achieve dedollarization (i.e. reduce foreign currency-denominated assets) policy-makers need to be aware of the key underlying drivers and understand above all whether dollarization was induced by demand- or supply-side factors (EBRD, 2010).

<sup>1</sup> Oesterreichische Nationalbank, Foreign Research Division, mariya.hake@oenb.at (corresponding author). Banco de España, International Economics Division, fernando.lopez@bde.es, lmolina@bde.es. The authors wish to thank two anonymous referees as well as Peter Backé, Markus Eller and Thomas Gruber (all OeNB), Jarko Fidrmuc (Zeppelin University, Germany) and the participants of an internal seminar at Banco de España in December 2013 for their helpful comments and suggestions.

<sup>2</sup> Dollarization is the (total or partial) replacement of the domestic currency by any foreign currency as a store of value, unit of account or medium of exchange within the domestic economy. Dollarization frequently involves the U.S. dollar, which is widespread in Latin American countries, while the CESEE countries have extensively used the euro and the Swiss franc. In this paper we analyze the dollarization of banks' financial assets, specifically lending to the private nonfinancial sector by banks in the domestic market.



The literature on dollarization has identified major determinants of foreign currency lending in emerging market economies, reflecting both demand- and supply-side factors and the interaction between them. These factors include the interest rate differential, the inflation rate and exchange rate depreciation; the volatility of inflation and of the exchange rate as well as the ratio between the two variables (the so-called minimum variance portfolio ratio – MVP ratio); and banks' funding in foreign currency.<sup>3</sup> At the same time, empirical studies on both Latin America and CESEE have remained rather inconclusive and the results diverge to some extent depending on the countries analyzed, the time period considered or the estimation method used.

Against this backdrop, this paper aims to first analyze the main drivers of loan dollarization (i.e. foreign currency lending by banks in the domestic market) in CESEE and Latin America, and to establish whether loan dollarization has been a supply- or a demand-driven process. In a second step, we investigate whether and how the drivers of loan dollarization differ between the two regions. Such a comparison should allow us (i) to identify typical patterns and idiosyncratic factors characterizing dollarization; and (ii) to deduce policy lessons for CESEE from the way dollarization and its consequences were handled earlier in Latin American countries. For that purpose, we conduct a metaregression analysis to condense the findings of previous empirical studies and establish the “true effect size” across datasets (Stanley and Jarrel, 1989).

Our findings suggest that loan dollarization was indeed driven by different factors in CESEE and Latin America. In Latin America, unlike in CESEE, the interest rate spread had a positive and significant impact on dollarization whereas exchange rate volatility had a negative impact, which would imply that Latin American dollarization was demand-driven. Hence, a rise in exchange rate volatility would make foreign currency loans less attractive for borrowers. In CESEE in contrast, exchange rate volatility had a positive impact, making risk-averse lenders more willing to supply foreign currency loans in order to match their foreign currency positions and reduce their currency risk. In both regions, loan dollarization was, moreover, heavily driven by macroeconomic instability, as reflected by inflation volatility, and banks' funding in foreign currency.

This paper is structured as follows. Section 1 provides descriptive evidence of financial dollarization, both on the assets and liabilities side in Latin America and CESEE. Section 2 presents a literature review of the determinants of foreign currency lending aimed at identifying the most common explanatory factors at the macroeconomic level. Section 3 describes the meta-analysis framework used to estimate the “true effect size” of the drivers of loan dollarization. Section 4 discusses the metaregression results and checks their robustness. The last section concludes.

<sup>3</sup> We should underline that the literature has identified region-specific factors which might influence the degree of dollarization. In particular, the EU accession perspective and the euro adoption perspective of the CESEE countries have been shown to play a key role (e.g. Rosenberg and Tirpák, 2008). However, in our study we focus on determinants of foreign currency lending which are common to both regions and have a sufficient number of coefficients.

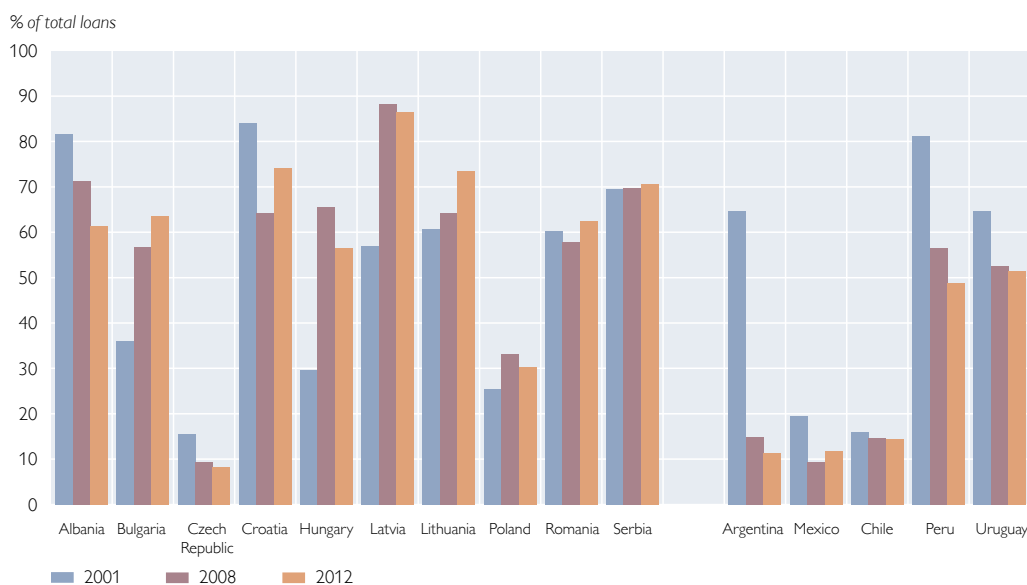
## 1 Descriptive Evidence on Financial Dollarization in Latin America and CESEE<sup>4</sup>

Although dollarization has been reduced successfully by some countries in both regions,<sup>5</sup> it tends to be a persistent phenomenon and has indeed been rising in some economies. Yet there are some striking differences between the two regions. First, the degree of currency substitution is higher on average in CESEE than in Latin America, both on the assets and the liabilities side (see charts 1 and 2).

In CESEE, 60% of private sector loans and 40% of private sector deposits were denominated in foreign currency in 2012, compared with only 27% and 24%, respectively, in Latin America. The lower dollarization levels in some countries in Latin America are, however, the result of policy or market intervention: In 2001, around 50% of total loans and deposits were denominated in U.S. dollars (or even around 70% in some countries, e.g. Peru and Uruguay). For instance, Argentina officially *pesified* (dedollarized) and indexed foreign currency loans and deposits after the 2001 crisis. Brazil, Chile, Mexico and Colombia imposed restrictions on holding foreign currency loans, introduced financial instruments indexed to exchange rate and inflation developments, or even implemented government policies to dedollarize public sector liabilities.<sup>6</sup> In Latin America, both loan and deposit dollarization hence decreased constantly from 2000 onward and somewhat stabilized

Chart 1

### Share of Foreign Currency Loans



Source: National central banks.

Note: The data refer to loans to the private nonfinancial sector and are adjusted for exchange rate developments (using January 2008 exchange rates). Data for Brazil and Colombia are not available.

<sup>4</sup> In the context of this paper, the CESEE region includes the seven CESEE EU Member States which have not yet adopted the euro (i.e. Bulgaria, the Czech Republic, Croatia, Hungary, Lithuania, Poland and Romania) plus Latvia (which became the 18<sup>th</sup> euro area member on January 1, 2014) and two (potential) EU candidate countries (i.e. Albania and Serbia). Latin America includes seven countries: Argentina, Brazil, Mexico, Chile, Colombia, Peru and Uruguay.

<sup>5</sup> The list of success stories includes Brazil, Chile, Colombia, Mexico and Poland (EBRD, 2010).

<sup>6</sup> See Gallego et al. (2010).

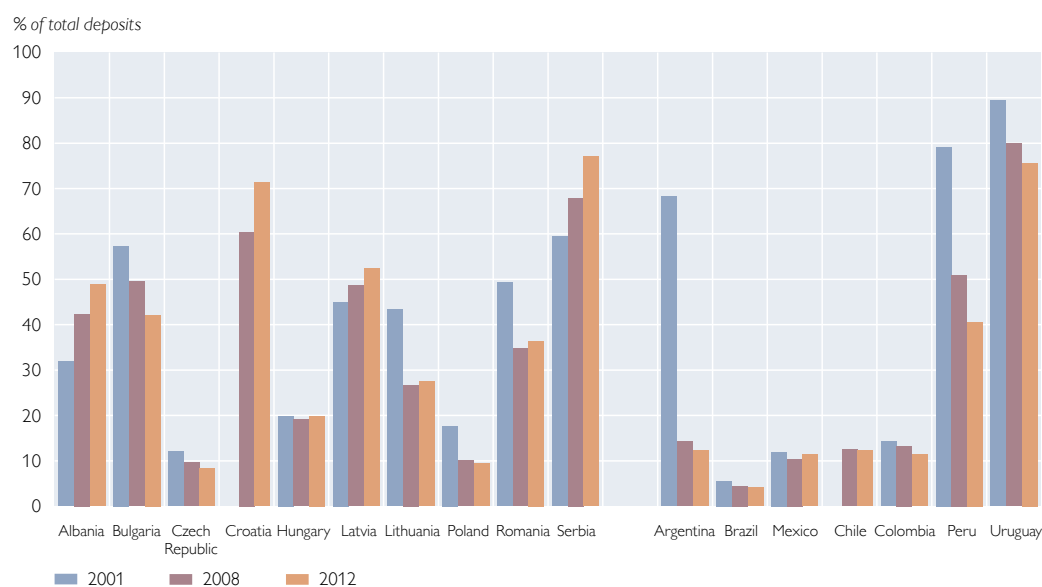
at lower levels during the recent crisis. In contrast, dollarization in CESEE was increasing steadily before the 2008/2009 crisis, fueled by both the EU accession perspective and increasing external funding as well as demand factors (Beckmann, Scheiber and Stix, 2011). The share of foreign currency loans in CESEE continued to increase even after the onset of the 2008/2009 crisis in all countries but the Czech Republic, Croatia and Albania. Indeed, the crisis seems to have pushed up dollarization in some CESEE countries. On average, loan dollarization increased by 13 percentage points in the region as a whole between 2008 and 2012.

Second, the degree of regional divergence differs as well. In Latin America, the share of foreign currency loans in total loans outstanding in 2012 ranged from 11% (Argentina and Mexico) to around a 50% (Peru and Uruguay), while the respective shares in CESEE ranged from 10% (Czech Republic) to close to 90% (Latvia). Furthermore, in CESEE, the share of foreign currency deposits was as high as 60% to 75% in the majority of the countries analyzed, with only one country (the Czech Republic) exhibiting a share clearly below 15% of total deposits. In contrast, in Latin America, five of the seven countries analyzed registered a ratio below 15%.

Third, regarding potential drivers of loan dollarization, a major difference between the two regions is the degree of currency mismatch in the respective banking systems (i.e. the difference between the level of loans and deposits in foreign currency as a share of GDP; see chart 3<sup>7</sup>). The banking systems in CESEE

Chart 2

### Share of Foreign Currency Deposits

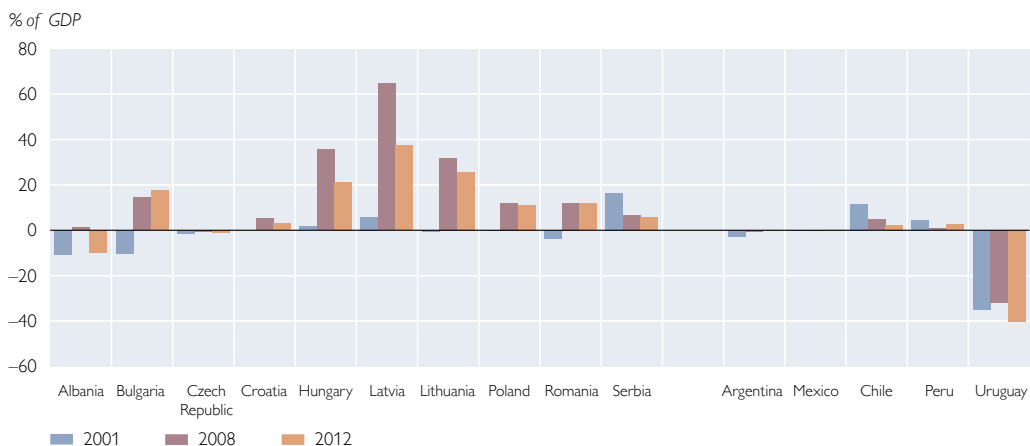


Source: National central banks.

Note: The data refer to deposits made by the private nonfinancial sector and are adjusted for exchange rate developments (using January 2008 exchange rates).

<sup>7</sup> Yet we do not have data on assets and liabilities different from loans and deposits in foreign currency held by banks. If we account for those “other” assets and liabilities, the currency mismatch may be amplified or reduced. For instance, banks may hedge net short positions in loans-deposits with long positions in other dollar-denominated assets and, therefore, match their foreign currency positions, reducing or at least balancing the indirect exchange rate induced risk.

Chart 3

**Dollarization Mismatch between Foreign Currency Loans and Deposits**

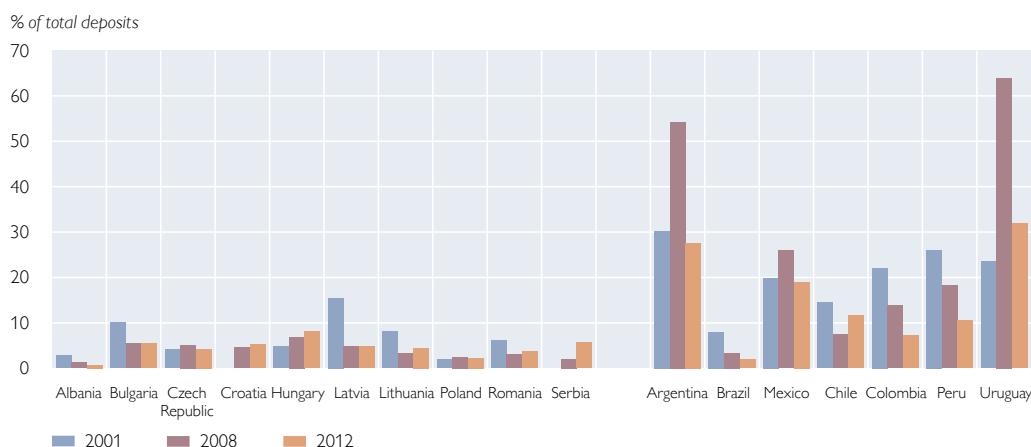
Source: National central banks.

Note: The mismatch is measured as the difference between foreign currency loans and foreign currency deposits as a % of GDP. Data for Brazil and Colombia are not available.

as defined here tend to be dollarized more heavily on the assets side than on the liabilities side. The currency mismatch is high and positive, having evolved over time from 1% of GDP on average in the early 2000s to around 15% in 2008, due to an extraordinary increase of foreign currency loans. From 2008 onwards dollarization decreased strongly as the crisis affected both foreign currency loan demand and supply, especially in countries like Hungary. Only in Albania and the Czech Republic is the sign of the mismatch negative (i.e. foreign currency deposits exceed foreign currency loans). In Latin America in contrast, the cross-country correlation between U.S. dollar loans and U.S. dollar deposits was close to 1 in 2012, following a decline during the 2000s. Within Latin America, Uruguay is an outlier, with a negative currency mismatch of 40% of GDP in 2012, reflecting the absorption of substantial amounts of U.S. dollar deposits from Argentina after the crisis in the early 2000s.

Fourth, the degree of dollarization is also reflected by foreign currency holdings abroad and the issuance of foreign currency debt in international markets. Such offshore dollarization is seen as less damaging than domestic dollarization, since the default risk is transferred to foreign institutions, although it usually reveals deficiencies in the domestic credit markets and distrust in the banking system. Yet for most of the CESEE countries offshore deposits represent only a small fraction of total deposits and have decreased in the sample period. In Latin America, offshore deposits are more relevant but have also decreased from the early 2000s (chart 4). Corporate issuance of foreign currency debt has gained relevance and grown exponentially in both Latin America and CESEE, as the accommodative stance of monetary policy in developed countries has sharply reduced funding costs in international markets for foreign currency loans in domestic markets. The pattern in the two regions is very similar: an increase of corporate issuance in international markets and in foreign currency. In absolute figures, the importance of foreign funding sources remains limited for these

Chart 4

**Offshore Deposits**

Source: BIS.

economies, though (around 2% of GDP and 5% of total bank credit in both regions).<sup>8</sup>

Finally, the countries in the two regions differ somewhat with respect to exchange rate and inflation rate developments and volatilities as well as with regard to the interest rate differential (i.e. the difference between the price of loans in foreign and in domestic currency).<sup>9</sup> Interestingly, while the interest rate differential (chart 5) has stabilized or decreased in some countries with a high degree of dollarization in both regions (e.g. Peru and Uruguay; Croatia and Albania), it remains at elevated levels of up to 10 percentage points difference in other highly dollarized countries in both regions (e.g. Serbia and Argentina), not least due to the persistently high inflation rates in these countries. Inflation volatility has decreased in all countries under review since 2005 (chart 6), with the exception of Latvia, which nevertheless registered very low inflation rates and even some episodes of deflation in recent years. Going further, although the majority of countries have seen their exchange rates appreciate since 2001, partly explained by the increase in income per capita and related to the Balassa-Samuelson effect, some differences arise in terms of exchange rate volatility, which decreased strongly in CESEE countries and has increased slightly in those Latin American countries with inflation targeting.<sup>10</sup>

<sup>8</sup> Data for fixed income issuance come from the Dealogic database and cover all corporate bonds and medium-term notes placed by domestic firms and sovereigns in domestic and international markets.

<sup>9</sup> The majority of studies included in section 4 use as a proxy for the interest rate differential a somewhat different calculation, the difference between the domestic interest rate and the U.S. or euro area interest rate, probably as it is difficult to recover long time series data for these differentials, and as some of the domestic markets for foreign currency loans or deposits were developed only from 2000 onwards.

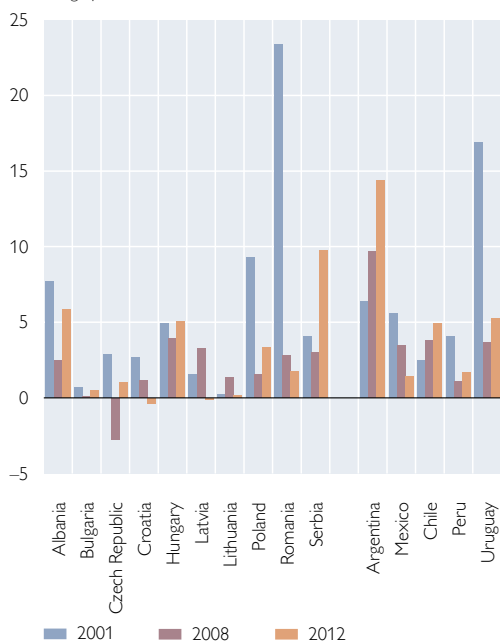
<sup>10</sup> Inflation and exchange rate volatility can be calculated in different ways. The papers included in the next section use both rolling standard deviations of inflation rates or volatility extracted using statistical models like GARCH. As we only try to illustrate the recent evolution of volatility, we opt for the easier calculation method.

Chart 5

### Differential between Interest Rates for Local Currency and Foreign Currency Operations

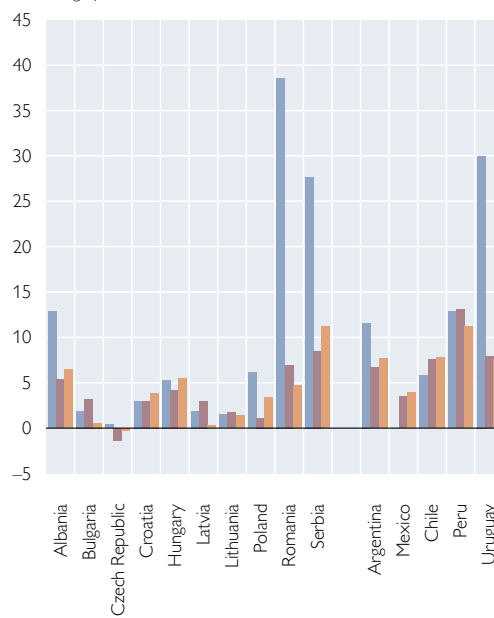
#### Interest Rate Differential: Deposits

Percentage points



#### Interest Rate Differential: Lending

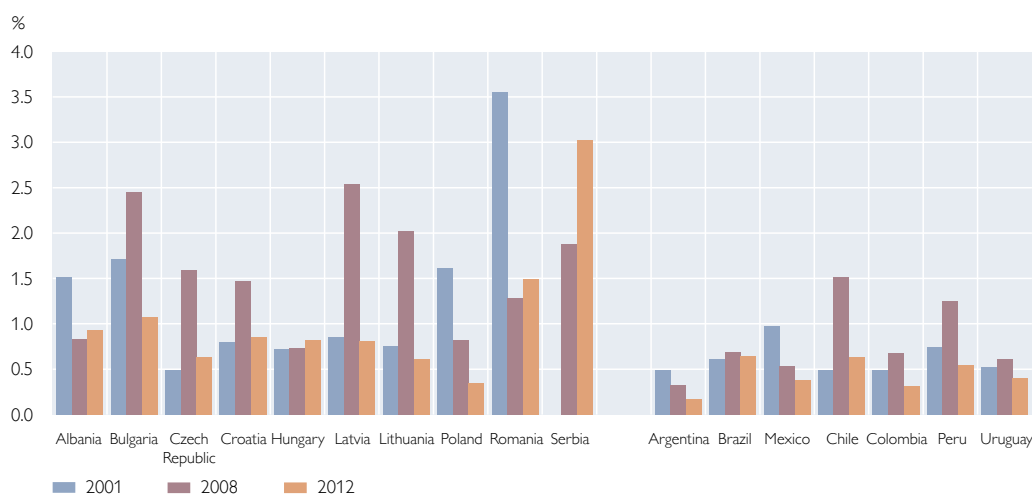
Percentage points



Source: IMF International Financial Statistics and national central banks.

Chart 6

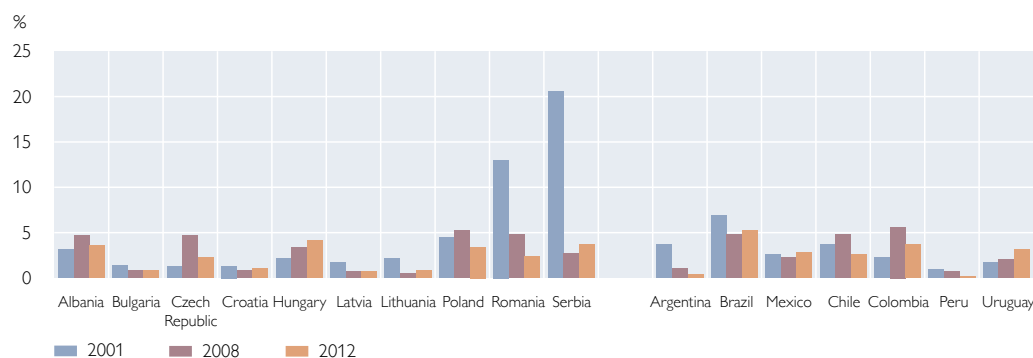
### Inflation Volatility



Source: National central banks.

Note: 12-month moving average of CPI inflation standard deviation.

Chart 7

**Nominal Effective Exchange Rate Volatility**

Source: National central banks.

Note: 12-month moving average of a broad nominal effective exchange rate.

**2 Literature Review of Loan Dollarization: Do the Two Regions Differ?**

Since dollarization was a widespread phenomenon in Latin America during the 1980s and 1990s, most of the early studies on dollarization focused on this region (e.g. Barajas and Morales, 2003). Although more recently the focus has turned to the CESEE countries, with an increasing number of studies based on survey data, traditionally the majority of studies used aggregate data and therefore focused on macro-level determinants, such as inflation, exchange rate depreciation and their volatilities. These determinants are shown to exert ambiguous effects on foreign currency lending depending on whether they express demand or supply factors. Most studies also included the interest rate differential, which is generally perceived to be more of a demand-side driver of foreign currency loans while indicating supply-side effects at the same time.<sup>11</sup> Moreover, both the empirical and theoretical studies traditionally include predominantly supply-side determinants such as the degree of deposit dollarization.

Regarding supply-side factors, Basso, Calvo-Gonzales and Jurgilas (2011) argue that currency matching plays a key role in the lenders' choice of currency denomination and hence is supposed to exert a positive influence on loan dollarization. Matching willingness is strengthened by supervisory regulation of banks' net foreign positions (see e.g. Luca and Petrova, 2008). For Latin America, Barajas and Morales (2003) find that foreign currency loans are strongly correlated with deposits in foreign currency. Fidrmuc, Hake and Stix (2013) find this correlation to be lower in CESEE, implying a lower relevance of funding in foreign currency compared to the Latin American region, although in some countries that matching behavior is supported by the large share of remittances (e.g. Albania and Serbia), which might also partially explain the size of deposit dollarization in those countries.

The interest rate differential – the explanatory variable used most often in the literature – reflects macroeconomic stability along with the relative price of foreign currency loans. If demand factors were dominant, we would expect a positive

<sup>11</sup> For example, the interest rate differential has been shown to play a major role in the recent process of funding sources substitution in some Latin American countries, ranging from bank credit in foreign currency in the domestic market to fixed income issuance in foreign currency in international markets.

effect on loan dollarization: borrowers would take out more foreign currency loans as long as they are cheaper than domestic currency loans. In turn, a higher domestic interest rate would be an incentive for banks to lend in domestic currency. Yet in some cases a positive relation between spreads and dollarization might indicate also a supply-side factor, since banks might be offering cheaper foreign currency loans in an effort to gain market share (Steiner, 2011). The tradeoff between currency risk and real interest rate risk (in the case of lower-than-expected inflation) explains the positive impact of the interest rate differential found in most of the studies on foreign currency lending in Latin America (e.g. Esquivel-Monge, 2007, for Ecuador). Interestingly, the empirical evidence for the CESEE countries is rather mixed. Rosenberg and Tirpák (2009) find that the interest rate differential is a robust determinant of foreign currency loans in the countries that joined the EU in 2004 and 2007 and in Croatia. In contrast, Brown and De Haas (2012), using bank-level data, find that foreign currency lending is negatively correlated with spreads in countries where those spreads declined in relation to the euro. Consequently, according to their interpretation, the macroeconomic stability which led to interest rate declines is a stronger determinant of foreign currency loans than spread advantages.

The impact of inflation and its volatility on foreign currency loans depends on the tradeoff between currency and real interest rate risks. High volatility of domestic inflation would induce more borrowing in foreign currency since the real interest rates would be more stable than domestic rates. Furthermore, higher inflation could induce larger savings in foreign currency, which at the same time positively influences lending in foreign currency (i.e. a supply-side perspective). In addition, even in a low inflation environment, the hysteresis effect may persist and induce borrowing in foreign currency (i.e. demand-side perspective) (Arteta, 2002). Regarding inflation, studies based on aggregate data and survey-based studies generally show a positive effect on loan dollarization (e.g. Zettelmeyer, Nagy and Jeffrey, 2010), while some studies also show a significant negative effect (e.g. Steiner, 2011).

Empirical studies also include (real) exchange rate depreciation and its volatility as determinants of loan dollarization in CESEE and Latin America. The theoretical impact of these variables is ambiguous, as it may affect the behavior of lenders and borrowers differently. Banks may try to shift the exchange rate risk to borrowers, increasing the supply of foreign currency loans, especially when they hold a large amount of foreign currency liabilities. At the same time, borrowers might reject the exchange rate risk and demand fewer foreign currency loans, especially in countries with stable monetary environments. By and large, a negative impact actually reflects the credit default risk of unhedged loans, since depreciation makes servicing loans more costly and risk-averse banks would reduce the supply of foreign currency loans especially if borrowers are not able to hedge against the currency risk. Nevertheless, in some cases corporate borrowers may be willing to accept foreign currency loans as a commitment device, signaling to lenders the firm's quality (and potentially a lower cost of default) and thus having to some extent a counterintuitive positive effect on loan dollarization from the demand side.<sup>12</sup>

<sup>12</sup> For instance, as shown by Alberola, Molina and Navia (2005) governments have the incentive to announce a fixed exchange rate regime just to regain access to cheaper international financial markets. This could explain the counterintuitive result that fixed exchange rate regimes are not related to stronger fiscal discipline, as the theory of fiscal dominance would imply.



When turning to empirical evidence, Barajas and Morales (2003) for Latin America and Luca and Petrova (2008) for a set of 21 transition countries infer that exchange rate volatility tends to reduce credit dollarization in the short run. In contrast, Honig (2009) points to a positive impact on loan dollarization in a study including a large sample of emerging market economies. Rosenberg and Tirpák (2009) find that exchange rate volatility has negative but small effects on the share of foreign currency loans in the countries that joined the EU in 2004 and 2007 and Croatia. Furthermore, past exchange rate volatility is not found to play a significant role in explaining loan dollarization, which has been explained by the increase in the perceived stability of the exchange rate due to EU membership, making economic agents more willing to accept the currency risk.

Finally, the studies on CESEE and Latin America differ in a number of ways. First, papers on Latin America usually focus on the effects of institutional frameworks on dollarization and include only some of the “traditional” factors as control variables. For instance, Honig (2009) and Arteta (2002) analyze the effects of the exchange rate regime on currency mismatches, while Barajas and Morales (2003) show how financial integration and domestic market developments affect dollarization. Furthermore Garcia-Escribano (2010) and Garcia-Escribano and Sosa (2011) analyze how policy frameworks affect the process of dedollarization. In CESEE-related empirical studies, we find the institutional dimension of the empirical research replaced to some extent by agents’ present or past experiences, not least due to the larger availability of survey-level data (e.g. Brown and De Haas, 2012; Fidrmuc, Hake and Stix, 2013). Second, unlike the studies on Latin American countries, the majority of studies on CESEE countries are based on survey data (either bank-, household- or firm-level), which permits some insights into whether the loan currency was chosen by the borrower or by the lender. Third, the papers on Latin America typically cover the 1990s and the early 2000s, while some of the papers on CESEE include more recent periods, i.e. also the 2008/2009 financial crisis. Fourth, including the MVP ratio<sup>13</sup> as a key determinant of foreign currency loans is very common for studies on CESEE but an exception for studies focused on Latin America, which usually substitute inflation and exchange rate volatilities. Finally, many studies on dollarization in Latin America focus on the liabilities side rather than the assets side of the banking system, which may be due to easier access to data on dollar deposits. At the same time, the dollarization process was believed to have begun with deposits and to have moved to the loans side of the banking portfolio due to official restrictions to net foreign currency positions in some countries. Furthermore, the focus on currency substitution in the studies on Latin America may have been motivated by the region’s long history of hyperinflation, prompting people and banks to rush into U.S. dollars to protect their incomes and assets from inflation.

<sup>13</sup> The MVP ratio was initially used in portfolio choice theory, i.e. in studying the currency composition of deposits. Only later studies, covering mostly the CESEE region, also used the MVP ratio to analyze the determinants of loan dollarization. Given the lack of observations on the MVP ratio included as an explanatory variable in studies on the Latin American region, we cannot include the MVP ratio in this meta-analysis.

### 3 Meta-Analysis Methodology and Data Description

#### 3.1 Meta-Analysis Approach

The majority of empirical studies on the determinants of foreign currency lending in both regions studied in this paper build upon linear regression models of the following type:

$$FCL_{ijt} = \alpha + X_{ijt} + \varepsilon_{ijt} \quad (1)$$

where  $FCL$  stands for the share (or the change in the share) of foreign currency loans,  $X$  is a matrix of explanatory variables and  $\varepsilon$  is an error term. Equation (1) is usually estimated for sectors, indexed by  $i$ , in one or more countries, indexed by  $j$ , while  $t$  is the time period.

Similarly, in microeconomic (survey) studies, which are more common for the CESEE region, the dependent variable is a dummy which measures whether a given borrower (firm or household) has taken out a foreign currency loan. Correspondingly, the following model is applied:

$$P(FCL_{ijt} = 1 | X) = F(\alpha + X_{ijt}\beta) \quad (2)$$

where  $F(\cdot)$  is a nonlinear function, usually the cumulative normal distribution function for probit models or the logistic function for logit models. Similar to Crespo Cuaresma, Fidrmuc and Hake (2011), we justify the inclusion of both micro- and macro-econometric results by the fact that all the reviewed studies report marginal probability effects which are similar to the elasticities reported in a standard ordinary least squares (OLS) regression.

Using the corresponding parameter estimates from 32 studies that deal with the determinants of foreign currency loans in CESEE and Latin America, we estimate metaregression equations to highlight possible differences in the estimated coefficients. To this effect, we split the sample of coefficients into two regional samples<sup>14</sup> and then perform estimations for the CESEE sample, the Latin American sample and the combined sample.

The metaregression equation, which is typically given by

$$\hat{\beta}_{lm} = \mu + D_{lm}\theta + U_{lm} \quad (3)$$

was estimated separately for each of the determinants of foreign currency loans. Thereby,  $\hat{\beta}$  is the estimate corresponding to variable  $l$  in study  $m$ , and  $D$  is a matrix containing variables reflecting various characteristics of the study. It is further assumed that  $u$  is the regression error term, which may have a different distribution for each of the analyzed studies. With the exception of the “observation year” variable, the matrix  $D$  includes mostly binary variables, which summarize information related to data definitions, data structure, estimation method and included control variables in the collected publication (see table 1).<sup>15</sup>

The year of observation is meant to highlight trends in foreign currency lending and its analysis, such as structural changes (e.g. an increasing role of foreign

<sup>14</sup> Several studies include both regions (see table 2). This is why the sum of the number of coefficients from the two separate groups exceeds the number of coefficients of the overall sample.

<sup>15</sup> While we tried different specifications of the metaregressions, the final set of control variables does not always include all potential control variables, not least due to collinearity. However, a comparison of several approaches shows that by and large the estimated intercept remains unchanged.

Table 1

**Definition of Study-Related Variables Used in the Meta-Analysis**

Control variables	Definition
Micro study	Binary dummy: 1 if a study is based on survey data, 0 otherwise.
Fixed effects	Binary dummy: 1 if a study accounts for either country or industry fixed effects, 0 otherwise.
Bias correction	Binary dummy: 1 if a study accounts for either an estimation bias by instrumental estimation or selection correction (instrumental estimators and Heckman selection model), 0 otherwise.
Hedging	Binary dummy: 1 if a study accounts for (household) remittances or (corporate) export activities, 0 otherwise.
Post-crisis	Binary dummy: 1 if a study includes a time period following the outbreak of the recent economic and financial crisis (i.e. after 2008) or earlier crisis periods in Latin America (according to Reinhart and Rogoff, 2009), 0 otherwise.
CIS countries	Binary dummy: 1 if a study includes CIS countries, 0 otherwise.
Latin American countries	Binary dummy: 1 if a study includes Latin American countries, 0 otherwise.
CESEE countries	Binary dummy: 1 if a study includes CESEE countries, 0 otherwise.
EU enlargement	Binary dummy: 1 if a study accounts for the perspective of EU accession or euro adoption, 0 otherwise.
Other countries	Binary dummy: 1 if a study includes other countries (i.e. other than CESEE, CIS and Latin America), 0 otherwise.
FX restrictions included	Binary dummy: 1 if a study accounts for foreign currency restrictions, 0 otherwise.
Pegged FX regime	Binary dummy: 1 if a study accounts for a pegged regime (as opposed to a floating exchange rate regime), 0 otherwise.
Interest rate differential independent variable	Binary dummy: 1 if a study and a specification include the interest rate differential as an independent variable, 0 otherwise.
FX depreciation independent variable	Binary dummy: 1 if a study and a specification include exchange rate depreciation as an independent variable, 0 otherwise.
FX volatility independent variable	Binary dummy: 1 if a study and a specification include exchange rate volatility as an independent variable, 0 otherwise.
Inflation volatility independent variable	Binary dummy: 1 if a study and a specification include inflation volatility as an independent variable, 0 otherwise.
Inflation independent variable	Binary dummy: 1 if a study and a specification include inflation as an independent variable, 0 otherwise.
FX deposits independent variable	Binary dummy: 1 if a study and a specification include foreign currency deposits as an independent variable, 0 otherwise.
Openness	Binary dummy: 1 if a study accounts for the trade openness of a country, 0 otherwise.
Year of observation	Continuous variable measured as the deviation from the mean year of the period of observation.

Source: Authors' compilation.

currency loans) or changes in the generally accepted views on the determinants of foreign currency loans. Related to this, another variable reflects whether a study covers a post-crisis period, i.e. periods following the 2008/2009 crisis or other crisis periods as defined by Reinhart and Rogoff (2009). To account for features of the underlying data, we also distinguish between publications using aggregate data or micro datasets. Through the latter dummy, we also account for potential differences between firm and household data, as they may affect the sign and magnitude of the coefficients of some of the determinants of foreign currency lending (i.e. exchange rate depreciation or exchange rate volatility). In addition, we include several dummies which reflect whether the estimations have accounted for important control variables (such as openness of the economy) which could impact the magnitude and significance of some determinants (e.g. exchange rate volatility). Finally, we also account for the interrelation between the different determinants of foreign currency loans, to establish whether an estimation including one determinant has also accounted for another determinant from our set.

Regarding the methodology applied in the studies, we define dummy variables for models with fixed effects (such as country, region or firm fixed effects) and with selection bias treatment (instrumental variables approach, Heckman two-step procedure, etc.). Further dummies encompass the geographic focus of the paper, to reflect the inclusion of CIS or other countries (e.g. Israel), as well as an EU enlargement variable, which indicates whether a study accounts for the EU accession or euro adoption perspective.<sup>16</sup> Finally, we also consider whether a study accounted for specific regulations on lending in foreign currency, as this could reduce the importance of the other foreign currency determinants. Since not all the regression models reported in the sampled studies include information on regulations on foreign currency lending, our metaregression specifications do not include all these variables for each of the parameters of interest.

To support and verify the robustness of our metaregression results, we estimate equation (3) with two methods. First, we perform a weighted least squares (WLS) estimation, using the precision of each parameter estimate (measured by the inverse of their standard errors or standard deviation) as a weight in the regression. This weighting approach is consistent, for instance, with Knell and Stix (2005) or Crespo Cuaresma, Fidrmuc and Hake (2011, 2013), but its controversy has been acknowledged by various authors (e.g. Krueger, 2003).

Second, we apply the random effect maximum likelihood (REML) approach (see e.g. Thompson and Sharp, 1999) to address the decisive drawback of the WLS methodology, i.e. the fact that it cannot deal with the potential heterogeneity in estimates across studies (i.e. the between-studies variance).

In particular, if we assume that the true value of  $\beta$  can only be imperfectly approximated by  $\mu + D_{lm}\theta$ , so that  $\beta_i = \mu + D_{lm}\theta + \omega_i$ , where  $\omega$  is a normally distributed random variable with zero mean and variance  $\sigma_\omega^2$  equal to the standard error reported for  $\beta$  in individual studies, then (3) can be written as

$$\hat{\beta}_{lm} = \mu + D_{lm}\theta + \omega_i + u_{lm} \quad (4)$$

Thereby, it is assumed that  $\omega$  and  $u$  are uncorrelated. Hence, this specification is able to account for both between-study variance (given by  $\sigma_\omega^2$ ) and the individual variance of the estimate reflecting the relative precision across the observed values of  $\beta$  (Crespo Cuaresma, Fidrmuc and Hake, 2013).

### 3.2 Metadata Set and Descriptive Statistics

For our meta-analysis we use estimates from 32 empirical papers on foreign currency loans in CESEE and Latin America.<sup>17</sup> We cover the main factors that according to the literature explain loan dollarization. From the seven determinants discussed by Crespo Cuaresma, Fidrmuc and Hake (2011) we have to drop one (i.e. MVP) due to the surprisingly few times it was included in studies on loan dollarization in Latin America. Likewise we had to ignore the choice of exchange

<sup>16</sup> The EU accession perspective and the euro adoption perspective were included only in the estimations for all coefficients and for the coefficients from studies on the CESEE countries.

<sup>17</sup> We used various sources of information in the period from February 2011 to January 2013 (e.g. the EconLit Database) to search for papers investigating the determinants of foreign currency loans with the only condition of including either the CESEE countries or Latin American countries. Several papers, exclusively investigating the CESEE region, were published first as working papers and then as journal articles. Both versions were surveyed and included in the metaregressions unless the journal article is completely identical to the working paper version.

Table 2

**Surveyed Studies**

Studies	Period	Countries	Data sample	Dependent variable	Determinants included
Arteta (2005)	1975/1990–2000	92 countries	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential, inflation, exchange rate depreciation
Barajas and Morales (2003)	1985–2011	Latin America	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential, FX deposits
Basso, Calvo-Gonzales and Jurgilas (2007, 2011)	2000–2006	24 CESEE and CIS countries	Macro-level data	Share of FX loans to the private sector and change in the share of FX loans	Interest rate differential, MVP
Brown, Ongena and Yesin (2009, 2011)	2002–2005	CESEE and CIS countries	Firm survey data	Dummy: FX loan (yes/no)	Interest rate differential, inflation volatility, exchange rate volatility, FX deposits
Brown, Kirschenmann and Ongena (2010)	2003–2007	Bulgaria	Firm survey data	Dummy: FX loan (yes/no)	Interest rate differential, inflation volatility
Brown and De Haas (2010, 2012)	2001, 2004	20 CESEE and CIS countries	Bank survey data	Share of FX loans in loans to the private sector	Interest rate differential, inflation volatility, exchange rate volatility
Brzoza-Brzezina, Chmielewski and Niedźwiedźska (2010)	1997–2008	4 CESEE countries	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential
Csajbók, Hudecz and Tamási (2010)	1999–2008	CESEE EU countries	Macro-level data	Share of FX loans in loans to the household sector	Interest rate differential, exchange rate volatility
Esquivel-Monge (2007)	1993–2007	Costa Rica	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential, exchange rate depreciation, inflation volatility
Fidrmuc, Hake and Stix (2011, 2013)	2007–2010	9 CESEE countries	Household survey data	Dummy: FX loan (yes/no)	Interest rate differential, inflation volatility, exchange rate volatility, MVP
Galiani, Levy Yeyati and Schargrodsky (2003)	1993–2001	Argentina	Firm-level data	Dollar-to-total debt ratio	Exchange rate depreciation
García-Escribano (2010)	2001–2009	Peru	Macro-level data	Change in loan dollarization	Interest rate differential, inflation, exchange rate volatility, exchange rate depreciation
Haiss and Rainer (2012)	1999–2007	13 CESEE countries	Firm-level and household-level data	Share of U.S. dollar credit in total credit	Interest rate differential, inflation, FX deposits
Honig (2009)	1988–2000	90 countries	Macro-level data	Share of U.S. dollar credit in total credit	Exchange rate volatility, exchange rate depreciation, inflation, inflation volatility, MVP

Source: Authors' compilation.

rate regime, or the degree of financial integration and domestic market development. Those variables are only included in a few specific studies, yielding only an insufficient number of observations. Therefore, although proven to be relevant, they are excluded from our analysis. Yet ultimately, this exercise provides us with nearly 1,200 estimates, most of which include the interest rate differential (see table 2).

Table 2 continued

**Surveyed Studies**

Studies	Period	Countries	Data sample	Dependent variable	Determinants included
Kamil and Rai (2010)	1999–2008	Latin America and Caribbean	Bank-level data	Change in loan dollarization	Interest rate differential, exchange rate depreciation
Lane and Shambaugh (2009)	1996–2004	117 countries	Macro-level data	FX exposure	Exchange rate volatility, inflation volatility
Luca and Petrova (2008)	1990–2003	21 CESEE and CIS countries	Macro-level data	Ratio of FX loans in loans to the corporate sector	Interest rate differential, exchange rate depreciation, FX deposits
Melvin and Ladman (1991)	1980–1987	Bolivia	Bank-level data	Dummy: FX loan (yes/no)	Inflation
Mora (2012)	1998–2003	Mexico	Firm-level data	Change in loan dollarization	Interest rate differential, exchange rate depreciation, FX deposits
Neanidis (2010)	1991–2010	24 CESEE and CIS countries	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential, exchange rate volatility, exchange rate depreciation, inflation, FX deposits
Neanidis and Savva (2009)	1993–2006	CESEE and CIS countries	Macro-level data	Change in loan dollarization	Interest rate differential, exchange rate depreciation, change in inflation rate, MVP, FX deposits
Peiers and Wrase (1997)	1980–1987	Bolivia	Firm-level data	Dummy: FX loan (yes/no)	Interest rate differential, exchange rate volatility, exchange rate depreciation, inflation rate volatility
Rosenberg and Tirpák (2008)	1999–2007	CESEE EU countries, Croatia	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential
Rosenberg and Tirpák (2009)	1999–2007	CESEE EU countries, Croatia	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential, exchange rate volatility, FX deposits
Steiner (2009, 2011)	1996–2007	CESEE EU countries, Croatia	Macro-level data	Share of FX loans in loans to the private sector	Interest rate differential, exchange rate depreciation, inflation, FX deposits
Uzun (2005)	1990–2001	Latin America, Turkey	Firm-level data	Dollar-to-total debt ratio	Interest rate differential, exchange rate depreciation, inflation
Zettelmeyer, Nagy and Jeffrey (2010)	2000–2008; 2002–2005	CESEE, CIS; Latin American countries	Macro-level data, firm survey-level data	Dummy: FX loan (yes/no); share of FX loans in loans to the private sector	Interest rate differential, exchange rate depreciation, inflation, FX deposits

Source: Authors' compilation.

The coefficients estimated for the explanatory variables included in the studies highlight several remarkable differences between the two regions (table 3). First, the coefficient estimated for the interest rate differential, while surprisingly close to zero for CESEE on average at only 0.009, is significantly different for Latin

Table 3

**Metastatistics**

Variable	CESEE countries						Latin American countries						T-test
	Number of observations	Mean	Standard deviation	Min	Max	Share of significant coefficients	Number of observations	Mean	Standard deviation	Min	Max	Share of significant coefficients	
Interest rate differential	275	0.009	1.122	-4.005	4.142	51.6	109	0.714	1.731	-2.8	9.3	45.3	-5.87***
Exchange rate volatility	91	-0.48	1.023	-4	1.198	34.6	61	0.217	0.994	-2.53	3.45	36.1	-3.67***
Exchange rate depreciation	117	0.193	0.664	-2	1.31	70.5	89	-0.102	0.415	-0.972	1.04	40.7	3.52***
Inflation	87	-0.037	0.115	-0.347	0.119	32.4	78	-0.238	1.989	-9.7	5.7	30.3	-0.81
Inflation volatility	44	0.924	4.451	-10.01	18.6	45.5	55	4.208	8.134	-4.65	25	72.7	-2.40**
FX deposits	77	0.406	0.435	-1	2	70.5	30	0.189	0.454	-0.576	0.965	40.6	3.52***

Source: Authors' calculations.

Note: The t-test establishes the difference between the means of the impact of the respective determinant in the two groups of coefficients. \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level.

America at 0.714. Second, apart from the means for inflation, the means of the coefficients differ significantly between the two samples. Third, there are substantial within and between variations for all variables in the two samples. Fourth, the share of significant coefficients is above 50% for exchange rate depreciation, foreign currency deposits as well as the interest rate differential in the CESEE sample, but only for inflation volatility in the Latin American country. Finally, inflation is the only variable for which the *t*-test, which accounts for the differences between the mean coefficients of the two country groups, fails to reject the null hypothesis (i.e. the means are equal).

#### 4 Metaresults: The Determinants of Foreign Currency Loans

Another purpose of the meta-analysis is to clearly identify the adjusted (“true”) effect of the individual determinants of foreign currency loans. Tables 4 to 9 present the results of the metaregression analysis (shown by the intercepts of equations 3 and 4) for the six most common determinants of foreign currency lending, as established with the REML approach and cross-checked with the WLS approach. Our preferred estimation method is the REML approach since it considers both the between and within studies variation of the coefficients, as the WLS approach primarily focuses on the within studies variation. For each determinant, we first perform the estimation for the set of coefficients including both regions, Latin America and CESEE, and then we run two separate regional estimations.

As the *interest rate differential* is the determinant with the largest number of coefficients (358), we presume that it will deliver the most reliable metaresults (table 4). Interestingly, we find a positive and significant coefficient only for the Latin American region, which we interpret as a predominantly demand-driven phenomenon. In contrast, the coefficient for the CESEE sample is not statistically significant, thus confirming results from a similar analysis (i.e. Crespo Cuaresma, Fidrmuc and Hake, 2011) that the interest rate differentials do not appear to play a



major role in the dollarization of loans in that region. This result is confirmed by both methods applied and the relatively low coefficient of determination ( $R^2$ ) in the metaregression for the CESEE region. In fact, this result may be an indication that some indirect supply-side effects may be also in place. In the Latin American case, the coefficient actually became more relevant in recent years, as reflected by the positive sign of the dummy variable “year of observation.” This finding appears to be intuitive: once high inflation abated and countries at the same time regained

Table 4

### Metaregression Estimates: Interest Rate Differential

	Random effect maximum likelihood (REML)			Weighted least squares (WLS)		
	All countries	CESEE countries	Latin American countries	All countries	CESEE countries	Latin American countries
Intercept	1.748*** (0.178)	0.163 (0.122)	2.981*** (1.244)	0.584** (0.276)	0.192 (0.101)	1.525*** (0.273)
FX volatility independent variable	0.191** (0.095)	-0.211 (0.145)	-0.016 (0.154)	-0.277 (0.191)	-0.732*** (0.058)	-0.003 (0.073)
FX depreciation independent variable	0.637*** (0.105)	0.078 (0.108)	0.725*** (0.229)	0.570*** (0.200)	0.121 (0.199)	-0.003 (0.018)
Inflation independent variable	-0.397*** (0.112)	0.144 (0.110)	1.197*** (0.318)	-0.272* (0.153)	-0.400** (0.167)	1.992*** (0.842)
Inflation volatility independent variable	0.395*** (0.113)	0.880*** (0.299)	0.318** (0.152)	-0.257 (0.153)	0.527*** (0.099)	0.021 (0.067)
FX deposits independent variable	-0.346*** (0.090)	-0.096 (0.087)	-0.222 (0.212)	0.131 (0.086)	-0.027 (0.027)	0.152 (0.245)
EU enlargement	0.362*** (0.109)	0.332*** (0.105)		0.249** (0.105)	0.103 (0.091)	
Openness	-0.449*** (0.115)	-0.185 (0.145)	-1.913*** (0.220)	-0.576* (0.292)	-0.430* (0.280)	-2.227*** (0.245)
FX restriction included	-0.470*** (0.118)	0.864*** (0.206)	-3.226*** (0.574)	-0.347** (0.164)	-0.129*** (0.088)	-0.395 (0.457)
Pegged FX regime	0.848*** (0.173)	-0.305*** (0.099)	-2.307*** (0.325)	0.183 (0.171)	-0.174 (0.292)	0.000 (0.000)
Year of observation	-0.025 (0.017)	-0.347*** (0.057)	-0.089** (0.036)	-0.009 (0.025)	-0.435*** (0.030)	0.113 (0.082)
Post-crisis period	1.135*** (0.234)	1.092*** (0.332)	2.362*** (0.706)	-0.395 (0.250)	-0.369* (0.190)	
Micro study	-1.401*** (0.110)	-1.607*** (0.224)	-2.131*** (0.226)	-0.238 (0.180)	-0.046 (0.101)	-0.241 (0.377)
Fixed effects	-0.793*** (0.102)	0.811 (0.093)	0.232 (0.198)	-0.359 (0.252)	0.151** (0.056)	0.012 (0.012)
Bias correction	-0.528*** (0.105)	-0.038 (0.085)	-1.198*** (0.230)	0.104 (0.171)	0.199*** (0.048)	-1.398* (0.606)
CIS countries	-0.581*** (0.207)	-0.291** (0.131)		-0.066 (0.124)	-0.053 (0.102)	-0.226 (0.165)
Latin American countries	-0.817** (0.320)	-1.342*** (0.241)		0.313 (0.290)	-1.205*** (0.276)	
CESEE countries	-0.739*** (0.184)			0.748*** (0.343)		
Other countries	-0.199* (0.119)	-0.062 (0.079)		0.237 (0.167)	0.029 (0.093)	-0.840 (1.804)
Observations	358	275	109	358	275	109
$R^2$	0.713	0.268	0.514	0.245	0.288	0.957

Source: Authors' calculations.

Note: \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level. Robust standard errors clustered by study in brackets. The total number of coefficients of “All countries” results from the coefficients from studies including either Latin American countries or CESEE countries or both.



access to international markets, the demand-side considerations become more relevant for determining the proportion of foreign loans in private agents' liabilities. Interestingly, including the post-crisis period reinforces the positive impact of the interest rate differential, while the negative coefficient of "openness" implies that it might be a proxy for access to fixed income in international markets or other sources of international financing.

Table 5

### Metaregression Estimates: Exchange Rate Depreciation

	Random effect maximum likelihood (REML)			Weighted least squares (WLS)		
	All countries	CESEE countries	Latin American countries	All countries	CESEE countries	Latin American countries
Intercept	-1.123** (-0.389)	-0.258 (-0.286)	-0.707* (-0.397)	-0.770** (-0.266)	-0.095 (-0.312)	-0.527*** (-0.012)
Interest rate differential independent variable	0.104 (0.174)			0.109 (0.024)	0.002** (0.001)	
FX volatility independent variable	0.338** (0.138)	-0.780** (0.354)	-0.320*** (0.061)	-0.005 (0.191)	-0.703 (0.601)	
Inflation independent variable	0.394*** (0.148)	-0.771** (0.263)	0.372*** (0.081)	0.151*** (0.003)	-0.715 (0.640)	0.321*** (0.000)
FX deposits independent variable	0.438*** (0.123)	0.434*** (0.149)		0.630*** (0.161)	0.056* (0.268)	
EU enlargement	-0.295* (0.171)	0.355 (0.327)		-0.325 (0.450)	0.784** (0.307)	
Openness	0.530*** (0.180)	1.019*** (0.336)	-0.689*** (0.214)	0.684*** (0.186)		
FX restrictions included	-0.213 (0.287)	0.250 (0.864)	0.399 (0.365)	-0.736** (0.338)	-0.918 (1.020)	0.386*** (0.019)
Pegged FX regime	0.561*** (0.293)	-0.250 (0.754)	-0.506 (0.362)	0.736** (0.338)	0.918 (1.020)	-0.475*** (0.004)
Year of observation	-0.034 (0.021)	0.103 (0.071)	0.003 (0.007)			
Post-crisis period	1.101*** (0.335)	-0.454 (0.434)	-0.355*** (0.056)	-0.343*** (0.022)	0.000 (0.000)	-0.343*** (0.008)
Micro study	-0.282 (0.204)	-1.314** (0.594)	0.338*** (0.057)	-0.143 (0.521)	-1.815** (0.630)	0.325*** (0.008)
Firm data	1.222*** (0.206)	0.962** (0.434)		0.541 (0.346)	1.019** (0.370)	0.000 (0.000)
Bias correction	-0.242** (0.111)	-0.593*** (0.157)	0.230*** (0.083)	-0.286 (0.350)	-0.631 (0.441)	0.243*** (0.019)
Other countries	1.148** (0.529)	-1.549** (0.707)		-0.649* (0.355)	0.000 (0.000)	0.000 (0.000)
CIS countries	-0.695** (0.323)	0.494 (0.682)	-0.619* (0.365)	-0.359 (0.364)	0.283 (0.474)	-0.607*** (0.004)
Latin American countries	-1.307*** (0.422)	0.786 (0.514)		-1.556*** (0.384)	-0.448 (0.803)	
CESEE countries	0.579 (0.428)			0.505 (0.333)		
Oil-exporting countries	0.284 (0.262)	0.016 (0.400)	0.571** (0.249)	0.116 (0.131)	0.004*** (0.000)	0.614*** (0.004)
Observations	166	117	89	166	117	89
R-squared	0.624	0.673	0.96	0.982	0.742	0.433

Source: Authors' calculations.

Note: \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level. Robust standard errors clustered by study in brackets. The total number of coefficients of "All countries" results from the coefficients from studies including either Latin American countries or CESEE countries or both.

Both theoretical and empirical evidence implies that *exchange rate depreciation* should have a negative impact on both demand and supply of foreign currency loans, since it reflects the credit default risk of unhedged loans. Yet a potential positive impact could be explained by the expected stability of the repayments. The results from the metaregression in table 5 confirm that this effect is significant and negative for Latin America, but not statistically significant for the CESEE sample of coefficients. In addition, exchange rate depreciation was more relevant

Table 6

### Metaregression Estimates: Exchange Rate Volatility

	Random effect maximum likelihood (REML)			Weighted least squares (WLS)		
	All countries	CESEE countries	Latin American countries	All countries	CESEE countries	Latin American countries
Intercept	-1.073** (0.532)	1.223** (0.555)	-0.474* (0.269)	-0.872*** (0.175)	1.351*** (0.007)	-0.926*** (0.004)
Interest rate differential independent variable	0.023 (0.050)	-0.008 (0.006)	1.319*** (0.104)	0.005 (0.016)	-0.008 (0.000)	1.594*** (0.007)
FX depreciation independent variable	-1.259*** (0.289)	-1.133 (0.943)		-1.211*** (0.150)	-1.136*** (0.003)	
Inflation independent variable	-0.271** (0.104)	-0.125 (0.293)	-1.104*** (0.110)	-0.113 (0.158)	-0.086*** (0.002)	-0.957*** (0.001)
Inflation volatility independent variable	0.300* (0.177)	0.134 (0.497)	1.742*** (0.162)	0.421** (0.151)	0.136*** (0.012)	1.858*** (0.014)
FX deposits independent variable	0.300 (0.038)	-0.004 (0.003)		0.010 (0.150)	-0.003*** (0.000)	
EU enlargement	-0.479*** (0.165)	0.220 (0.323)		-1.049** (0.391)	-6.403*** (1.762)	
Openness	-0.200 (0.111)	-0.064 (0.497)		0.195 (0.123)	-0.225*** (0.005)	-0.966*** (0.003)
FX restrictions included	0.282 (0.534)	-0.003 (0.904)		1.569** (0.632)	-0.003*** (0.000)	0.000 (0.000)
Pegged FX regime	-0.536*** (0.188)	-0.127 (0.995)		-0.587* (0.307)	-0.090*** (0.002)	
Year of observation	-0.137*** (0.019)	-0.124 (0.078)	-0.171*** (0.018)	-0.045 (0.035)	1.498** (0.455)	-0.091** (0.035)
Post-crisis period	-0.212* (0.122)	-2.750*** (1.089)	-0.617*** (0.154)	-0.029 (0.184)	0.000 (0.000)	-0.101 (0.063)
Micro study	0.649*** (0.143)	1.478*** (0.556)	0.422*** (0.144)	1.250*** (0.335)	3.546*** (0.838)	-0.253*** (0.006)
Fixed effects	0.005 (0.084)	-0.045 (0.061)	0.134 (0.112)	0.008 (0.027)	-0.156 (0.188)	0.066 (0.037)
Bias correction	0.371** (0.158)	0.046* (0.028)	0.709*** (0.132)	0.073 (0.121)	-13.898** (4.036)	0.464 (0.338)
FX restrictions included	1.013*** (0.222)	-0.003 (0.904)		1.569** (0.632)	-0.003*** (0.000)	0.000 (0.000)
Latin American countries	1.420*** (0.519)	2.878*** (0.839)		1.818*** (0.595)	0.562 (0.414)	
CESEE countries	0.785*** (0.136)		-1.186*** (0.105)	0.623*** (0.197)		0.056 (0.746)
Other countries	-0.363*** (0.133)	-2.704*** (0.813)		0.041 (0.195)	-2.830*** (0.008)	0.758*** (0.011)
Observations	113	52	61	113	52	61
R-squared	0.991	0.998	0.975	0.81	0.647	0.885

Source: Authors' calculations.

Note: \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level. Robust standard errors clustered by study in brackets. The total number of coefficients of "All countries" results from the coefficients from studies including either Latin American countries or CESEE countries or both.

before the 2008/2009 crisis (as shown by the “pre-crisis” dummy), as the majority of the currencies in Latin America has shown an appreciating trend since early 2009. The effect of exchange rate depreciation is reduced by a pegged exchange rate regime, as it generates incentives to increase loans (and deposits) in domestic currency as pegging (apparently) reduces uncertainty about the exchange rate developments. Finally, being a commodity exporter reduces the effect of the depreciation through higher access to hard foreign currency; foreign exchange restrictions have the same effect, as expected.

The results in table 6 confirm the negative effect of *exchange rate volatility* in Latin America, implying that a less volatile exchange rate induces borrowers to take out more loans in U.S. dollars if the interest rate spreads are large enough. This could also be related to the search for macroeconomic stability, and could also be masking the effects of inflation, as the majority of countries in the region, which used to suffer from hyperdepreciation and hyperinflation, today pursue inflation targets with a floating exchange rate. The negative coefficient for the year of observation also points to a higher effect of exchange rate volatility in the past. In contrast, this coefficient is positive for the CESEE sample. In other words, supply-side factors could be more relevant for explaining dollarization in that region, since risk-averse lenders might be more willing to supply foreign currency loans in order to match their foreign currency positions and reduce currency risk, i.e. the prevalence of indirect exchange rate risk.

Some studies test for the validity of *inflation rate volatility* (e.g. Zettelmeyer, Nagy and Jeffrey, 2010; Brown and De Haas, 2012; Esquivel-Monge, 2007) on top of including the *inflation rate*. Our metaregressions (tables 7 and 8) show that inflation and inflation volatility have the expected positive sign. Moreover, the latter has a very high coefficient, pointing to a strong relevance in both regions due to the long history of hyperinflation. Interestingly, we find higher inflation to boost foreign currency loans in Latin America but not in CESEE, implying that it is not the inflation rate *per se* but its volatility that matters. In the case of the Latin American countries, the coefficient for inflation could also mask the increase of foreign currency deposits in parallel with the increase in prices offsetting the loss of value of the domestic currency. Moreover, both variables became less relevant as determinants of foreign currency loans in recent years (signs and significance of time trend and post-crisis variables), and are less relevant in countries with pegged exchange rate regimes and exchange rate restrictions. This result seems intuitive against the historical background of the Latin American countries, where strong money creation led to quick exchange rate depreciation, and hence to episodes of hyperinflation. Thus, pegged exchange rate regimes and foreign exchange rate restrictions were used to reduce exchange rate uncertainty and short-circuit the process described above, although they sometimes ended in hyperdepreciation and hyperinflation when fiscal consolidation was not implemented timely.

Supply-side determinants are often proxied for by the *share of foreign currency deposits in total deposits* (see table 9).<sup>18</sup> In particular, banks with high levels of foreign currency deposits shift currency risk towards their customers (i.e. indirect currency risk). As regards the metaresults, foreign currency deposits are a relevant

<sup>18</sup> However, it should be pointed out that hedging at the micro level is also possible, with borrowers also aiming to match their balance sheets.

Table 7

**Metaregression Estimates: Inflation**

	Random effect maximum likelihood (REML)			Weighted least squares (WLS)		
	All countries	CESEE countries	Latin American countries	All countries	CESEE countries	Latin American countries
Intercept	2.133*** (-0.36)	0.107 (2.798)	8.738*** (1.639)	1.412* (0.551)	1.083 (0.008)	6.928*** (0.007)
Interest rate differential independent variable	3.747** (1.231)		0.187*** (0.108)	0.952 (0.693)		
FX depreciation independent variable	-8.293*** (2.132)	-0.036 (1.780)	2.701* (1.566)	-3.594*** (1.127)		
FX volatility independent variable	3.436*** (1.300)	-0.060 (2.965)			-0.059*** (0.000)	
Inflation volatility independent variable	0.037*** (0.007)		0.033 (0.033)	0.033 (0.033)	0.032*** (0.000)	
FX deposits independent variable	0.000 (0.000)	0.000 (0.000)			0.000 (0.000)	
FX restrictions included	0.530 (0.355)		-5.367*** (0.452)	-0.418 (0.475)	0.000 (0.000)	-11.245*** (0.007)
Pegged FX regime	-1.296*** (0.237)	-0.033*** (0.008)	-0.191*** (0.016)	0.343 (0.450)	-0.038*** (0.007)	-2.762*** (0.003)
Year of observation	-0.187*** (0.029)	-0.030*** (0.007)	-0.009*** (0.000)	-0.013** (0.005)	-0.038*** (0.000)	-0.008*** (0.000)
Micro study	0.784*** (0.164)		0.378 (0.299)	0.994* (0.524)	0.000 (0.000)	-2.100*** (0.001)
Fixed effects	0.083 (0.085)	0.000 (0.005)	-0.000 (0.000)	0.000 (0.000)	-0.003 (0.005)	-0.000 (0.000)
Bias correction	0.119 (0.114)	0.041** (0.020)	-0.183*** (0.042)	0.472 (0.410)	0.010 (0.063)	-2.737*** (0.000)
Post-crisis period	0.955*** (0.227)		-0.319 (0.300)	0.807 (0.497)	0.000 (0.000)	0.000 (0.000)
CIS countries	0.748 (0.529)	0.039 (0.853)	-0.452 (0.300)	-0.919 (0.536)	0.052*** (0.000)	2.012*** (0.002)
Latin American countries	-2.14*** (0.228)			-2.017*** (0.512)	2.694*** (0.041)	
CESEE countries	-8.794*** (1.395)		-0.888* (0.508)			0.452*** (0.002)
Other countries	1.079* (0.520)			1.795*** (0.367)	0.000 (0.000)	0.645*** (0.003)
Observations	111	87	78	111	87	78
R-squared	0.901	0.899	0.891	0.997	0.738	0.999

Source: Authors' calculations.

Note: \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level. Robust standard errors clustered by study in brackets. The sample is based on the set of estimates which are presented as preferred estimates or baseline estimates in the respective papers.

determinant of loan dollarization in both regions, yet with an intercept pointing to an almost parity relation in Latin America<sup>19</sup> while the coefficient is much lower in the CESEE region. In the Latin American countries this result could be impaired by the fact that most banks tend to use domestic funding to increase their loans. In other words, banks rely more on the increase of deposits than on leverage to expand their loan portfolio, resulting in a loan-to-deposit ratio of close to 1 after the banking crises suffered by the region in the early 1990s. Interestingly, the relevance of foreign currency deposits decreased during the sample period, as

<sup>19</sup> Results have to be interpreted with caution as the number of observations is too low.

Table 8

**Metaregression Estimates: Inflation Volatility**

	Random effect maximum likelihood (REML)			Weighted least squares (WLS)		
	All countries	CESEE countries	Latin American countries	All countries	CESEE countries	Latin American countries
Intercept	7.062*** (2.395)	8.878* (5.194)	21.273*** (3.129)	4.954** (1.950)	12.702*** (0.068)	21.288*** (0.916)
Interest rate differential independent variable	-1.010 (1.451)	-0.986 (1.122)	-1.011** (0.543)	-0.608 (0.874)	-1.250*** (0.039)	-0.632 (0.923)
FX depreciation independent variable	-3.522*** (1.772)	12.188*** (3.878)	-10.624*** (2.748)			
FX volatility independent variable	-0.984 (4.498)	-0.984 (4.500)	3.436 (6.583)			-5.609 (6.332)
Inflation independent variable	2.948** (1.178)	-9.604** (4.768)	-14.938*** (3.427)			-23.582*** (0.593)
FX deposits independent variable	0.009 (0.103)	0.008 (2.075)		0.008*** (0.000)		
Openness	-2.156 (2.408)		6.352*** (1.505)	-19.617 (15.401)	0.000 (0.000)	4.044*** (0.416)
EU enlargement	-0.749 (1.833)	-6.504*** (0.649)		10.582 (34.568)	-5.826*** (0.001)	
FX restrictions included	-9.810*** (1.817)	-9.608*** (4.590)				0.000 (0.000)
Year of observation	-0.201 (0.211)	-2.170*** (0.217)	1.630*** (0.225)	1.137 (1.082)	-1.944*** (0.000)	1.475*** (0.234)
Micro study	-7.897*** (2.902)		4.458*** (1.331)	-18.355 (19.003)	0.000 (0.000)	1.893*** (0.179)
Fixed effects	-2.766** (1.322)	4.157 (5.246)	0.013 (0.021)	0.316 (0.210)	3.255 (.)	0.042 (0.103)
Post-crisis period	5.483*** (1.799)		-6.236*** (0.934)	0.807 (0.497)	0.000 (0.000)	0.000 (0.000)
Bias correction				-10.115 (13.111)	0.000 (0.000)	
Latin American countries		-15.054*** (2.254)			-16.677*** (0.106)	
CESEE countries	-8.500*** (0.426)			-7.638 (8.144)		
CIS countries	3.845** (1.764)	-4.315*** (0.435)		-2.445*** (0.294)		
Observations	99	44	55	99	44	55
R-squared	1.00	0.99	0.99	0.702	0.695	0.703

Source: Authors' calculations.

Note: \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level. Robust standard errors clustered by study in brackets. The sample is based on the set of estimates which are presented as preferred estimates or baseline estimates in the respective papers.

most countries started to regulate banks' net exchange rate open positions. Finally, openness increases the effect of foreign currency deposits, as this variable could be considered as a proxy of access to international financial markets.

As regards the impact of further control variables, we found variables related to methodology to predominantly have significant effects. As there is a general agreement among authors that estimation methods should address the endogeneity problem, our meta-analysis shows that the coefficients from studies that treated endogeneity are often associated with weaker general results, which also holds true for estimations based on micro (survey)-level data. In contrast, estimations

Table 9

**Metaregression Estimates: Foreign Currency Deposits**

	Random effect maximum likelihood (REML)			Weighted least squares (WLS)		
	All countries	CESEE countries	Latin American countries	All countries	CESEE countries	Latin American countries
Intercept	0.571*** (-0.214)	0.408*** (0.089)	0.904*** (0.020)	0.549* (-0.631)	0.099*** (0.040)	0.839*** (0.000)
Interest rate differential independent variable	-0.113 (-0.117)	0.696*** (-0.161)		-0.189 (-0.565)	0.565*** (-0.179)	
FX depreciation independent variable	-0.806*** (0.096)	-0.625*** (0.083)		-0.809*** (0.374)	-0.713*** (0.090)	
FX volatility independent variable	0.227* (0.125)	0.789*** (0.123)		0.112 (0.331)	0.504* (0.160)	
Inflation independent variable	0.193* (0.082)	-0.074*** (0.069)		0.209 (0.225)	-0.165*** (0.048)	
Inflation volatility independent variable	0.247* (0.126)					
EU enlargement	0.104 (0.109)	-0.569*** (0.103)		-0.896*** (0.003)	-0.898*** (0.000)	
Openness	0.731*** (0.281)	1.419*** (0.161)	1.140*** (0.021)	2.261*** (0.708)	1.722*** (0.057)	1.074*** (0.000)
FX restrictions included	0.576*** (0.118)	0.747*** (0.092)		-3.234*** (0.556)	0.000 (0.000)	0.000 (0.000)
Pegged FX regime	-1.468*** (0.185)	-1.887*** (0.156)		-1.297*** (0.344)	-1.777*** (0.077)	0.000 (0.000)
Year of observation	-0.109*** (0.018)	-0.179*** (0.022)	-0.009** (0.004)	-0.095 (0.067)	-0.174*** (0.007)	-0.020*** (0.000)
Micro study	0.266 (0.204)	-1.155*** (0.136)	0.236*** (0.002)	1.862*** (0.536)	-1.167*** (0.062)	0.238*** (0.000)
Fixed effects	-0.029 (0.072)	-0.005 (0.062)	-0.001 (0.002)	0.009 (0.011)	-0.009 (0.033)	0.000*** (0.000)
Bias correction	0.312*** (0.106)	0.081 (0.077)		0.728 (0.536)	0.042 (0.025)	0.000 (0.000)
Post-crisis period	-0.327*** (0.091)			-0.011 (0.017)	0.000 (0.000)	0.000 (0.000)
CIS countries	0.972*** (0.138)	1.088*** (0.103)		1.012*** (0.035)	0.993*** (0.054)	0.000 (0.000)
CESEE countries	-2.541*** (0.367)			1.801*** (0.341)		
Other countries	-1.181*** (0.285)			0.203 (0.415)	0.634*** (0.032)	0.000 (0.000)
Observations	107	77	30	107	77	30
R-squared	0.975	0.834	1.000	0.994	0.999	0.997

Source: Authors' calculations.

Note: \*(\*\*)[\*\*\*] stands for significance at the 10% (5%) [1%] level. Robust standard errors clustered by study in brackets. The sample is based on the set of estimates which are presented as preferred estimates or baseline estimates in the respective papers.

with fixed effects broadly do not make a difference for the coefficients of the respective determinant.

Meta-analyses usually test for publication selection bias, which occurs when the published literature is systematically unrepresentative of the sample of available studies as authors follow their preferences for statistically significant and theoretically sound results (Stanley and Doucouliagos, 2012). To test the potential presence of a publication selection bias, we constructed a funnel diagram, which is a scatter

diagram with the horizontal scale measuring the effect size and the vertical scale measuring the standard error (or precision). In the absence of publication selection bias, a plot of effects against their errors should be symmetric around the weighted mean. Furthermore, we performed Egger's test, which is a linear test for asymmetry, performing a linear regression of the intervention effect estimates on their standard errors, while using the inverse variance as weights. Again, in the absence of publication selection bias, the estimated size of the coefficient should not be correlated with its standard error, i.e. the null hypothesis should be rejected (Egger et al., 1997). Both the funnel plot analysis and Egger's test (results are available from the authors upon request) reject the presence of a publication selection bias for all variables with the exception of inflation and inflation volatility being caused by few outliers in the two determinants. Moreover, these biases are shown to be relatively small. According to Havranek and Irsova (2011) and Doucouliagos and Stanley (2008) the asymmetry is important if the coefficients of the publication bias are statistically significant and larger than one in absolute value. As this is not the case for these two determinants, we do not discuss the publication selection bias further in this paper.

## 5 Conclusions and Policy Implications

Our meta-analysis shows that different dollarization drivers have been at work to different extents in Latin America and CESEE. A common pattern is that macro-economic instability (as expressed by inflation volatility) and banks' funding in foreign currency are key drivers of loan dollarization. In CESEE, the latter result may reflect the major role of foreign-owned banks in the region's domestic banking system, i.e. of institutions with easy access to wholesale and parent bank funding in foreign currency. In Latin American countries, meanwhile, foreign banks, which are also dominant in some countries like Mexico, were established as subsidiaries rather than branches, and as such rely more on traditional funding (deposits) than on wholesale funding.

Regarding differences, the interest rate differential plays a significant and increasingly positive role for foreign currency lending only in Latin America, following achievement of macro stability. In contrast, and in line with other studies (i.e. Crespo Cuaresma, Fidrmuc and Hake, 2011), interest rate differentials do not influence the currency selection of loans in CESEE. From this perspective, borrowers take an excessive risk when taking out foreign currency loans, underestimating the danger of exchange rate depreciation.

Furthermore, exchange rate depreciation and exchange rate volatility exert a negative impact on foreign currency loans in Latin America, pointing to a mostly demand-driven effect (i.e. lower volatility induces households and firms to take more foreign currency loans). In CESEE, however, the exchange rate movements do not play a clear-cut role. On the one hand, exchange rate depreciation does not robustly influence foreign currency loans. On the other hand and contrary to the results for Latin America, exchange rate volatility induces more lending in foreign currency, implying thus predominant supply-driven effects, with banks shifting the exchange rate risk to borrowers.

These findings and in particular the differences between the two regions should be taken into account for designing effective policies for reducing dollarization. Generally, when promoting sound monetary and fiscal policies to



gain macroeconomic stability, dedollarization usually emerges as an endogenous outcome (Galindo and Leiderman, 2005). Nevertheless, that process may be too slow<sup>20</sup> and not always successful. For instance, anecdotal evidence for some countries suggests that macroeconomic stabilization might reduce money supply and deposit dollarization, but at the same time induce an increase in liabilities dollarization if, for example, a country reaches higher ratings and corporates find it cheaper to fund themselves in foreign currency on international markets than in local currency via domestic banks.

Policies targeted at promoting macroeconomic stability should be complemented by specific dedollarization measures, geared to whether supply- or demand-driving factors are prevalent. In particular, in countries where dollarization is mainly driven by demand-side factors, policies could try to discourage foreign currency holdings in a market-driven fashion, for instance through the development of domestic capital markets in local currency, the introduction of a derivative market to hedge against exchange rate risk, or the extensive use of financial instruments indexed to inflation. In this sense, as a first step, changing the composition of public sector debt toward indexed instruments may induce inertia in the behavior of the private sector and facilitate the introduction of domestic nominal nonindexed instruments once price stability is on track. As a case in point, Brazil, Chile, Uruguay and Bolivia have pursued such policies, with some very positive results, whereas Peru focused on developing nominal bonds, with promising results. In contrast, if dollarization is considered to be predominantly driven by supply factors, other complementary measures focused on prudential rules, such as banking sector regulation to impose a ceiling on the net foreign currency positions of commercial banks, could be taken into account. Moreover, imposing special reserve requirements on foreign currency assets and liabilities may curb the expansion of foreign currency loans and, consequently, of currency mismatches in the nonfinancial private sector. Brazil and Peru are maybe the most prominent examples of public sector-induced dedollarization and the intensive use of reserve requirements to dedollarize the economy. In the extreme, past experience has proven that the “de jure” prohibitions to hold liabilities or assets in foreign currency may be successful (e.g. Brazil and Colombia). Yet at the other extreme, the Argentinean experience (of forced convertibility to domestic currency) in the early 2000s has also shown that those policies are flawed with risks, in particular if a country has not been able to consolidate a credible policy framework.

<sup>20</sup> For example, Peru has slashed to half the share of foreign currency deposits, but this process lasted ten years, from 2003 to 2013, while hyperinflation periods ended in 1993.



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# Can Trade Partners Help Better FORCEEE the Future?

## Impact of Trade Linkages on Economic Growth Forecasts in Selected CESEE Countries

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*For Central, Eastern and Southeastern European (CESEE) countries, the euro area is the most important export destination. Nevertheless, geographical export patterns differ among individual CESEE countries, and economic growth within the euro area has diverged in the run-up to and since the economic and financial crisis. We therefore examine the effects such heterogeneous developments have had on trade – and thus economic growth – in CESEE. Given the importance of such spillovers for macroeconomic projections, we evaluate the OeNB's macroeconomic forecasting model (FORCEE) for Bulgaria, Croatia, the Czech Republic, Hungary, Poland and Romania. The FORCEE model captures trade spillovers via aggregate demand from the euro area. We challenge this simplification by introducing a more differentiated representation of the regional structure of trading partners. Our results show that such a modification improves the forecasting performance of our structural macro model in particular for the three Southeastern European countries in our sample. However, our tests do not yet account for the additional uncertainty introduced into the model by broadening the set of external assumptions, when we cover external demand from a wider range of partner countries.*

JEL codes: C14, C53, E37, F17

Keywords: trade linkages, forecasting; Central, Eastern and Southeastern Europe

Given the importance of economic growth spillovers, euro area GDP growth is a crucial ingredient in the OeNB's macroeconomic forecasting model FORCEE. This time series-based, structural macro model delivers the basis for our semi-annual GDP and import projections for six Central, Eastern and Southeastern European (CESEE) countries (Bulgaria, Croatia, the Czech Republic, Hungary, Poland and Romania).<sup>2</sup> More specifically, for each country's exports, the model captures growth spillovers through the trade channel via external demand from the euro area. To date, we have relied on aggregate euro area demand as a proxy for external demand for each of our six focus countries. However, this simplification might have become questionable in recent years for two related reasons. First, the literature on global value chains suggests a division of supply chains into a European core and a considerably less integrated European periphery. While the core – through trade in tasks – extends to Central and Eastern Europe (CEE), the periphery includes both the Southern European cohesion countries and the Southeastern European (SEE) countries. Second, and presumably related to this, in recent years we have witnessed increasingly divergent economic developments

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<sup>2</sup> In this context, the OeNB additionally cooperates with the BOFIT on the macro forecast for Russia, with the BOFIT responsible for the model-based GDP projections (see the article by Rautava, 2013, in the previous issue).

between euro area members in the core and in the southern periphery. This divergence has been a salient feature in the run-up to the euro area debt crisis, and differences in terms of growth performance have been rather persistent since then. Thus, the euro area aggregate, which serves as our proxy for external demand, does not reflect the current heterogeneity among the individual euro area members. In fact, the aggregate is dominated by developments in Germany and thus mainly representative of the core.

At the same time, the regional trade structures of the six CESEE countries covered in our projections differ greatly. While Germany and other core euro area members are the dominant trading partners for the three CEE countries (the Czech Republic, Hungary and Poland), the three SEE countries (Bulgaria, Croatia and Romania) trade predominantly with partners in the southern euro area periphery. Furthermore, neighboring Eastern European countries are frequently among the five most important individual trading partners for many CESEE countries, a fact which has not been reflected in our projection model so far.

This paper investigates whether a more precise representation of the regional structure of trading partners – by capturing the economic heterogeneity within the euro area – improves the forecasting accuracy of the OeNB's macroeconomic projection model FORCEE. Given the importance of external demand for GDP growth in the six CESEE countries – all of them being small, open economies –, the modeling of external demand is likely to have a noticeable impact on the quality of GDP forecasts. A number of empirical papers also confirm that macro forecasts improve if international linkages are taken into account by including GDP series of a number of related countries as control variables in a VAR or VECM model (e.g. Bańbura, Giannone and Reichlin, 2010; Pesaran, Schuermann and Smith, 2009; Giannone and Reichlin, 2009).

The strong influence of external demand from Western Europe on economic growth in CESEE is also confirmed by recent OeNB research based on global VAR models (Feldkircher, 2013; and Backé, Feldkircher and Slačák, 2013). Feldkircher (2013) develops a global VAR model, which allows for regional differentiation within CESEE and which he uses to simulate four different shock scenarios. His model confirms that the propagation of euro area output shocks to CESEE is substantial in general (a 1% increase in euro area output translates into a permanent rise in CESEE output of approximately 0.6%). But the magnitude of the spillover varies within the region and small, open economies such as Slovenia, Slovakia, Croatia, Romania and Ukraine seem particularly susceptible. Building on the model by Feldkircher (2013), Backé, Feldkircher and Slačák (2013) model trade and financial spillovers simultaneously and find both channels to be of a similarly strong importance for five Central and Eastern European economies (the Czech Republic, Hungary, Poland, Slovakia and Slovenia). Likewise, the IMF (2012) estimates in its Spillover Report a 0.4% decrease in CESEE<sup>3</sup> GDP in response to a 1% decrease in Western European GDP through the trade channel alone. Thus, changing economic conditions in the euro area impact considerably on economic growth in the CESEE countries; between one-third and one-half of an output

<sup>3</sup> The IMF's CESEE aggregate covers 22 countries, including e.g. the Eastern European EU Member States, Russia and other CIS countries as well as Turkey.

shock in Western Europe is transmitted to Eastern Europe according to the recent empirical literature. In summary, this effect is not only found to be statistically significant, but also economically meaningful.

Such large spillover effects seem plausible given the strong trade linkages between Western and Eastern Europe. These linkages are likely to gain further strength in view of the increasing integration of CESEE countries into Europe-wide supply chains. Recent empirical research on the importance of global value chains highlights the formation of three major regional supply chains in the world. For example, Baldwin and López González (2013) identify the “factory Europe,” with Germany as the headquarter economy that arranges European production networks and CESEE countries as the major “factory economies” that provide labor in this production network. A recent IMF staff report deals more specifically with the “German-Central European Supply Chain” which has evolved since the 1990s and which has led to a rapid expansion of bilateral trade links between Germany, the Czech Republic, Hungary, Poland and Slovakia (IMF, 2013). Both studies reveal that CEE economies are integrated into European production chains most strongly, while the more peripheral SEE economies seem to be far less affected by changes in demand originating from the Germany-dominated European supply chain. Hence, the region shows a considerable amount of heterogeneity in this respect. Unfortunately, such peripheral European supply chains are by far less well researched. However, a simple comparison of regional trade patterns already reveals the smaller importance of Germany for these countries. As a consequence, economic shocks affecting the euro area’s core should impact primarily on the CEE countries, while SEE economies are likely to be more susceptible to economic developments in their main trading partners.

The paper is structured as follows: Section 1 describes the regional patterns of trade linkages for the six CESEE countries under examination, section 2 gives a brief description of the economic and econometric properties of the FORCEE model, section 3 describes the approach we use for assessing and comparing the forecasting accuracy of both models, and section 4 describes our results. Finally, section 5 concludes.

## 1 Regional Differentiation and Changes in CESEE Export Patterns

At least since the trade liberalization in the 1990s, Western European countries have been among the top export destinations for CESEE producers. Between 1995 and 2012, more than 50% of total exports from the Czech Republic, Croatia, Hungary, Poland and Romania on average went to euro area countries.<sup>4</sup> However, trade patterns vary across countries and time. The euro area was by far the most important trade partner for the Czech Republic, with 64% of Czech exports destined for this market in 2012. In contrast, the SEE countries are less involved in euro area trade, as evidenced by their 2012 export shares of 50% (Croatia) and 44% (Bulgaria, see chart 1). The SEE countries also focus on export destinations outside the European Union, but tend to trade mostly with EU countries. Croatian exports were largely oriented toward the Western Balkan countries given Croatia’s

<sup>4</sup> The share of total exports to the EU-27 on average amounted to more than 70%.

Chart 1

### Share of Euro Area Exports Is Downtrending, but Still Largely above 50%

Exports to the euro area in % of total exports



Source: IMF DOTS, authors' calculations.

Note: CEE = Central and Eastern European countries; SEE = Southeastern European countries.

membership in the Central European Free Trade Agreement (CEFTA)<sup>5</sup>. When it joined the European Union in July 2013, Croatia had to resign from CEFTA, and the Croatian industry might further redirect its exports in the future.

Between 2000 and 2012, the importance of the euro area as an export destination declined somewhat for all countries in our sample. The greatest amount of export reorientation – away from the euro area toward partners in CESEE, including Turkey and the CIS – was observed for Hungary and Croatia.

The regional trade structures of the six CESEE countries covered in our projections show a great deal of differentiation (chart 2). While Germany and other core euro area members are the dominant trading partners for the CEE countries, the SEE countries trade predominantly with partners in the southern euro area periphery. In 2012, the share of exports to Germany and Italy was almost equal for both Bulgaria and Romania. However, this had not always been the case. In 2000, Italy used to be the main export destination within the EU for Bulgaria and Romania. In part due to declining import demand from Italy in the wake of the economic and financial crisis in 2008, Germany emerged as the leading export destination. On the other hand, Germany had continuously lost importance as an export destination for the CEE countries and Croatia, at least since the end of the 1990s. Another common characteristic besides the dominance of Germany and Italy is that at least one neighboring CESEE EU country featured among the five most important trade partners for all six countries in our sample in 2012.

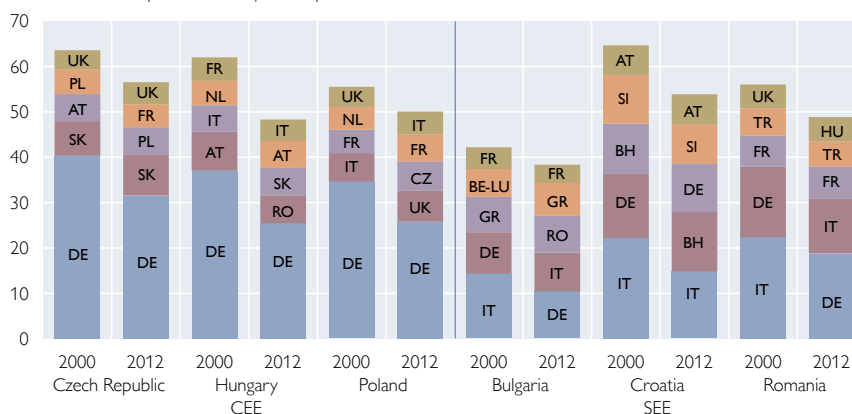
<sup>5</sup> CEFTA is a trade agreement between Southeastern European countries, namely Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Moldova, Montenegro, Serbia and Kosovo (as at November 2013).



Chart 2

### Regional Trade Patterns Differ among Central, Eastern and Southeastern European Countries

Five main EU trade partners in % of total exports



Source: IMF DOTS, authors' calculations.

Note: CEE = Central and Eastern European countries; SEE = Southeastern European countries.

To sum up, the euro area as an aggregate remained the most important export destination for five of the six CESEE countries under review between 2000 and 2012, although its share in the total exports of these countries declined somewhat. We observe, however, that exporters react rather swiftly to changes in import demand by redirecting their exports toward more promising markets. As long as the euro area as a whole remains the major export destination, the composition of exports will not greatly impact the performance of the forecasting model as such. Yet, the different export destination patterns might well matter for the forecasting accuracy of the model at a time when the speed of economic growth between countries in the euro area's core and in the South is diverging and there are differences in the regional trade structure between the CESEE countries. Furthermore, the rising importance of neighboring Eastern European EU countries as trading partners for many CESEE countries has not yet been reflected in our projection model. These aspects would favor a modified approach to proxying external demand in the forecasting model via import demand from the respective major trading partners. The following sections will shed more light on these issues.

## 2 The OeNB's FORCEE Forecasting Model

The FORCEE model is a country-specific structural error correction model used by the OeNB's Foreign Research Division to forecast GDP and imports of non-euro area CESEE EU members. The model output underpins the expert-based projections which are published semiannually in the Focus on European Economic Integration (in every second and fourth issue per year). The core part of the econometric model consists of six structural cointegration relationships, linking private consumption, gross fixed capital formation, exports, imports, interest rates and exchange rates with the remaining variables in the model. This demand side-oriented model follows closely the aggregate demand-aggregate supply model in Merlevede, Plasmans and Van Aarle (2003) and is described in more detail in Crespo Cuaresma et al. (2009).



The long-run equilibrium relationships in the model are predominantly Keynesian with stable consumption, investment, import and export ratios, but also include some neoclassical features, such as the dependence of private consumption on interest rates. The short-term interest rate is estimated by an augmented Taylor rule, and the formation of exchange rates is based on the flexible price monetary approach, thus resting on the purchasing power parity condition in its weak form. The core structure of the model is given by the structural equations (1) to (6) below:

$$c\_priv = \alpha_1 * gdp + \alpha_2 * (ir - \Delta cpi) + \alpha_3 * wage \quad (1)$$

$$inv = \beta_1 * gdp + \beta_2 * (ir - \Delta ppi) + \beta_3 * priv\_credit \quad (2)$$

$$exp = \gamma_1 * ip + \gamma_2 * (er * \frac{cpi\_ea}{cpi}) + \gamma_3 * gdp\_ea + \gamma_4 * exp\_ea \quad (3)$$

$$imp = \delta_1 * gdp + \delta_2 * (er * \frac{cpi\_ea}{cpi}) \quad (4)$$

$$ir = \phi_1 * ppi + \phi_2 * \Delta gdp + \phi_3 * er + \phi_4 * ir\_ea \quad (5)$$

$$er = \kappa_1 * (m3 - m3\_ea) + \kappa_2 * (gdp - gdp\_ea) \quad (6)$$

GDP is calculated as the sum of its components. The remaining GDP components (public consumption and stock changes) as well as all other exogenous variables entering the model are assumed to follow simple AR(1) processes, which is least costly in terms of degrees of freedom loss.<sup>6</sup>

While referring the interested reader to Crespo Cuaresma et al. (2009) for a more detailed discussion of the model, let us go briefly through the economic intuition behind the equilibrium relationships above: Private consumption ( $c\_priv$ ) is determined by the consumption-to-GDP ratio and nominal interest rates ( $ir$ ) deflated by consumer prices ( $cpi$ ). Furthermore, labor market variables (wages in this case) are included to capture households' and companies' cyclical positions. In the same vein, the investment equation is modeled as a function of GDP ( $gdp$ ) and the interest rate ( $ir$ ) deflated by producer prices ( $ppi$ ) plus a variable capturing financial conditions. In times when credit to the private sector ( $priv\_credit$ ) is high, firms and households are likely to use this liquidity for investments. Exports depend primarily on supply capacity as given by industrial production ( $ip$ ) and the real exchange rate ( $er * cpi\_ea / cpi$ ) as an indicator of price competitiveness. It is here that we include external demand via euro area GDP ( $gdp\_ea$ ). Moreover, euro area exports ( $exp\_ea$ ) are included as a proxy for global trade volume and reflect trends in world trade which are common to all countries.<sup>7</sup> The import equation is again characterized by a constant import-to-GDP ratio, where GDP approximates

<sup>6</sup> In most cases the optimal lag length proved to be 1, therefore the results do not change significantly if the optimal lag length of each AR process is chosen according to standard information criteria.

<sup>7</sup> In the initial version of the model, we used EU exports, which capture a slightly larger share of world exports. The switch to euro area exports improved the quality of the external assumptions as we are now able to use the confidential quarterly export forecast from the ECB's macroeconomic projection exercise.

domestic demand<sup>8</sup> and the real exchange rate covers price effects. The short-term interest rate is following an augmented Taylor rule determined by inflation (*cpi*), nominal interest rates in the euro area (*ir\_ea*) and the output gap (proxied very roughly by the first difference of GDP,  $\Delta gdp$ ), as well as the nominal exchange rate (*er*).<sup>9</sup> Finally, exchange rates are determined by differences in money supply and activity between the respective country and the euro area.<sup>10</sup> As the majority of foreign trade in our sample is denominated in euro, we consider this specification to be appropriate for modeling the exchange rate.

The core model is modified to respond to country-specific characteristics. To this end, we drop highly insignificant variables and include additional or differentiated variables (e.g. we use the unemployment rate instead of wages in equation (1) for some countries) to obtain a good fit to the data. A major deviation from the standard model is implemented for Bulgaria due to the currency board arrangement: here the exchange rate is kept constant and interest rates are modeled as a markup over euro area interest rates.

The whole system of six structural equations and roughly ten AR processes is estimated by means of seemingly unrelated regressions to account for correlations between the model components through the unobserved correlation in the error terms. The model contains also purely exogenous variables, such as euro area GDP, euro area exports, euro area inflation rates and euro area interest rates. These variables are taken from the most recent ECB forecast. Furthermore, an identity equation for GDP, which is simply the sum of its components, is included. 1- to 8-step ahead dynamic forecasts are then derived from the structural parameters of the model.

In what follows, we scrutinize the role of external demand for the forecast accuracy of our model. In equation (3) above, external demand is captured by aggregate demand from the euro area. As we have shown above, the euro area is the most important trading partner for all the six CESEE countries. However, within the euro area, different Member States emerge as the most important destinations for goods exports. This – coupled with the increased (and to date persistent) heterogeneity in economic growth within the euro area – may result in a poor forecasting performance. Therefore, we modify the model, introducing external demand in a more differentiated way into our model, to reflect the intra-euro area heterogeneity. We include the GDP of each country's five main trading partners separately. This alternative specification takes into account different growth prospects of individual trading partners as well as the fact that non-euro area members (in particular neighboring CESEE EU countries) are among the most important individual trading partners for some countries.

<sup>8</sup> We experimented with a more detailed specification of domestic demand, using only the respective components of GDP (private and public consumption, gross fixed capital formation). However, this introduced strong feedback loops between the respective equations and resulted in great volatility in out-of-sample predictions. Furthermore, all CESEE countries are characterized by a strong export-import nexus in line with their integration into global supply chains. Thus, aggregate GDP can be considered to be a good proxy for import demand.

<sup>9</sup> In this specification we differ from Merlevede, Plasmans and Van Aarle (2003).

<sup>10</sup> According to economic theory, the interest rate differential would also determine exchange rate formation. We decided to exclude this variable, however, as it caused overly strong feedback loops with the previous equation in the model, which would result in high volatility in out-of-sample predictions.

Thus, we modify the FORCEE model by replacing equation (3) with equation (3a):

$$exp = \gamma_1 * ip + \gamma_2 * (er * \frac{cpi_{ea}}{cpi}) + \sum_{i=1}^5 \varphi_i * gdp_i + \gamma_4 * exp_{ea} \quad (3a)$$

where euro area GDP is replaced by the GDP of the five most important trading partners for each country. The five most important trading partners are defined as those with the largest share in each country's exports calculated as the average over the entire period.<sup>11</sup> There is a clear tradeoff between the two specifications: the modified model captures heterogeneous economic developments among a country's most important trading partners, while the benchmark model captures a larger fraction of external demand. If the modified model (which captures only a lower share of external demand) produces more accurate forecasts than the benchmark model, we may safely conclude that more weight should be given to heterogeneity among trading partners.

Although it is not our focus here to analyze in detail where improvements in forecasting accuracy arise from, we would like to mention that the design of a theoretically sound comparison is far from trivial. Such a comparison should differentiate between a change in the number of trading partners and the role of heterogeneous developments within the euro area<sup>12</sup> and could involve two steps: First, we would replace euro area GDP in equation (3) by individual GDP series for all euro area members and compare the results. Second, we would augment this new specification by adding GDP series of the major non-euro area trading partners (mostly neighboring CESEE countries) and assess the magnitude of additional gains. This comes at the cost of using up a large number of additional degrees of freedom, though.<sup>13</sup> Given the short time series for CESEE countries, such statistical considerations play a nonnegligible role and would render a meaningful estimation impossible.<sup>14</sup> Alternatively, one could work with trade-weighted averages of trading partner blocs (euro area versus non-euro area). While such an approach would save degrees of freedom, the assignment of trade weights over the projection horizon is highly problematic. Hence, we opt for a simple comparison between two practically feasible model specifications without trying to split the gains in forecasting accuracy between considering additional trading partners versus respecting heterogeneity among trading partners.

<sup>11</sup> Naturally, this set of five most important trading partners would need to be revised regularly as regional trade patterns are constantly changing.

<sup>12</sup> We thank the referee for making this point.

<sup>13</sup> A further limitation to the number of trading partners included arises from the practical use of the model in semi-annual forecasting rounds: external demand is purely exogenous, hence the GDP forecasts for trading partners are not generated by the model itself but have to be taken from other sources. This can become a tedious and possibly insurmountable task if a large range of non-euro area countries is included in the specification. Generating GDP forecasts for trading partners through AR processes within each model would not be feasible either as this violates a common set of exogenous assumptions for all countries.

<sup>14</sup> Alternatively, we could have included a trade-weighted GDP aggregate of the most important trading partners. However, we feel that our current specification allows for more flexibility with respect to changing weights. In our current specification, trade weights are implicitly captured in the estimation coefficient and will thus be adjusted in each forecasting round. Otherwise we would need to make an assumption on future weights.

Each country model is estimated based on quarterly data from Eurostat ranging from the first quarter of 1995 to the fourth quarter of 2012.<sup>15</sup> The country models for Bulgaria and Romania are estimated on a slightly shorter time period: suitable time series for Bulgaria start in the first quarter of 1997, and, given the lack of quarterly GDP series for Greece, one of Bulgaria's main trading partners, our sample ends with the first quarter of 2011. Data for Romania start in the first quarter of 2000, thus we exclude the recession years in the late 1990s. All data are seasonally and working day adjusted and deflated by using chained linked values.

In view of the regional export patterns, we expect the results to differ most in the forecasts for Bulgaria and Romania. For these two countries, the most important trade partners were Italy and Germany – in other words, two countries that have shown markedly different economic developments, especially in recent years, and are thus likely to show dissimilar developments in import demand.

### 3 Validation of the Predictive Power of Competing Models

To evaluate the forecasting power of the FORCEE model with respect to precision and its ability to correctly capture a variable's direction of change, we produce ex post out-of-sample forecasts by using a rolling window approach in the following way: We cut out a window of eight quarters at the beginning of the sample and use the remaining data to simultaneously estimate the parameter values for our modified, i.e. five main trading partner, model on the one hand and the benchmark model on the other. Using these parameter estimates, we produce an out-of-sample forecast with both models – the modified model and the benchmark model – for 1 to 8 quarters for the eight-quarter window previously cut out. The forecasting errors are computed by comparing both sets of forecasts with actual realizations. This eight-quarter window is subsequently moved one quarter ahead, the models are reestimated and new out-of-sample forecasts are obtained for the new eight-quarter window. This procedure is repeated until the window reaches the end of the sample, and all available observations are used to estimate the model parameters.<sup>16</sup>

For each of the eight forecasting horizons, we compute three quality indicators to evaluate the forecasting ability of our models: the root mean squared error (RMSE), the Diebold-Mariano test and the hit rate. The RMSE is a measure of forecasting accuracy and is defined as

$$\text{RMSE}_h = \sqrt{\frac{\sum_{n=1}^{N_h} (\hat{g}_n - g_n)^2}{N_h}},$$

where  $N_h$  is the number of h-steps ahead forecasts computed,  $g_n$  is the actual value of the respective variable and  $\hat{g}_n$  is the corresponding forecast. The Diebold-

<sup>15</sup> We extrapolated time series at the beginning of our sample with monthly data from the Vienna Institute for International Economic Studies and from national sources in cases where the Eurostat time series did not go back to 1995.

<sup>16</sup> In a few cases, the rolling procedure of the forecast window has to be adjusted given data peculiarities caused by the economic transition at the beginning of the sample and the outbreak of the crisis. For certain (very few) forecasting windows, the constellation of the remaining data used for parameter estimation resulted in a near-singular covariance matrix for the coefficient estimates and thus made the model crash. Hence, such periods were skipped and the forecasting window simply moved one step ahead.

Mariano test (Diebold and Mariano, 1995) is based on the null hypothesis stating that the forecasting ability of the modified model and of the benchmark model is equal. In our case we apply a one-sided test of the null hypothesis that the RMSE of the benchmark model is smaller than or equal to the RMSE of the modified model. If we can reject the null hypothesis, we may conclude that the modified model beats the benchmark model in terms of forecast accuracy.

The hit rate computes, for a given horizon, the percentage of cases in which the forecast movement direction of a variable relative to its previous level coincides with the direction of change of the realized data. In other words, it gives the percentage of cases where the model correctly predicts the sign of the quarter-on-quarter growth rate. Formally, the hit rate for a horizon  $h$  ( $HR_h$ ) is defined as follows:

$$HR_h = 1 \text{ if } \{(g_{t+h} - g_t) > 0 \text{ and } (\hat{g}_{t+h} - g_t) > 0\} \text{ or if } \{(g_{t+h} - g_t) < 0 \text{ and } (\hat{g}_{t+h} - g_t) < 0\} \\ \text{and} \\ HR_h = 0 \text{ else.}$$

$g_{t+h}$  denotes the actual value of the respective variable  $h$  steps ahead from time  $t$  while  $\hat{g}_{t+h}$  is again the corresponding forecast. We then test for the difference between the hit rate of the modified model and the hit rate of the benchmark model, using a binomial test for paired samples.<sup>17</sup>

## 4 Results

Tables 1 to 6 report the results of the Diebold-Mariano test and the binomial test on differences in hit rates between the modified and the benchmark model for each country. GDP and imports are the most important variables as projections for these two variables are published semiannually. In the tables below, we also report the results for exports (as this variable is directly affected by the modification) and for gross fixed capital formation (GFCF). Tables 1 to 3 give the results for the three CEE countries and tables 4 to 6 for the three SEE countries. Details on the actual hit rates and the root mean squared errors are given in the annex (see tables A1 to A6). Overall, the results do not only show country differences, but also differences according to variables.

As an important observation, we find that the modified model performs at least as well as, and in many cases outperforms, the benchmark model. Thus, controlling for heterogeneity in the economic developments of major trading partners does not worsen the forecasting performance of the model. Let us focus on forecasting accuracy first: The Diebold-Mariano test performed on the difference between the root mean squared errors of both model specifications should give a significant and negative test statistic if the model incorporating five main trading partners beats the standard model (with the euro area as the proxy for external demand). Since we are only interested in whether our modification lowers the

<sup>17</sup> To respect the fact that the two samples – the forecasts under the modified and the benchmark model – are paired is important, since the probability of hitting the correct sign is not time invariant. The hit rate depends on the realization and differs between turbulent (crisis) times and stable growth periods. Moreover, it has to be noted that due to the small number of observations, we are not likely to obtain a statistically significant result even when we observe an economically highly relevant difference. Please refer to the tables A1 to A6 in the annex for the fraction of hit rates in each model specification.

root mean squared forecasting error, we perform a one-sided test and, hence, any t-value lower than  $-1.645$  reported in the tables 1 to 6 below can be interpreted as showing the modified model to be more precise. In the Czech Republic, the modified model gives better results than the benchmark model for imports and exports for all forecasting horizons, yet the forecasting accuracy of GDP and GFCF is not improved. For Hungary, the results are sketchy, with the forecasting accuracy according to the Diebold-Mariano test only higher for imports, GFCF and GDP for some forecasting horizons, mostly the nearer-term forecasts. In contrast, for Poland, there are many cases where the modified model delivers a more accurate forecast than the benchmark model. Especially exports are predicted with higher precision at all horizons, and the same is true for the remaining three variables at longer-term horizons (i.e. 4 to 8 quarters ahead).

For the SEE countries, forecasting accuracy is significantly higher in all three countries for 4- to 8-step ahead GDP forecasts. In Bulgaria and Croatia, gross fixed capital formation is predicted with higher accuracy, and Croatia shows some improvements in import forecasts. Finally, we obtain better GDP and import forecasts for Romania at (almost) all horizons and also better near-term export forecasts.

While the results are somewhat mixed with respect to forecasting accuracy, the modified model clearly produces the correct direction of the predicted variable more often than the benchmark model. Analyzing quarter-on-quarter changes, we assess which model specification is better able to capture cyclical movements. This difference is not always statistically significant, with the three CEE countries a case in point. For the three SEE countries, however, the modified model clearly shows better hit rates in a number of cases. We also obtain better results for Hungary for many variables, especially for exports. In contrast, the differentiation in trading partners does not improve the hit rate for Poland and the Czech Republic meaningfully. These results stand in contrast to the previous results, where the modified model for Poland yielded the strongest improvements in terms of forecasting accuracy, followed by the modified models for Romania and Croatia.

Table 1

### Comparison of Forecast Accuracy for the Czech Republic

Horizon	GDP		Imports		Exports		GFCF	
	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates
1	1.08	0.55	<b>-2.46</b>	<b>0.06</b>	<b>-2.17</b>	<b>0.04</b>	<b>-3.19</b>	1.00
2	-0.13	0.13	<b>-2.00</b>	<b>0.07</b>	<b>-1.99</b>	0.13	-1.63	0.22
3	0.25	0.22	<b>-1.97</b>	1.00	<b>-2.24</b>	1.00	-1.38	0.25
4	0.53	1.00	<b>-2.06</b>	..	<b>-2.48</b>	1.00	-1.24	0.69
5	0.49	1.00	<b>-2.15</b>	1.00	<b>-2.47</b>	1.00	-0.86	0.63
6	0.44	0.38	<b>-2.12</b>	1.00	<b>-2.41</b>	0.50	-0.39	0.13
7	0.19	0.63	<b>-2.07</b>	0.50	<b>-2.42</b>	0.50	-0.03	1.00
8	-0.25	1.00	<b>-2.14</b>	0.50	<b>-2.53</b>	0.13	-0.23	1.00

Source: Authors' calculations.

Note: "Diebold-Mariano" shows the t-value of the one-sided Diebold-Mariano test on the difference between the modified and the benchmark model, with statistically significant values at the 5% level marked in bold. "Difference in hit rates" gives the p-value of a binomial test on the differences between the hit rates of either model specification, with statistically significant values at the 10% level marked in bold.

Table 2

### Comparison of Forecast Accuracy for Hungary

Horizon	GDP		Imports		Exports		GFCF	
	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates
1	<b>-2.08</b>	0.23	<b>-1.84</b>	0.50	-1.54	0.25	-1.85	<b>0.06</b>
2	<b>-1.79</b>	0.39	-1.46	1.00	-1.54	0.13	<b>-2.51</b>	<b>0.02</b>
3	-1.40	<b>0.07</b>	-1.59	0.25	-1.45	<b>0.03</b>	<b>-2.64</b>	<b>0.01</b>
4	-1.27	0.29	<b>-1.66</b>	<b>0.06</b>	-1.34	<b>0.02</b>	<b>-2.79</b>	0.73
5	-1.25	<b>0.04</b>	<b>-1.73</b>	<b>0.03</b>	-1.31	<b>0.01</b>	-1.02	1.00
6	-1.26	<b>0.04</b>	<b>-1.68</b>	<b>0.06</b>	-1.29	<b>0.00</b>	0.07	1.00
7	-1.26	<b>0.02</b>	-1.55	0.25	-1.28	<b>0.00</b>	0.43	1.00
8	-1.26	0.13	-1.43	0.38	-1.26	<b>0.02</b>	0.58	1.00

Source: Authors' calculations.

Note: "Diebold-Mariano" shows the t-value of the one-sided Diebold-Mariano test on the difference between the modified and the benchmark model, with statistically significant values at the 5% level marked in bold. "Difference in hit rates" gives the p-value of a binomial test on the differences between the hit rates of either model specification, with statistically significant values at the 10% level marked in bold.

Table 3

### Comparison of Forecast Accuracy for Poland

Horizon	GDP		Imports		Exports		GFCF	
	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates
1	-0.89	0.55	-0.24	0.75	<b>-4.68</b>	<b>0.02</b>	0.00	0.69
2	-1.71	0.69	-0.01	1.00	<b>-2.81</b>	<b>0.04</b>	-0.64	0.38
3	<b>-1.99</b>	0.38	-1.27	0.63	<b>-2.20</b>	0.22	-1.16	0.38
4	<b>-2.20</b>	1.00	-1.41	1.00	<b>-2.27</b>	0.25	-1.64	0.38
5	<b>-2.26</b>	1.00	<b>-1.66</b>	1.00	<b>-2.36</b>	1.00	<b>-2.01</b>	1.00
6	<b>-2.41</b>	1.00	<b>-2.09</b>	1.00	<b>-2.49</b>	0.50	<b>-2.37</b>	1.00
7	<b>-2.63</b>	1.00	<b>-2.46</b>	1.00	<b>-2.61</b>	0.50	<b>-2.70</b>	1.00
8	<b>-2.92</b>	1.00	<b>-2.92</b>	1.00	<b>-2.87</b>	1.00	<b>-2.88</b>	0.69

Source: Authors' calculations.

Note: "Diebold-Mariano" shows the t-value of the one-sided Diebold-Mariano test on the difference between the modified and the benchmark model, with statistically significant values at the 5% level marked in bold. "Difference in hit rates" gives the p-value of a binomial test on the differences between the hit rates of either model specification, with statistically significant values at the 10% level marked in bold.

Table 4

### Comparison of Forecast Accuracy for Bulgaria

Horizon	GDP		Imports		Exports		GFCF	
	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates
1	2.32	0.63	-1.55	0.45	-1.44	0.55	<b>-2.82</b>	<b>0.01</b>
2	0.55	0.18	-1.19	1.00	<b>-2.04</b>	<b>0.01</b>	<b>-1.97</b>	<b>0.04</b>
3	0.46	0.58	-1.46	0.79	<b>-2.01</b>	<b>0.00</b>	<b>-2.52</b>	<b>0.01</b>
4	-1.36	0.29	-1.55	<b>0.04</b>	-1.21	<b>0.00</b>	<b>-2.24</b>	<b>0.00</b>
5	<b>-2.35</b>	0.15	-1.61	<b>0.07</b>	-0.74	<b>0.00</b>	<b>-2.35</b>	<b>0.00</b>
6	<b>-2.97</b>	<b>0.00</b>	-1.37	<b>0.04</b>	-0.39	<b>0.01</b>	<b>-2.49</b>	<b>0.00</b>
7	<b>-2.90</b>	<b>0.00</b>	-1.55	<b>0.07</b>	-0.02	0.30	<b>-2.71</b>	<b>0.00</b>
8	<b>-3.80</b>	<b>0.00</b>	-1.34	<b>0.04</b>	0.21	0.21	<b>-2.97</b>	<b>0.00</b>

Source: Authors' calculations.

Note: "Diebold-Mariano" shows the t-value of the one-sided Diebold-Mariano test on the difference between the modified and the benchmark model, with statistically significant values at the 5% level marked in bold. "Difference in hit rates" gives the p-value of a binomial test on the differences between the hit rates of either model specification, with statistically significant values at the 10% level marked in bold.



Table 5

### Comparison of Forecast Accuracy for Croatia

Horizon	GDP		Imports		Exports		GFCF	
	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates
1	-1.10	0.39	<b>-2.02</b>	<b>0.02</b>	<b>-2.18</b>	0.12	<b>-2.03</b>	0.45
2	-1.20	<b>0.04</b>	<b>-1.82</b>	<b>0.04</b>	-1.36	0.58	<b>-1.97</b>	<b>0.04</b>
3	-1.32	0.18	<b>-1.87</b>	<b>0.02</b>	-1.16	0.17	<b>-2.23</b>	0.11
4	-1.38	0.73	-1.63	<b>0.00</b>	-1.32	<b>0.00</b>	<b>-2.11</b>	<b>0.09</b>
5	<b>-1.65</b>	0.73	-1.64	<b>0.06</b>	-1.37	<b>0.01</b>	<b>-2.20</b>	<b>0.04</b>
6	<b>-2.15</b>	1.00	<b>-1.72</b>	<b>0.00</b>	-1.47	0.15	<b>-2.26</b>	<b>0.00</b>
7	<b>-2.01</b>	0.29	<b>-2.10</b>	<b>0.02</b>	-1.56	0.73	<b>-2.21</b>	<b>0.00</b>
8	<b>-2.16</b>	0.22	<b>-1.94</b>	<b>0.01</b>	-1.56	<b>0.07</b>	<b>-2.15</b>	<b>0.00</b>

Source: Authors' calculations.

Note: "Diebold-Mariano" shows the t-value of the one-sided Diebold-Mariano test on the difference between the modified and the benchmark model, with statistically significant values at the 5% level marked in bold. "Difference in hit rates" gives the p-value of a binomial test on the differences between the hit rates of either model specification, with statistically significant values at the 10% level marked in bold.

Table 6

### Comparison of Forecast Accuracy for Romania

Horizon	GDP		Imports		Exports		GFCF	
	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates	Diebold-Mariano	Difference in hit rates
1	-0.52	0.38	<b>-1.73</b>	<b>0.03</b>	<b>-3.57</b>	0.27	-1.55	0.25
2	<b>-1.70</b>	0.38	<b>-1.68</b>	<b>0.03</b>	<b>-3.39</b>	0.30	-1.50	0.13
3	<b>-1.83</b>	0.13	<b>-1.68</b>	<b>0.02</b>	<b>-2.91</b>	0.55	-1.45	<b>0.01</b>
4	<b>-1.83</b>	0.22	<b>-1.67</b>	<b>0.01</b>	<b>-2.66</b>	0.18	-1.46	<b>0.01</b>
5	<b>-1.88</b>	<b>0.02</b>	<b>-1.70</b>	<b>0.07</b>	<b>-2.04</b>	0.51	-1.47	<b>0.01</b>
6	<b>-1.89</b>	0.45	<b>-1.71</b>	<b>0.02</b>	-1.23	0.39	-1.47	<b>0.00</b>
7	<b>-2.01</b>	<b>0.07</b>	<b>-1.67</b>	0.45	-0.94	<b>0.04</b>	-1.47	<b>0.01</b>
8	<b>-2.04</b>	<b>0.02</b>	<b>-1.65</b>	0.45	-0.70	<b>0.04</b>	-1.47	<b>0.00</b>

Source: Authors' calculations.

Note: "Diebold-Mariano" shows the t-value of the one-sided Diebold-Mariano test on the difference between the modified and the benchmark model, with statistically significant values at the 5% level marked in bold. "Difference in hit rates" gives the p-value of a binomial test on the differences between the hit rates of either model specification, with statistically significant values at the 10% level marked in bold.

Thus, our initial expectation was met by the results. We expected to see stronger improvements in the forecasting ability of our structural macro model for the SEE economies, given the marked differentiation in the geographical structure of external demand between SEE and CEE countries. Interestingly, our initial specification of external demand is more in accordance with the CEE countries' actual export structure. Poland represents a positive exception to this, showing a significant improvement in forecasting accuracy.

## 5 Summary and Conclusions

The OeNB produces semiannual forecasts for six Central, Eastern and South-eastern European countries with its macroeconomic forecasting model FORCEE, using aggregate euro area GDP growth as a proxy for external demand. Yet, there are two factors that call for a differentiated approach to modeling external demand in the OeNB's model. First, these six CESEE countries show different regional



structures in terms of their main trading partners. Also, the growth paths within the euro area are likewise diverging. Given recent developments, the question arises whether the model's forecasting performance would benefit from capturing these differing geographical trade patterns. We therefore modified the FORCEE model to capture external demand in each of the six country models by including the individual GDP growth rates of each country's main trading partners.

This modification of the model entails practical and statistical issues and does not come at zero cost. From a statistical point of view, we lose degrees of freedom in an error-correction model, where a large number of endogenous variables is estimated on a relatively short time series. Furthermore, by splitting a single variable for external demand into a number of different time series, we introduce additional volatility into the model. In particular, we generate feedback loops between individual country models that had previously been estimated separately and had been connected only by the common set of external assumptions, most prominently by the assumption about the future development of external demand from the euro area. Hence, from a practical point of view, implementing the modification implies a strong dependence of each model's predictions on reliable estimates of future developments in individual trading partners. In other words, the modified model should significantly improve forecasting ability to justify the extra costs and additional amount of uncertainty associated with the modification.

We tested for the difference in forecasting performance between the two model specifications by comparing ex post out-of-sample forecasts over the entire sample period, using a rolling window approach. We based our assessment on root mean squared errors, the Diebold-Mariano test (which compares root mean squared errors of both model specifications) and a hit rate comparison (i.e. we compared the fraction of cases where each model predicts a quarter-on-quarter movement in the same direction as the respective realization of a variable). Our results showed that the modified model performs at least as well as, and in many cases significantly better than, the benchmark model. In particular, both forecasting accuracy and the hit rate are statistically significantly better for the three Southeastern European countries, especially for Romania and Croatia. Given this evidence, it might well be worthwhile to implement a modification to the model structure in order to better capture differences in external demand – if not for all, at least for some – of the countries in question.

However, the results were not always clear cut: While forecasting accuracy often improved in the Polish model, the hit rate did not significantly improve in statistical terms and the absolute difference in hit rates exceeded 5 percentage points in only 5 of the 32 cases we investigated (32 predictions for four time series and eight different forecasting horizons). While our hit rate for the Southeastern European countries (Bulgaria, Croatia and Romania) often improved significantly – especially when forecasting imports and gross fixed capital formation as well as GDP in the longer run –, the root mean squared error improved significantly only in less than half of all possible cases. By contrast, for the 1-step ahead GDP forecast for Bulgaria, the outcome was significantly worse, but this was the only incidence where forecasting accuracy had deteriorated as a result of the model modification.

Furthermore, these results do not represent the full degree of uncertainty underlying out-of-sample forecasts. In future forecasting rounds, the actual improvement in terms of forecasting accuracy will to a large extent also depend on

the quality of the estimates of GDP growth in the main trading partners. It is not possible to account for this additional uncertainty about external assumptions in our empirical test.

Thus, the jury is still out and will probably be influenced to a large extent by future developments within the euro area: If economic developments inside the euro area become more homogenous as a result of diminishing imbalances, it will be less important to model external demand in a differentiated way. On the other hand, if CESEE countries increasingly reorient their trade from partners inside toward partners outside the euro area, then a differentiated approach should be implemented to capture economic developments in such new and increasingly important trading partners.

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## Annex

Table A1

### RMSE and Direction of Change – Czech Republic

Horizon	GDP				Imports			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	8,975	7,812	0.77	0.82	15,552	17,724	0.79	0.70
2	13,267	13,478	0.80	0.88	18,608	24,580	0.88	0.77
3	16,506	15,926	0.86	0.93	21,641	31,262	0.91	0.91
4	18,882	17,050	0.91	0.91	24,272	37,084	0.96	0.96
5	20,705	18,700	0.93	0.95	26,110	42,001	0.96	0.95
6	21,777	19,764	0.89	0.95	26,927	45,558	0.96	0.95
7	22,531	21,656	0.91	0.95	26,648	48,040	0.96	0.93
8	23,149	24,145	0.91	0.93	28,068	50,923	0.93	0.89

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A1 continued

### RMSE and Direction of Change – Czech Republic

Horizon	Exports				GFCF			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	11,985	17,354	0.82	0.70	6,455	7,396	0.73	0.71
2	15,216	27,153	0.91	0.82	9,235	10,595	0.75	0.68
3	15,706	33,192	0.93	0.91	10,497	12,538	0.75	0.70
4	17,525	39,151	0.98	0.96	11,494	13,031	0.75	0.71
5	18,076	44,576	0.98	0.96	12,201	13,113	0.79	0.75
6	17,662	49,180	0.96	0.93	12,609	13,025	0.88	0.80
7	18,186	53,174	0.96	0.93	12,620	12,649	0.86	0.84
8	18,747	56,373	0.98	0.91	12,598	12,830	0.84	0.86

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A2

### RMSE and Direction of Change – Hungary

Horizon	GDP				Imports			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	66,129	108,376	0.66	0.53	133,000	150,737	0.82	0.76
2	123,692	226,958	0.58	0.47	210,210	261,028	0.82	0.79
3	229,170	464,146	0.53	0.37	329,716	424,377	0.87	0.79
4	406,761	914,726	0.47	0.37	479,295	623,373	0.89	0.76
5	636,223	1,530,206	0.42	0.24	656,794	873,023	0.84	0.68
6	922,177	2,401,554	0.45	0.26	855,143	1,172,942	0.82	0.68
7	1,264,124	3,593,996	0.39	0.21	1,102,806	1,587,632	0.71	0.63
8	1,672,037	5,234,758	0.32	0.21	1,414,624	2,172,965	0.66	0.58

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A2 continued

### RMSE and Direction of Change – Hungary

Horizon	Exports				GFCF			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	109,401	167,465	0.82	0.74	24,888	31,354	0.84	0.71
2	218,187	368,417	0.84	0.74	37,649	50,591	0.76	0.58
3	405,458	723,010	0.76	0.61	50,958	66,241	0.79	0.58
4	671,366	1,290,432	0.79	0.61	66,249	81,658	0.68	0.63
5	993,085	2,061,676	0.71	0.50	87,724	97,590	0.71	0.68
6	1,386,588	3,135,056	0.66	0.42	116,052	114,363	0.66	0.66
7	1,862,773	4,622,790	0.66	0.42	150,911	134,068	0.66	0.66
8	2,445,706	6,702,508	0.55	0.37	191,251	157,657	0.63	0.63

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A3

### RMSE and Direction of Change – Poland

Horizon	GDP				Imports			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	2,766	3,435	0.85	0.78	5,166	5,241	0.54	0.49
2	3,080	4,310	0.88	0.93	6,872	6,877	0.76	0.73
3	3,273	6,698	0.88	0.95	8,563	9,298	0.78	0.73
4	4,169	7,872	0.98	0.95	9,705	10,860	0.85	0.85
5	5,121	10,022	0.98	0.95	10,426	11,831	0.88	0.90
6	6,330	10,778	1.00	0.98	10,624	13,041	0.85	0.85
7	7,362	12,494	1.00	0.98	10,861	13,607	0.80	0.83
8	8,346	13,103	1.00	0.98	11,119	14,768	0.78	0.76

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A3 continued

### RMSE and Direction of Change – Poland

Horizon	Exports				GFCF			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	2,656	4,834	0.88	0.68	1,059	1,059	0.73	0.78
2	3,610	7,492	0.88	0.71	1,712	1,775	0.78	0.85
3	4,610	9,475	0.95	0.85	2,260	2,497	0.78	0.85
4	5,922	11,198	0.85	0.78	2,814	3,421	0.73	0.80
5	7,084	12,533	0.88	0.85	3,383	4,515	0.73	0.76
6	7,869	13,151	0.85	0.80	4,050	5,902	0.73	0.73
7	7,892	12,961	0.93	0.88	4,774	7,535	0.68	0.71
8	8,281	12,636	0.93	0.90	5,607	9,420	0.66	0.61

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A4

### RMSE and Direction of Change – Bulgaria

Horizon	GDP				Imports			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	352	201	0.68	0.76	609	669	0.56	0.65
2	427	388	0.68	0.82	716	860	0.62	0.62
3	494	458	0.85	0.76	887	1,213	0.71	0.65
4	552	742	0.88	0.76	1,004	1,399	0.79	0.56
5	566	844	0.85	0.68	1,042	1,736	0.79	0.59
6	684	1,147	0.85	0.50	1,255	1,821	0.79	0.56
7	721	1,204	0.91	0.56	1,290	2,166	0.79	0.59
8	770	1,473	0.88	0.47	1,411	2,106	0.82	0.59

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A4 continued

### RMSE and Direction of Change – Bulgaria

Horizon	Exports				GFCF			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	348	500	0.74	0.65	126	165	0.65	0.41
2	439	746	0.82	0.56	216	274	0.79	0.59
3	537	941	0.85	0.47	311	408	0.88	0.59
4	754	1,090	0.91	0.50	383	550	0.88	0.56
5	970	1,226	0.94	0.47	469	700	0.91	0.56
6	1,202	1,344	0.79	0.44	529	826	0.97	0.56
7	1,372	1,379	0.68	0.53	586	962	0.88	0.47
8	1,515	1,442	0.71	0.53	649	1,055	0.91	0.50

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A5

### RMSE and Direction of Change – Croatia

Horizon	GDP				Imports			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	1,018	1,454	0.67	0.56	1,171	1,439	0.79	0.59
2	1,571	2,146	0.79	0.59	1,522	2,472	0.82	0.62
3	2,231	3,093	0.74	0.62	1,878	3,051	0.72	0.49
4	3,006	3,887	0.67	0.62	2,249	4,187	0.74	0.38
5	3,692	4,660	0.54	0.59	2,761	4,716	0.69	0.49
6	4,396	5,405	0.56	0.56	3,297	5,412	0.72	0.44
7	5,243	6,226	0.59	0.49	3,752	5,893	0.59	0.36
8	6,054	6,988	0.56	0.46	4,251	6,601	0.59	0.36

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A5 continued

### RMSE and Direction of Change – Croatia

Horizon	Exports				GFCF			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	685	1,175	0.69	0.51	742	884	0.74	0.67
2	1,033	1,640	0.77	0.69	1,052	1,390	0.82	0.62
3	1,381	2,286	0.72	0.54	1,186	1,750	0.79	0.64
4	1,778	3,146	0.77	0.49	1,509	2,249	0.82	0.64
5	2,180	3,533	0.77	0.54	1,843	2,790	0.82	0.59
6	2,667	3,877	0.62	0.46	2,104	3,305	0.85	0.51
7	3,262	4,313	0.44	0.38	2,328	3,785	0.85	0.51
8	3,801	4,631	0.46	0.31	2,522	4,241	0.90	0.49

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A6

### RMSE and Direction of Change – Romania

Horizon	GDP				Imports			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	1,014	1,074	0.81	0.73	1,795	2,344	0.86	0.70
2	1,168	1,560	0.95	0.86	3,256	4,399	0.92	0.76
3	1,366	2,537	0.95	0.84	4,206	6,594	0.95	0.76
4	1,763	3,900	0.95	0.84	5,021	8,783	1.00	0.78
5	2,147	5,106	0.95	0.76	5,660	11,461	0.92	0.76
6	2,419	6,667	0.86	0.78	5,966	13,660	0.92	0.73
7	2,616	7,888	0.92	0.76	6,188	16,472	0.81	0.73
8	2,767	9,294	0.95	0.76	6,468	19,438	0.78	0.70

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.

Table A6 continued

### RMSE and Direction of Change – Romania

Horizon	Exports				GFCF			
	RMSE		Hit rates		RMSE		Hit rates	
	Model	Benchmark	Model	Benchmark	Model	Benchmark	Model	Benchmark
1	734	1,068	0.81	0.68	804	1,125	0.86	0.78
2	1,010	1,637	0.78	0.65	1,589	2,537	0.92	0.81
3	1,385	2,035	0.78	0.70	2,382	4,215	0.97	0.76
4	1,927	2,582	0.84	0.70	3,095	6,140	0.97	0.76
5	2,579	3,200	0.81	0.73	3,622	8,169	0.97	0.76
6	3,157	3,719	0.78	0.68	4,038	10,374	0.97	0.70
7	3,711	4,312	0.84	0.62	4,330	12,712	0.95	0.70
8	4,376	4,987	0.86	0.65	4,542	15,284	0.95	0.65

Source: Authors' calculations.

Note: "RMSE" values are given in million local currency; "Hit rates" are given as a percentage, normalized between 0 and 1.



# The Cyclical Character of Fiscal Policy in Transition Countries

Rilind Kabashi<sup>1</sup>

*This study investigates the cyclical character of fiscal policy in transition countries in Central, Eastern and Southeastern Europe (CESEE) in the period from 1995 to 2011, using system GMM as the preferred estimation method for the underlying sample and model specification. The study finds discretionary policy in the CESEE EU Member States and in the Western Balkan countries to have been procyclical, thus aggravating economic fluctuations, whereas automatic stabilizers moved overall policy to an acyclical stance. In addition, the analysis indicates considerable differences in the cyclical character of fiscal policy between transition countries and the Western European EU Member States, where both overall fiscal policy and discretionary policy were acyclical. Finally, the study also offers several recommendations for policymakers, particularly in transition countries.*

*JEL classification:* H62, E32, C33

*Keywords:* fiscal policy, transition countries, European Union, system GMM

The two main schools of macroeconomics have different views on the adequate response of fiscal policy to output movements, and correspondingly on the stabilization properties of fiscal policy. According to traditional Keynesian theory, governments can and should pursue countercyclical policies, particularly by lowering revenues and increasing consumption and public investment in recessions. In contrast, the neoclassical school is mostly skeptical about the ability of fiscal policy to stabilize economic movements and therefore advocates that governments should keep tax rates constant over the business cycle (Barro, 1979). For a given path of government spending, constant tax rates would result in countercyclical overall budget balances. Yet contrary to these theoretical prescriptions, empirical research since the 1990s has often tended to find acyclical or procyclical policies, particularly in developing countries. Various explanations have been put forward for these findings. For instance, Gavin and Perotti (1997) suggest that procyclical policy in Latin America is related to market failures, as government borrowing is constrained in recessions. Lane and Tornell (1998) and Tornell and Lane (1999) argue that procyclicality is a result of voracity effects, as multiple power groups compete for a higher share in a common pool of resources. Further, Talvi and Végh (2005) argue that procyclicality is an optimal response to shocks to the tax base, which is more volatile in developing countries due to their more volatile output movements. Finally, Alesina, Campante and Tabellini (2008) explain procyclicality with political agency problems in democracies. According to their model, voters are suspicious of corrupt governments and therefore press for higher spending, causing the government to borrow more in order to meet these demands.

Despite the prevailing focus on monetary policy in the academic literature, the issue of the cyclical stance of fiscal policy has been addressed by several empirical studies during the past two decades, mostly in the context of EU or euro area countries. Galí and Perotti (2003) find that discretionary policy in the euro area

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countries was procyclical before 1992, but acyclical afterwards. In contrast, Candelon, Muysken and Vermeulen (2010) find that discretionary policy was procyclical both before and after 1992, and that procyclicality has even increased in recent years in the euro area countries. Deroose, Larch and Schaechter (2008) conclude that the finding of procyclical discretionary policy in the euro area in empirical studies tends to overlook the relatively large size of automatic stabilizers in these countries, which can offset discretionary measures in periods of large cyclical movements. In addition, they attribute the weaknesses of discretionary policy in the euro area to the wrong assessment of cyclical conditions in real time and to the tendency of policymakers to spend revenue windfalls. Further, Annett (2006) concludes that the Stability and Growth Pact (SGP) has been quite successful in improving fiscal discipline in most countries. Afonso and Hauptmeier (2009) also conclude that fiscal rules within the Maastricht Treaty and the SGP improve fiscal discipline, while spending decentralization and electoral cycles have a negative effect. Finally, in a wider study of fiscal policy in OECD countries, Égert (2010) finds that overall policy has become more countercyclical, particularly in downturns, and that discretionary policy is countercyclical mostly in countries with low debts and deficits, and procyclical in others.

Most studies of fiscal policy that also include transition countries (e.g. Ilzetzki and Vegh, 2008; Afonso and Hauptmeier, 2009; Égert, 2010) pay little attention to modeling their specific circumstances. Rahman (2010) uses relatively simple approaches to analyze the cyclical character of revenues and expenditures in the then EU Member States from Central, Eastern and Southeastern Europe (CESEE) and Croatia between 2003 and 2007. Her results indicate that the procyclicality of revenues is a reflection mostly of domestic absorption and less of the output gap, while the procyclicality of expenditures is driven by capital expenditures, with domestic absorption and the output gap having similar effects on the cyclical stance of total expenditures. Further, two recent studies analyze fiscal policy in transition countries in a more careful manner, including the use of empirical methods that are prevalent in the recent empirical literature. Staehr (2008) finds that fiscal policy in CESEE EU Member States is less inertial and more countercyclical than in Western European EU Member States, while debt and interest payments are insignificant in both groups. Further, Lewis (2009) concludes that overall fiscal policy in these countries is countercyclical and less inertial than in the EU-15 group. However, the main drawback of these studies is that they do not allow for a direct interpretation of results in terms of cyclicity, since they both use GDP growth as an indicator of the business cycle rather than the output gap, which is a standard approach in the empirical literature. In addition, they both focus on overall budget balances, and thus omit a more detailed investigation of the cyclical stance of discretionary policy.

The main aim of this study is to empirically analyze the cyclical character of fiscal policy in transition countries between 1995 and 2011. While focusing on discretionary fiscal policy, it also analyzes overall policy, thus providing an indication of the effects of automatic stabilizers. This is an important extension of existing studies, which tend to pay little attention to transition countries, are mostly based on years prior to EU accession or focus on overall fiscal policy. Further, the study also investigates differences in the cyclical stance between Western European EU Member States on the one hand and the CESEE EU Mem-

ber States as well as the countries from the Western Balkans (CESEE-6) on the other hand. Therefore, to the best of our knowledge, this is the first study to empirically investigate the cyclical stance of fiscal policy in the CESEE-6 countries. Further, the study pays particular attention to the choice of model specification and empirical method for analyzing the cyclicity of fiscal policy in order to avoid some of the weaknesses in existing studies. Finally, the study provides some recommendations which should be relevant for policymakers in transition countries when designing and implementing stabilizing fiscal policies.

The study proceeds as follows. Section 1 describes the context and data. Section 2 presents the model specification and the estimation method. Section 3 discusses the results and section 4 concludes.

## 1 Context and Data

In our sample we include all the European transition countries which have data available for variables of interest, and split them in two groups. The first group consists of the ten EU Member States from Central, Eastern and Southeastern Europe that joined the EU in 2004 and 2007 (CESEE EU Member States). The second group, denoted as CESEE-6, includes six transition countries that are in various stages of the EU accession process: Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, and Serbia.<sup>2</sup> To be able to make comparisons with previous EU members, our analysis also includes the group of EU-15 plus Malta and Cyprus (labeled EU-17<sup>3</sup>). This means that our empirical analysis is based on an unbalanced panel of 33 countries between 1995 and 2011, as the data for the CESEE-6 are only available from dates later than 1995. Moreover, we use the European Commission AMECO database for all data for the EU countries, and various sources and author calculations for data on the CESEE-6 (see annex).

Fiscal policy in our sample was affected by several important factors during the period under analysis. Most notably, this applies to the requirements of the Maastricht criteria and of the SGP. The Maastricht Treaty prohibits countries from exceeding reference values for budget deficits and public debts, defined as 3% and 60% of GDP, respectively. The literature notes two possibilities for the effects of the Maastricht Treaty and the SGP on fiscal policy (e.g. Galí and Perotti, 2003; Fatás and Mihov, 2009). On the one hand, the loss of monetary sovereignty means that fiscal policy is the only remaining tool for macroeconomic stabilization, so policymakers would use it more aggressively in a countercyclical manner when faced with crisis or output volatility. On the other hand, the limits set by the Maastricht Treaty and the SGP could prevent such an activist countercyclical policy, which could become acyclical or even procyclical as a result.

In transition countries, fiscal policy has additionally been affected heavily by unprecedented political, economic and structural transformation since the early 1990s. Initially, fiscal policy was constrained because of changes in revenues and expenditures due to the restructuring and privatization of state-owned enterprises. Government budgets were also affected by market and price liberalization,

<sup>2</sup> Kosovo is omitted due to the lack of data on public debt. Croatia became an EU Member State in 2013, while our analysis ends in 2011.

<sup>3</sup> Cyprus and Malta joined the EU in 2004 as well, but they are grouped with the EU-15 countries because their economic structure and history put them much closer to the EU-15 than to the CESEE EU Member States.

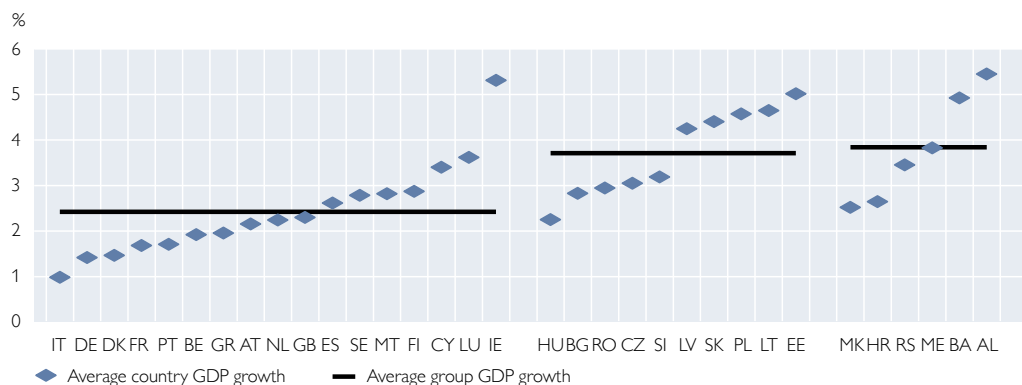
infrastructure building and institutional reforms. Expensive borrowing sources and some of the exchange rate regimes were additional constraints. As transition advanced, the challenges started resembling those of their Western European peers, such as issues of countercyclical fiscal policy and the sustainability of public debt. However, some specific challenges remained: The process of EU accession meant that there was a continued need for spending on institutional reforms and infrastructure modernization to meet EU entrance criteria and reach the levels of Western European countries. Further, as EU members and potential candidates for joining the euro area, they were also faced with the constraints of the SGP. Various authors argue that the SGP puts additional constraints on transition countries, generally considered undue because of their rapid development and their specifics (Nuti, 2006). Coricelli (2004) brings forward three arguments why SGP requirements would be more stringent for the CESEE EU Member States. First, they have a higher potential and more volatile actual GDP growth than Western European EU Member States, so the deficit ceiling would be binding more often, even if one considers cyclically adjusted indicators. This would impose a need for frequent fiscal adjustments, thus increasing the volatility and the procyclical bias of fiscal policy. Second, in the original SGP there is a lack of consideration for public investments, which are higher in CESEE due to the catching-up process. Third, the political element in the excessive deficit procedure, which was also important in some cases of breaches by EU-15 Member States, means that larger CESEE countries might be treated more leniently when breaching the SGP.

Macroeconomic developments during the period under analysis broadly confirm the specific environment for implementing fiscal policy in the EU-17 and in European transition countries during the past two decades. As evidenced by chart 1, average GDP growth was considerably higher in the CESEE EU Member States (3.7%) and CESEE-6 (3.8%) between 1995 and 2011 than in the EU-17 group (2.2%).<sup>4</sup> In line with expectations in Coricelli (2004), GDP growth was also more volatile in the CESEE EU Member States and in the CESEE-6 (with a standard deviation of 4.5 and 4.4, respectively) than in the EU-17 countries (with a standard deviation of 2.7). In addition, in most countries in the EU-17 group GDP growth was fairly close to the group average, with Ireland as a positive outlier. On the other hand, growth in transition countries was much more diverse, with very few countries close to their respective group average. For instance, among the CESEE EU Member States, the Baltic countries, Poland and Slovakia had growth rates considerably higher than the group average, whereas the other countries and particularly Hungary had significantly lower growth. A similar picture arises for the Western Balkan countries, with Albania and Bosnia and Herzegovina growing much more quickly and FYR Macedonia and Croatia having a considerably lower GDP growth.

<sup>4</sup> All group indicators are calculated as simple, nonweighted averages.

Chart 1

## Average GDP Growth Rates by Countries and Groups, 1995–2011



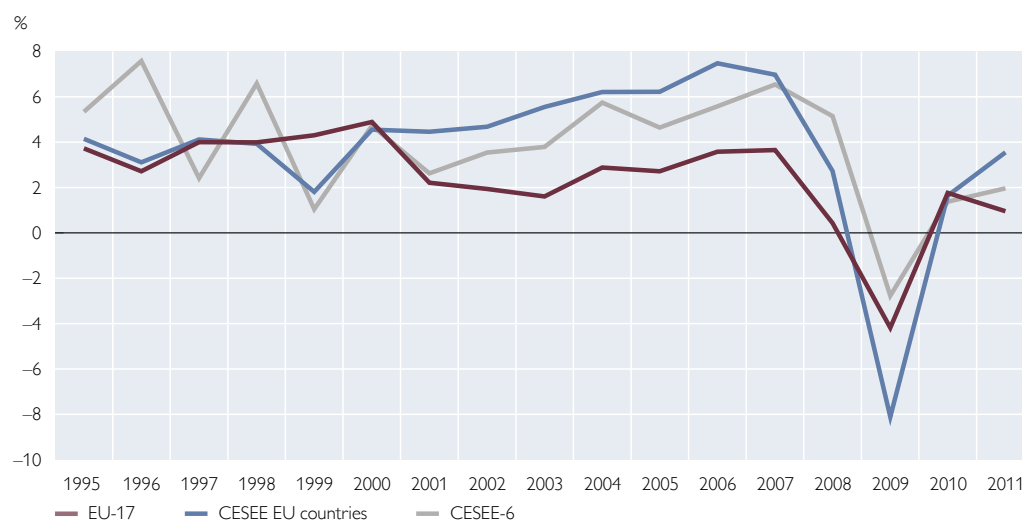
Source: European Commission, AMECO database for EU-17, CESEE EU Member States and some CESEE-6 countries. National statistical offices, central banks or finance ministries, EBRD, and IMF WEO database for some CESEE-6 countries.

Note: Group averages are unweighted. Averages for CESEE-6 are based on data available from dates later than 1995 for some countries.

Differences in GDP growth between the three groups of countries are also noticeable if averages are compared across years. According to chart 2, average GDP growth in both groups of current EU Member States was quite similar in almost all years until 2000. At the same time, growth in the CESEE-6 was quite volatile, in good part reflecting the consequences of wars and postwar reconstruction in the region during this period. However, a clear decoupling appears between 2000 and 2007, with both groups of transition countries growing more quickly than their Western European peers in all years. In this period, growth was highest in the CESEE EU countries, which were clearly reaping the benefits of pre- and post-accession convergence. Finally, growth in all countries was

Chart 2

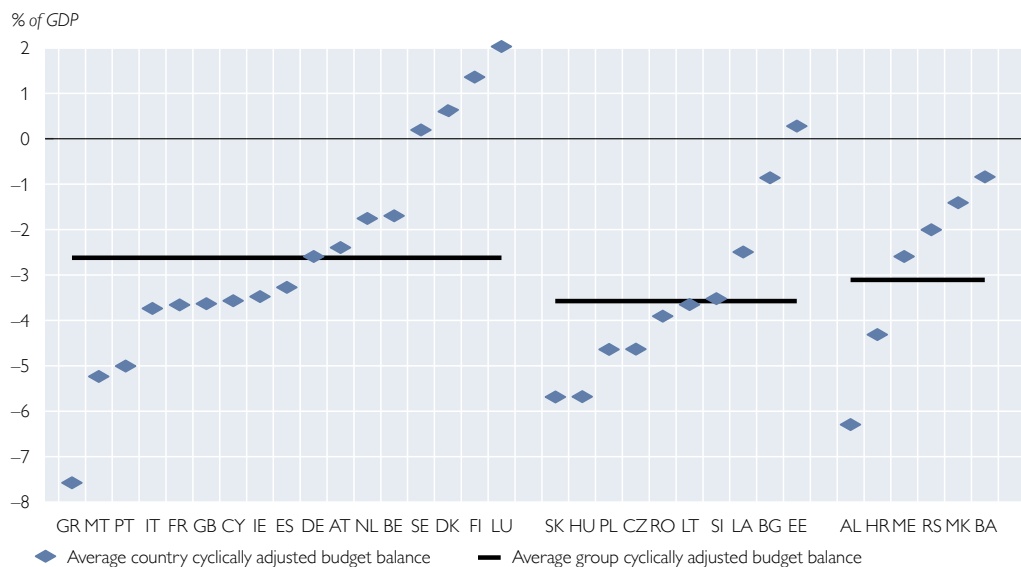
## Average Annual GDP Growth Rates by Country Groups, 1995–2011



Source: European Commission, AMECO database for EU-17, CESEE EU Member States and some CESEE-6 countries. National statistical offices, central banks or finance ministries, EBRD, and IMF WEO database for some CESEE-6 countries.

Note: Group averages are unweighted. Averages for CESEE-6 are based on data available from dates later than 1995 for some countries.

Chart 3

**Average Cyclically Adjusted Budget Balance by Countries and Groups, 1995–2011**

Source: European Commission, AMECO database for EU-17 and CESEE EU Member States. Author's calculations based on data from national statistical offices, central banks or finance ministries, EBRD, and IMF WEO database for CESEE-6 countries.

Note: Group averages are unweighted. Averages for CESEE-6 are based on data available from dates later than 1995 for some countries. The cyclical adjustment is based on the Hodrick-Prescott calculation of trend GDP.

considerably lower during the global crisis. Nevertheless, during the crisis, average GDP growth was generally higher in both groups of transition countries, with the noticeable exception of 2009 when the group of CESEE EU Member States recorded the lowest growth rate of all three groups.

The cyclically adjusted budget balances, which are expected to correct for differences in economic growth, also reflect considerable differences in fiscal policy: The average cyclically adjusted deficit in the CESEE EU Member States between 1995 and 2011 was 3.6% of GDP, much larger than the deficit of 2.6% in the EU-17 group, while the CESEE-6 were somewhere in between with an average deficit of 3.1% of GDP. In addition, according to chart 3, there were also relatively large variations among countries, particularly transition countries. Indeed, most of the “core” EU-17 countries had discretionary surpluses or small deficits, while a few countries from the “periphery” had relatively large deficits. In contrast, except for a marginal surplus in Estonia, on average all CESEE EU Member States reported cyclically adjusted deficits during the period, with the four Visegrád countries having large deficits of close to or exceeding 5% of GDP. In addition, cyclically adjusted balances were also negative on average in all CESEE-6 countries, and quite large in Croatia and particularly Albania.

This divergence in cyclically adjusted balances, which also holds if headline balances are analyzed (not shown), may be explained by two factors. First, it confirms the expectation that fiscal policy in transition countries would be affected by the comprehensive political, economic and structural transformation. Therefore, it is in line with the arguments in Nuti (2006) and Coricelli (2004) that the fiscal policy environment would be heavily affected by the specifics of the transition process. Second, for most of the period it seemed that transition countries had a



somewhat more comfortable “fiscal space,” although it was considerably limited in most countries during and after the global economic and financial crisis. While it is not the aim of this paper to deal with the issue of fiscal space in CESEE (see Eller, 2009, and OeNB, 2012, for more details), the fact that the CESEE countries were able to pursue expansionary fiscal policies for a relatively long period does lend some support to this argument. In addition, transition countries started the period with fairly low debt levels, which enabled them to accumulate budget deficits, generally without seriously bringing into question the issue of debt sustainability (average debt-to-GDP ratios during the period were 30.9% in the CESEE EU Member States and 44.4% in the CESEE-6). At the same time, the fiscal space was much more constrained in the EU-17 countries, which had an average debt-to-GDP ratio of 63.4% during this period, with significant variations among countries. In addition, some of these countries had fairly high initial debt levels, and they were required to lower them in order to meet the Maastricht convergence criteria.

After this brief discussion of the economic and fiscal movements in our sample, in the next two sections we turn to a formal empirical analysis of our research questions. Before doing so, it should be noted that we use the output gap as a measure of cyclical movements, which is in line with the consensus in the empirical literature (e.g. Galí and Perotti, 2003). By doing so, we also aim to overcome some of the weaknesses of the existing studies on transition countries that use GDP growth, as noted above. In particular, we use the output gap defined as a percentage deviation of actual from trend GDP as calculated with the Hodrick-Prescott filter, since this is the only cyclical indicator that can be consistently calculated for all the countries, unlike the production function approach which is not available for the CESEE-6 countries. In accordance with this, for the cyclically adjusted budget balances we also use the data based on the Hodrick-Prescott filtered trend GDP. All the data for the EU countries are taken from the AMECO database of the European Commission, while data for the CESEE-6 are taken from various sources and calculated by the author<sup>5</sup> (see the annex for details).

## 2 Model Specification and Estimation Methodology

Policymakers and researchers usually split overall fiscal policy into automatic stabilizers and discretionary policy. Automatic stabilizers include components of fiscal policy that are incorporated in the legislation and act without any short-term action by policymakers. Discretionary policy consists of measures undertaken by policymakers as a reaction to various factors, such as output movements, debt movements or other factors.

This classification of fiscal policy has a straightforward translation into a fiscal policy function which has become standard in cyclical studies and will also be used as our model specification (equation 1). It reflects the dependence of fiscal outcomes on cyclical output movements and debt, as well as policy inertia, which is included on strong practical grounds. In addition, the inclusion of initial debt and deficit enables proper consideration of initial conditions, as well as testing for

<sup>5</sup> While other statistical filters could also be used, we decided to use the Hodrick-Prescott filtered trend GDP for the CESEE-6 countries in order to ensure consistency with the data on EU countries published by the European Commission. In the Hodrick-Prescott filtering, we use a smoothing parameter of 100, in line with common practice for annual data.

budget sustainability. According to Bohn (1998), a response of the primary balance to the debt-to-GDP ratio that is positive and at least linear is a sufficient condition for sustainability. Finally, we also include inflation in our specification, following Torsten Persson's comment on Gavin and Perotti (1997) that the omission of inflation may bias the coefficient on the cycle, which is in fact the main variable of interest.

$$Bal_{it} = \alpha + \beta \cdot Cycle_{it} + \gamma \cdot Debt_{i,t-1} + \delta \cdot Bal_{i,t-1} + \omega \cdot Infl_{it} + \varepsilon_{it} \quad (1)$$

*Bal* – budget balance as a share of nominal GDP

*Cycle* – indicator for cyclical movements of the economy (output gap)

*Debt* – public debt as a share of GDP

*Infl* – inflation rate

If the coefficient on the cycle ( $\beta$ ) is positive, then fiscal policy is counter-cyclical, meaning that it acts in a stabilizing manner by accumulating surpluses in expansions and stimulating demand in recessions. In contrast, a negative  $\beta$  indicates procyclical policies (i.e. policies that are likely to amplify economic fluctuations<sup>6</sup>), while an insignificant  $\beta$  points to acyclicity. Further, if the dependent variable is defined as the overall budget balance, then the coefficient on the output gap shows the combined cyclicity of automatic stabilizers and discretionary policy. If the dependent variable is defined as the cyclically adjusted budget balance, then  $\beta$  shows only the cyclical stance of discretionary policy.

In our study, we mostly use the cyclically adjusted primary balance as a fiscal indicator, since we are primarily interested in discretionary responses by policy-makers. However, we also pay attention to overall fiscal policy by using the overall unadjusted primary budget balance. The difference between these indicators consists of automatic stabilizers, so comparing the results of the two options allows us to infer the effectiveness of stabilizers, which should be countercyclical by design.

The model implies two sources of endogeneity: the dynamic specification and simultaneity between the dependent and one of the independent variables, i.e. fiscal outcomes and the contemporaneous output gap. Therefore, the use of pooled ordinary least squares (OLS) or random effects with generalized least squares would be inappropriate, since endogeneity would bias the results. Further, numerous studies in this area use least squares dummy variables (LSDV), although it has long been recognized that in dynamic models with a finite time dimension LSDV yields biased coefficients (also known as “the Nickell bias” following Nickell, 1981). Related to this, Judson and Owen (1997) show that LSDV yields a considerable bias of the autoregressive parameter of up to 28% when the sample has 20 periods, and of up to 20% when the time dimension rises to 30. Several other studies, especially the more recent ones, tend to address the Nickell bias by employing a bias-corrected LSDV estimator, which was proposed by Kiviet (1995), and extended by Bun and Kiviet (2003) and Bun and Carree (2006). However, this correction rests on the assumption of strict exogeneity of regressors and is hence inapplicable in our model with a contemporaneous output gap, which is endogenous to fiscal outcomes.

<sup>6</sup> The extent to which fiscal policy affects the business cycle in reality is also related to the size of the fiscal multiplier, an important issue which is however beyond the scope of this study.



Therefore, we decided to use the generalized method of moments (GMM), which is being increasingly used in the empirical literature, including cyclicity studies. In particular, we use the “system GMM” estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). One of the advantages of system GMM is that it utilizes a bigger subset of instruments, thus using more information. System GMM is a lot more efficient than difference GMM, particularly with a higher persistence of the dependent variable and a lower time dimension (Blundell and Bond, 1998), which are typical features of macroeconomic data. The improvement in efficiency is enhanced by the ability of system GMM to use more information by generating more instruments not only for the lagged dependent variable, but for other regressors as well, which might themselves exhibit high inertia. However, GMM estimators are not without their drawbacks. While additional moment conditions are useful in exploiting additional information, they can cause a rapid growth of the instrument count with the time dimension. This problem of too many instruments may result in overfitting endogenous variables, thus failing to remove their endogenous components, which can yield biased coefficients (Roodman, 2008). In addition, a high number of instruments can severely weaken the Sargan/Hansen test of overidentifying restrictions (Bowsher, 2002).

Another potential problem of GMM estimators is the fact that they were originally designed and are mostly used for microeconomic panels with a large cross-section and short time dimensions, while their small sample properties may be problematic. Several recent studies nonetheless tend to prefer GMM over alternative estimators even in small samples. Bun and Kiviet (2006) apply higher-order asymptotic methods and Monte Carlo simulations in analyzing the properties of a range of alternative least squares and GMM estimators. They conclude that there is no straightforward advice on what estimator to use in small samples, but system GMM is a relatively safe choice with inertia in the dependent variable and effect stationarity.<sup>7</sup> Hayakawa (2007) also suggests that system GMM is less biased than both difference and level GMM. Finally, on the basis of detailed Monte Carlo simulations, Soto (2010) concludes that, in small samples with high inertia in the dependent variable, system GMM outperforms a wide range of alternative estimators in terms of bias and efficiency, and that it is highly reliable in terms of the power of statistical significance tests.

Bearing all this in mind, we proceed with system GMM as our estimation method, using the *xtabond2* syntax for Stata written by Roodman (2006). We use internal instruments for the lagged dependent variable and the output gap to exploit one of the main strengths of the method and avoid the difficulty of finding valid external instruments. To deal with instrument proliferation, we follow the advice of Roodman (2008) for lag limiting and collapsing the instruments. We also check for cross-section error dependence using the procedure suggested by Sarafidis, Yamagata and Robertson (2009). Further, we use two-step system GMM, which provides standard errors that are robust to heteroskedasticity and autocorrelation within cross-sections (Roodman, 2006). Finally, we address the downward bias of standard errors in two-step GMM by using

<sup>7</sup> With effect stationarity (also known as mean stationarity) “the original data in levels have constant correlation in time with the individual-specific effects,” which implies that lagged differences can be used as instruments for current levels of endogenous variables (Bun and Sarafidis, 2013, p.5)

the correction proposed by Windmeijer (2005), which is implemented by the *xtabond2* syntax.

### 3 Results

Table 1 shows our results and main diagnostics. In order to account for common shocks affecting fiscal policy and to control for possible cross-sectional dependence, we initially included full year dummies (results not shown). However, the inclusion of full year dummies yielded 26 instruments in a sample of 33 countries, and there is a reasonable risk that we would quickly run into a degrees of freedom problem as we extend this initial specification. Therefore, we considered dropping some of the year dummies, particularly bearing in mind that most of them are insignificant. After performing sequential tests by dropping one or several year dummies, results indicated that dummies for 1995–2001 were both individually and jointly insignificant. Therefore, we decided to drop them from further estimations and proceed with dummies for 2002–2011 (column 1). The testing procedure suggested by Sarafidis, Yamagata and Robertson (2009) indicates that, even after dropping them, there is no problem with cross-section dependence. What is also reassuring is that the significance and size of coefficients from the case with full year dummies (not shown) is quite robust to this modification.

According to the results in column 1, there is a considerable persistence of discretionary fiscal policy, which supports the use of system GMM. The significantly negative coefficient on the output gap shows that discretionary policy has been procyclical in the entire sample. According to these results, an increase in the output gap by 1 percentage point results in a discretionary balance that is lower by around 0.2 percentage points (as a share of GDP). Further, there is no indication that policymakers are concerned with debt movements, since the debt coefficient is only significant at a level slightly over 10%, and its size is very small, indicating that a considerable increase of the debt-to-GDP ratio of 10 percentage points improves the discretionary balance-to-GDP ratio by only 0.1 percentage point. This lack of consideration of debt movements relates well to the recent events, when the consequences of the global economic and financial crisis in Europe were exacerbated by the high debt levels in several countries and the ensuing uncertainty over debt sustainability. Finally, the effect of inflation is also very small and only significant at a level slightly above 10%. However, we retain both debt and inflation due to the theoretical and practical recommendations discussed above.

Table 1

**Baseline Results**

Dependant variable	Cyclically adjusted primary balance (HP trend GDP), % of nominal GDP				Overall unadjusted primary balance, % of nominal GDP	
Lagged dependent variable	0.59*** (0.08)		0.60*** (0.08)	0.60*** (0.09)	0.64*** (0.09)	0.61*** (0.10)
Lagged dependent variable*EU-17 interaction		0.74*** (0.12)				
Lagged dependent variable*CESEE EU countries interaction		0.36*** (0.11)				
Lagged dependent variable*CESEE-6 interaction		0.24* (0.12)				
Output gap, % of HP trend GDP	−0.16** (0.06)	−0.18*** (0.05)		−0.17** (0.08)	0.01 (0.06)	
Output gap*EU-17 interaction			0.10 (0.17)			0.31 (0.21)
Output gap*CESEE EU countries interaction			−0.20*** (0.04)			−0.06 (0.06)
Output gap*CESEE-6 interaction			−0.41*** (0.10)			−0.11 (0.17)
Lagged public debt, % of nominal GDP	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)		0.01 (0.01)	0.01 (0.01)
Lagged public debt*EU-17 interaction				0.00 (0.01)		
Lagged public debt*CESEE EU countries interaction				0.01 (0.02)		
Lagged public debt*CESEE-6 interaction				−0.04 (0.03)		
Inflation rate	0.01 (0.01)	0.02*** (0.01)	0.02*** (0.00)	0.02** (0.01)	0.00 (0.00)	0.01 (0.01)
Dummy for EU-17		−0.07 (0.62)	0.13 (0.73)	0.34 (0.71)		0.15 (0.89)
Dummy for CESEE EU countries		−0.83* (0.41)	−0.37 (0.40)	−0.54 (0.71)		−0.26 (0.58)
Dummy for CESEE-6		−1.01 (0.70)	0.26 (0.54)	1.91* (1.06)		0.22 (0.61)
Constant	−0.21 (0.47)				−0.09 (0.47)	
Observations	500	500	500	500	502	502
Period	1995–2011	1995–2011	1995–2011	1995–2011	1995–2011	1995–2011
Number of countries	33	33	33	33	33	33
Number of instruments	19	27	27	23	19	27
p-value for F-statistics, joint significance test	0.00	0.00	0.00	0.00	0.00	0.00
Arellano-Bond test for AR(1) in differences	0.00	0.00	0.00	0.00	0.00	0.00
Arellano-Bond test for AR(2) in differences	0.94	0.54	0.82	0.96	0.85	0.87
Sargan test of overidentified restrictions p-value	0.10	0.00	0.53	0.05	0.09	0.64
Hansen test of overidentified restrictions p-value	0.26	0.54	0.87	0.16	0.12	0.49
GMM instruments for levels: Hansen test excluding group p-value	0.42	0.34	0.62	0.40	0.61	0.50
GMM instruments for levels: Difference-in-Hansen test of exogeneity of instruments p-value	0.17	0.64	0.87	0.10	0.04	0.40

Source: Author's estimations.

Note: Standard errors in parentheses. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively. Internal instruments are used for endogenous variables (lagged dependent variable and output gap). Lag limits are 1/2 for the lagged dependent variable, and 2/3 for output gap. The "collapse" option is always used. Year dummies for 2002–2011 are also included but not shown.

In columns 2, 3 and 4 we analyze possible differences across country groups for the main variables. In order to do this, we use dummy variables for the three country groups and interact them with the particular variable of interest. It should be noted that there is no base group and the constant is removed, so the interpretation of the reported coefficient sizes and significances for interaction terms is straightforward. According to column 2, the autoregressive coefficient is significant in all three country groups. However, there are considerable differences in policy inertia. Indeed, discretionary policy is quite persistent in the EU-17 group, while the relatively lower size of this coefficient in both groups of transition countries lends some support to the argument that discretionary policy in these countries has been more volatile. Column 3 shows differences in the cyclicity of discretionary policy across country groups, which is one of our main issues of interest. Discretionary policy has been acyclical in the EU-17 countries but procyclical in the CESEE EU Member States and even more so in the CESEE-6, which means that fiscal policy exacerbated cyclical economic movements in those countries. Indeed, these results indicate that this feature in transition countries is driving the procyclicality in the entire sample (column 1). These findings are in line with expectations and empirical findings of more procyclical policies in less developed countries. Next, column 4 shows differences in reactions to public debt levels. In line with findings in column 1, in none of the country groups were policymakers reacting to debt movements, which indicates that all three country groups paid insufficient attention to debt movements. While this might be somewhat justified for transition countries, which generally have fairly low public debt levels, the result is more worrying for the EU-17, bearing in mind the still ongoing European debt crisis.

Another important issue of interest is the cyclical character of overall fiscal policy and the effectiveness of automatic stabilizers. Therefore, in columns 5 and 6 we use the overall, unadjusted primary balance as dependent variable. Column 5 shows results for the entire sample, while column 6 shows results on cyclicity by country groups. Results in column 5 show that overall fiscal policy has also been quite persistent, similar to comparable results on discretionary policy in column 1. However, the most important result here is the insignificant output gap, which indicates that overall fiscal policy in the entire sample has been acyclical. This result relates very well to the previous ones: in the entire sample, automatic stabilizers have been exercising their expected countercyclical effect, thus offsetting procyclical discretionary policy (column 1) and resulting in an overall acyclical fiscal policy. At the same time, while this means that overall fiscal policy was not amplifying cyclical movements, it was not acting in a stabilizing manner either, since it is not countercyclical. Finally, the last column shows differences of overall policy across groups. Results for the CESEE EU Member States and the CESEE-6 are in line with expectations and results on discretionary policy in column 3. Overall policy in the transition countries is acyclical, which shows that the countercyclical effects of automatic stabilizers are offsetting procyclical discretionary policies in these countries. However, we can find no such effect in the EU-17 group, where both overall and discretionary policy are acyclical, indicating that automatic stabilizers are unable to shift the discretionary acyclicity into an overall countercyclicity.

These results mostly differ from findings of previous studies on transition countries. In particular, Staehr (2008) finds that overall fiscal policy has been more countercyclical in the CESEE EU Member States, while we reach the opposite conclusion, with overall policy being acyclical in all three country groups. Lewis (2009) also finds that overall policy in the CESEE EU Member States has been countercyclical, which is not confirmed by our results that indicate acyclical overall policy. In addition, although he mostly focuses on overall balances, Lewis (2009) indirectly calculates that discretionary policy has been acyclical in the CESEE EU Member States, while our detailed investigation of this issue suggests that discretionary policy in this group has in fact been procyclical. While a more detailed investigation of these divergences in results is beyond the scope of this paper, they probably reflect several differences in our approach compared to Staehr (2008) and Lewis (2009): we use a longer sample, output gap as a cyclical indicator, and system GMM as an estimation method.

Diagnostic tests in table 1 do not reject the validity of instruments and the validity of instruments for endogenous variables in the level equation in system GMM (based on the Hansen test of overidentifying restrictions and the difference-in-Hansen test of the exogeneity of GMM instruments for levels, respectively) and we therefore prefer system GMM as an estimation method. However, in table 2 we present some robustness checks of the baseline results on discretionary policy.

Table 2

### Robustness Checks

Dependent variable	Cyclically adjusted primary balance (HP trend GDP), % of nominal GDP			
Lagged dependent variable	0.59*** (0.08)	0.68*** (0.10)	0.71*** (0.03)	0.58*** (0.04)
Output gap, % of HP trend GDP	−0.16** (0.06)	−0.15*** (0.05)	−0.20*** (0.04)	−0.19*** (0.04)
Lagged public debt, % of nominal GDP	0.01 (0.01)	0.01 (0.01)	0.01*** (0.00)	0.03*** (0.01)
Inflation rate	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)
Constant	−0.21 (0.47)	−0.12 (0.38)	−0.17 (0.26)	−1.19** (0.52)
Observations	500	500	500	500
Period	1995–2011	1995–2011	1995–2011	1995–2011
Number of countries	33	33		33
Number of instruments	19	22		
p-value for F-statistics, joint significance test	0.00	0.00	0.00	0.00
R-squared			0.69	0.59
Arellano-Bond test for AR(1) in differences	0.00	0.00		
Arellano-Bond test for AR(2) in differences	0.94	0.92		
Sargan test of overidentified restrictions p-value	0.10	0.01		
Hansen test of overidentified restrictions p-value	0.26	0.25		
GMM instruments for levels: Hansen test excluding group p-value	0.42	0.15		
GMM instruments for levels: Difference-in-Hansen test of exogeneity of instruments p-value	0.17	0.66		

Source: Author's estimations.

Note: Standard errors in parentheses. \*\*\*, \*\* and \* denote significance at the 1%, 5% and 10% level, respectively. In the first two columns, internal instruments are used for endogenous variables (lagged dependent variable and output gap). Lag limits are 1/2 for the lagged dependent variable and 2/3 for output gap in column 1, and 1/4 and 2/4 respectively in column 2. The "collapse" option is used in the first two columns. Year dummies for 2002–2011 are also included but not shown.

In order to facilitate the comparison, baseline results are repeated in column 1. Then in column 2 we use deeper lags as instruments for the two endogenous variables, i.e. policy inertia and output gap, again using the *xtabond2* option to collapse the instruments. However, there is no considerable change in baseline results, except for the slightly higher policy inertia when more lags are used as instruments. Columns 3 and 4 then re-estimate the baseline specification in column 1, but now using OLS and LSDV, respectively. Despite the drawbacks of these two methods, Roodman (2006) suggests that GMM estimates of the lagged dependent variable should lie within the range of OLS estimates, which are upward biased, and LSDV estimates, which are downward biased. In our case, the coefficient on policy inertia in column 1 indeed lies between OLS and LSDV estimates in columns 3 and 4. Further, there are fairly limited differences when alternative estimators are used. In particular, the coefficient on output gap is slightly less negative when system GMM is used. In addition, both OLS and LSDV yield a statistically significant coefficient on public debt, which is insignificant in the baseline. However, the size of the debt coefficient with GMM in column 1 is within the confidence interval of alternative estimators in columns 3 and 4, which themselves also suggest a very low effect of this factor on discretionary balances.

#### 4 Conclusions

This study investigates the cyclical character of discretionary and overall fiscal policy in transition countries in Central, Eastern and Southeastern Europe and compares them to the Western European EU Member States for the period between 1995 and 2011, using a specification that is recommended by theory and recent studies. Based on recommendations from the literature and the specifics of the model, system GMM is used as the preferred estimation method, although alternative estimates are also presented for the baseline specification.

Results show that discretionary fiscal policy has been procyclical in the CESEE EU Member States and even more so in Southeastern Europe, which means that policymakers in these countries were exacerbating economic fluctuations. At the same time, overall policy in both groups of transition countries is acyclical, meaning that automatic stabilizers were effective in eliminating the procyclical stance of discretionary policy, but that overall fiscal policy did not have a stabilizing effect on economic fluctuations. Comparisons indicate that there are considerable differences with Western European EU Member States (EU-17), where both discretionary and overall policy are acyclical, suggesting that automatic stabilizers are not strong enough to offset the acyclical character of discretionary policy and to make overall fiscal policy countercyclical. In addition, discretionary policy is much more persistent in the EU-17 group than in both groups of transition countries. Finally, the results show that policymakers in all country groups have paid little attention to public debt, which is a worrying sign for debt sustainability.

These results give rise to several recommendations that should be useful for policymakers, particularly in transition countries. First, considerable efforts are needed in order to eliminate the amplifying effect of discretionary measures on economic fluctuations, and to move discretionary policy in a countercyclical direction. This could be achieved particularly by efforts to improve estimates of cyclical movements and economic forecasts. In turn, this could help improve the design and implementation of discretionary measures to react to forecasts of

economic fluctuations, bearing in mind implementation lags of fiscal policy. In addition, the removal of the procyclical stance of discretionary policy would help turn overall fiscal policy countercyclical, bearing in mind that automatic stabilizers are effective in transition countries. Second, policymakers in transition countries also need to address the issue of the higher volatility of discretionary measures. Combined with the finding of a considerably procyclical policy stance, this indicates that transition countries are tempted to relax policies during expansions and tighten policies during recessions. Therefore, the implementation of some kind of medium-term fiscal rules or other types of commitment would help to reduce volatility. In addition, a better design and implementation of discretionary measures would also help, as it would enable a timely reaction to economic movements. Finally, policymakers in all three country groups need to pay much more consideration to debt sustainability. The results of our analysis and the ongoing European debt crisis indicate that insufficient attention was paid to this issue in the past. At the same time, they also point out that there is no room for complacency about this issue in transition countries, despite their generally low debt levels.

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## Annex

### Data Description and Sources

Series	Description	Source/calculation
Overall, unadjusted primary balance, % of nominal GDP	Overall, cyclically unadjusted primary budget balance as a share of nominal GDP	AMECO database of the European Commission (May 2013) for EU-17 and CESEE EU countries. For CESEE-6, author's calculation based on data from national statistical offices, central banks or finance ministries, EBRD, and IMF WEO database (April 2013).
Cyclically adjusted primary balance (HP trend GDP), % of nominal GDP	Cyclically adjusted primary balance as a share of nominal GDP (cyclical adjustment using the Hodrick-Prescott trend GDP)	AMECO database for EU-17 and CESEE EU countries. For CESEE-6, author's calculation based on data from national statistical offices, central banks or finance ministries, EBRD, and IMF WEO database. The cyclical adjustment is done following the methodology described in Fedelino, Ivanova and Horton (2009), and using the author's calculation of Hodrick-Prescott trend real GDP. In the absence of relevant information, revenue and expenditure elasticities are approximated by using respective averages for CESEE EU countries calculated from country elasticities in European Commission (2005).
Output gap, % of HP trend GDP	Output gap as a share of Hodrick-Prescott trend real GDP	AMECO database for EU-17, CESEE EU countries and Croatia. For other CESEE-6 countries, author's calculation based on data from national statistical offices, central banks or finance ministries, EBRD, and IMF WEO database.
Public debt, % of nominal GDP	Public debt as a share of nominal GDP	
Inflation rate	Average annual CPI inflation, in %	AMECO database; except Albania, Bosnia and Herzegovina and Serbia from IMF WEO database (April 2013).
Dummy for EU-17	Dummy = 1 for the EU-15 Member States, Cyprus and Malta; 0 otherwise	
Dummy for CESEE EU countries	Dummy = 1 for 10 CESEE countries that gained EU membership in 2004 or 2007; 0 otherwise	
Dummy for CESEE-6	Dummy = 1 for the following CESEE countries: Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro and Serbia; 0 otherwise	

Source: Author's compilation.

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### **Credit Boom in Russia despite Global Woes – Driving Forces and Risks**

Stephan Barisitz

After the crisis slump of 2008–2009, real year-on-year credit growth in Russia turned into a boom in 2011, with double-digit growth climaxing at +24% in mid-2012, before slowing down again. The ratio of domestic credit to GDP is, however, not high compared to peer countries. Retail lending, while still modest, developed most dynamically. Yet domestic deposits rose even more swiftly than domestic loans, and the loan-to-deposit ratio slightly declined. The driving forces of the Russian credit boom are (a) on the demand side: the oil price recovery (from early 2009 to early 2012) and relatively brisk domestic demand growth, partly driven by generous public salary and pension adjustments, and financial deepening in the highly profitable retail sector; (b) on the supply side: the “deposit boom,” increasing profits of resource enterprises, and official liquidity assistance. Risks related to the credit boom include surging unsecured consumer loans (+44% in real terms in 2012, thus accounting for 60% of household credit), widespread connected lending, elevated levels of nonperforming loans (NPLs), and modest provisioning. The Central Bank of the Russian Federation (CBR) reacted to the (consumer) credit boom by moral suasion and some prudential measures. The deceleration of lending growth since mid-2012 was probably largely due to the general economic slowdown. Shock-absorbing factors are considerable, including growing deposits as well as satisfactory profitability and the banking sector’s net external creditor position, but some factors, such as capital adequacy and loan loss provisions, have been eroding recently. In the current economic situation, the most probable outlook for the Russian lending boom is a softlanding.

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### **ARNIE in Action: The 2013 FSAP Stress Tests for the Austrian Banking System**

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In this paper we present the main concepts and methods of the stress tests that the Oesterreichische Nationalbank conducted in 2013 in close cooperation with the IMF under the latter’s Financial Sector Assessment Program (FSAP). We cover solvency and liquidity stress tests as well as, as part of our contagion analysis, the interaction of solvency with liquidity. The paper’s objective is to contribute to the growing literature on applied stress testing by (i) sharing our methodological approaches, in particular innovations to cash flow-based liquidity stress testing, and by (ii) discussing the calibrations employed in what were the most extensive stress tests conducted for Austria in the past five years. Moreover we (iii) provide results at an aggregated level. The 2013 FSAP stress tests for Austria also mark the first public appearance of the OeNB’s new systemic risk assessment tool, ARNIE (“Applied Risk, Network and Impact assessment Engine”). By covering recent methodological as well as operational progress, we also shed light on practical challenges. Finally, we identify the need for further work, in particular with regard to the interaction of solvency and liquidity stress testing, and contagion analysis more generally.

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## Event Wrap-Ups

# Conference on European Economic Integration 2013 – Financial Cycles and the Real Economy: Lessons for CESEE

Compiled by  
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The Conference on European Economic Integration (CEEI) 2013, which the Oesterreichische Nationalbank (OeNB) hosted in Vienna on November 18 and 19, 2013, focused on the topic “Financial Cycles and the Real Economy: Lessons for CESEE”.<sup>2</sup> Following an excursion to Helsinki in 2012 upon the invitation of Suomen Pankki – Finlands Bank, which had co-organized the CEEI in 2011 and 2012, the conference was again back at its traditional venue in 2013. Following extensive discussions on issues of balanced growth and convergence in Central, Eastern and Southeastern Europe (CESEE) at the CEEI 2012, the CEEI 2013 examined the link between the financial cycle – the notion of financial booms followed by busts – and the real economy. The debate on the respective policy challenges reflected the heterogeneous recovery paths in CESEE and the question to what extent these differences mirror variations in the pattern of pre-crisis financial cycles and varying policy responses to financial busts. These issues were explored in the light of recent efforts to strengthen (macro)financial sector regulation at national and international levels. More than 330 participants from 35 countries followed the presentations and discussions of high-ranking representatives of central banks, international organizations, the business and banking sectors and academia.

In his opening remarks, OeNB Governor *Ewald Nowotny* pointed out that it is important to address the relationship between economic activity and financial development from different angles. While financial deepening is expected to promote economic growth in CESEE in the long run, this positive impact may be smaller than expected a few years ago and depend much more on the regulatory and overall policy framework. Over the short- to medium-term horizon, finance adds to – or even causes – cyclical swings in the real economy and, in the worst case, outright boom-bust developments, which can entail substantial welfare costs. Prior to the crisis, policymakers had failed to appropriately take into account this cyclical component of the finance-growth nexus. With hindsight, the prevalence of overly optimistic expectations and the build-up of excessive leverage in the CESEE countries can be explained by this lack of attention to the financial cycle. When the financial cycle went into reverse, several CESEE economies experienced a severe and rather protracted financial bust that is still weighing on their recovery and slowing down the convergence process. From this, Nowotny concluded that we must enhance our understanding of the financial cycle and draw appropriate lessons for economic policy, not only in the CESEE region but also at the European level. In this context, he highlighted the decision to establish the single supervisory mechanism (SSM) and reiterated the Eurosystem’s invitation to non-euro area countries to broaden the reach of the SSM by participating as well.

<sup>1</sup> Oesterreichische Nationalbank, Foreign Research Division. Compiled on the basis of notes taken by Elisabeth Beckmann, Markus Eller, Martin Feldkircher, Martin Gächter, Isabella Moder, Mathias Lahnsteiner, Thomas Scheiber, Maria Silgoner, Tomáš Sláčík and Julia Wörz.

<sup>2</sup> The conference proceedings will be published by Edward Elgar Publishing Ltd. in the course of 2014. Presentations and papers, information about the speakers and the conference program are available at [www.oenb.at](http://www.oenb.at).

Given improving but still heterogeneous economic developments, Nowotny urged that financial fragmentation in Europe be reversed and a European rather than national perspective be taken in dealing with crisis-induced policy challenges.

### **The Financial Cycle and Macroeconomics: What Have We Learned?**

In the first keynote lecture, *Claudio Borio (BIS)* emphasized the need for economists to rethink standard macroeconomic models that are unable to predict severe financial distress. He advocated analyzing the financial cycle, which can be described, in short, by credit and property prices and is characterized by both a low frequency (16–20 years) and a high amplitude. Most importantly, financial cycles are reliable leading indicators for financial crises, which historically triggered permanent losses in output and slow and protracted recoveries. Borio proposed to replace standard measures of cyclical fluctuations by “finance-neutral” output gaps, which are more reliable indicators for the current state of the economy than common measures that ascribe deviations from potential output solely to inflation. Looking ahead, he identified ill-designed policies as a key risk to global recovery. More specifically, policy measures should aim at leaning more aggressively against the buildup of imbalances in the boom phase and be less expansive during the bust phase. In this regard, he views current policy measures as being too asymmetric, running the risk of eroding the defenses of economies under stress while exhausting policymakers’ ammunition. Finally, policymakers have to recognize the financial cycle as a medium-term phenomenon and therefore expand the focus of fiscal, monetary and macroprudential policy measures accordingly. In his policy recommendations for future crisis resolution, Borio argued that it is key to quickly ensure full loss recognition, recapitalize financial institutions and promote the removal of excess capacity in the financial sector. Fiscal policy should shore up private sector balance sheets by substituting private for public sector debt in a very judicious manner rather than applying across-the-board fiscal stimulus.

### **Credit Cycles, Central Bank Policy and the Real Economy in CESEE**

The first policy panel brought together four CESEE central bank leaders who shared their countries’ experiences with credit booms and their messages for macroprudential policy. In his introductory statement, OeNB Governor Ewald Nowotny recalled central lessons from the crisis, namely the need to coordinate monetary, fiscal and prudential policies, and the risks to macrofinancial stability arising from private sector indebtedness. *Marek Belka*, President of *Narodowy Bank Polski*, summarized the Polish experience as a mixture of fortunate timing and early policy awareness. He recalled that credit expansion in Poland had been moderate apart from a sectoral boom in the mortgage market. Policymakers addressed this boom early on by taking regulatory steps and restricting foreign currency lending. At the same time, Poland benefited from the fact that domestic credit growth was dampened by the global crisis. After reviewing the strengths and weaknesses of micro- and macroprudential policies geared to protect financial stability, Belka turned to the role of foreign capital and argued that foreign capital-financed growth, which is still common in the CESEE region, involves considerable risks, such as exchange rate risk and – more subtle, but also more vicious – the risk of a lopsided sectoral allocation of capital. Especially this latter phenome-

non may potentially foster bubbles and has to be addressed by supervisors in a timely and appropriate manner. *Boštjan Jazbec*, Governor of *Banka Slovenije*, focused on the synchronization of business cycles between Slovenia and the euro area. He attributed improvements of the past years mainly to strengthened trade links. The more recently observed decoupling of business cycles, in his view, is a result of domestic developments and mainly related to financial sector problems. He emphasized the crucial role of institutions in general and the room for institutional improvement in the Western Balkans in particular. Especially Slovenia would need to become more efficient in dealing with state-owned companies and to clean up banks' balance sheets. He concluded by stressing the potential tension between short-term crisis management and long-term crisis resolution and the continually high need for crisis management in Slovenia. *Vedran Šošić*, Vicegovernor of *Hrvatska narodna banka*, recapitulated Croatia's long-standing experience with macroprudential policy. Being a small, open and highly euroized economy with a high degree of financial integration, Croatia has traditionally had very limited room for independent monetary policymaking. Hence, macroprudential policy has been used successfully not only to mitigate vulnerabilities but also to build up buffers and strengthen the banking system's resilience. Despite noticeable deleveraging in 2013, the external liabilities of the Croatian banking sector remain above pre-crisis levels. In conclusion, Šošić strongly spoke in favor of a holistic approach to macroprudential policy which takes into account interactions, synergies and links between individual measures. He also stressed the merits of moving early, as measures taken in good times determine the "degrees of freedom" in bad times. *Eva Zamrazilová*, Member of the Board of *Česká národní banka*, recalled that the transformation experience of the Czech Republic had initially been accompanied by the buildup of massive external imbalances and a weak monetary policy regime targeting both money supply and the exchange rate. The FDI-financed and therefore creditless recovery that started in 1999 gave way to high credit growth from 2005 to 2007 and to overheating in the housing market. The bursting of the subprime bubble in the United States spared the Czech economy from a further intensification of internal imbalances. The big puzzle in her view is the current weak performance of investments, which may reflect a stronger repatriation of profits gained from FDI than in pre-crisis times when such profits were often reinvested in the economy – developments which highlight risks related to foreign capital-financed growth. Zamrazilová concluded by pointing toward the limitations of monetary policy, with the traditional monetary framework having been stretched to the limit in the face of a weakened transmission mechanism, and underlined the importance of restoring confidence. Taking up input from the keynote lecture, the ensuing general discussion centered on the difficulties involved in obtaining reliable estimates of potential output, both from a forward-looking and a backward-looking perspective. Further topics raised included the interdependencies between monetary and fiscal policies as well as the appropriate focus of monetary policy in the euro area in view of the diverging developments across euro area countries.

### Real Estate Bubbles and the Financial Crisis

In his introductory statement to session 1, OeNB Executive Director *Kurt Pribil* highlighted the crucial role house price dynamics play in gaining an understanding

of economic imbalances. While real estate bubbles are hard to detect in real time, finding the right policy response is an even greater challenge, especially in the absence of robust empirical evidence on the effectiveness of various measures. With respect to Austria, Pribil outlined the initiatives taken in recent years to tackle Austrian banks' high exposure stemming from foreign currency-denominated housing loans. As the first speaker, *Dubravko Mihaljek (BIS)* sketched the incentive structures of buyers, sellers, banks and governments that may all contribute to an increasing house price bubble. The current discussion in Austria, Germany or Switzerland illustrates the difficulty of detecting real estate bubbles early on and, indeed, of fully understanding past house price bubbles – especially in Central and Eastern European countries, where credit growth played a less important role than in OECD countries. Moreover, he argued that the various regulatory, fiscal, monetary and macroprudential measures to address house price booms need to be accompanied by appropriate central bank communication, media information and financial education to influence house price expectations. *Eloísa Ortega (Banco de España)* shared the Spanish experience of recent years. A decade ago, Spain was considered a model case for prudent policies, given its sound public debt levels and the dynamic provisioning system in banking regulation. All these policies, however, turned out to be insufficient to curb house price increases and to prevent the subsequent crisis. The sharp residential property price correction during the crisis had strong repercussions on the rest of the Spanish economy, which were reinforced by malfunctioning labor markets. Spain's painful private and public sector adjustment process and the restructuring of the financial system are slow in bearing fruit. The Spanish example illustrates the key role of the housing market in generating macroeconomic and financial imbalances during upswings, but also its impact on the depth of the current crisis in Spain and on the pace of subsequent recovery. *Paul van den Noord (Autonomy Capital Research LLP)*, who had been working for the OECD before moving to the private sector recently, investigated house price patterns in the G-7 countries. In the period from the 1970s to date, he observed three cycles, each longer and with a higher amplitude than the previous one. The correlation of the house price cycle with the business cycle declined over time, indicating the important role of financial deregulation and of housing as safe haven investment. He raised the provocative hypothesis that we may already be seeing the first signs of a forthcoming bubble, maybe again bigger and longer-lasting than the preceding ones, driven by current expansionary policies. As one should not take for granted the learning ability of policymakers, macroprudential policies should be given into the hands of strong and independent authorities.

### **The Finance-Growth Nexus: Implications for CESEE**

Session 2, chaired by *Doris Ritzberger-Grünwald*, Director of the OeNB's Economic Analysis and Research Department, addressed the finance-growth nexus and its implications for CESEE. Previous research has established a positive nexus between financial deepening and economic growth, while more recent debates questioned the sustainability of debt-financed growth, given the deleveraging process that began after the onset of the crisis. Against this backdrop, this session analyzed whether the general link between finance and growth can be confirmed for recent years, and for CESEE in particular, and whether different stages of economic and



financial development impacted the effect of finance on growth. *Martin Gächter (OeNB)* made a case for taking the financial cycle into account in business cycle measurement. He presented empirical results from an extended structural unobserved components model which explicitly considers private credit and house price developments for four advanced and four emerging economies from the CESEE region. The results show that the financial cycle has a considerable impact on business cycles and confirm that the effect of the financial crisis differs widely across countries. These findings demonstrate that traditional approaches to measuring potential output, which rely solely on the concept of nonaccelerating-inflation output, are unable to detect upswings caused by the financial cycle. In conclusion, Gächter therefore highlighted the importance of incorporating financial information in the estimation of potential output and the corresponding “finance-augmented” output gaps. *Guglielmo Maria Caporale (Brunel University)* presented long-term pre-crisis evidence on the banking system and the financial sector in CESEE EU Member States (excluding Croatia). Results from a dynamic panel model for the period from 1994 to 2007 suggested that the contribution of stock and credit markets to economic growth in these economies was limited. *Adalbert Winkler (Frankfurt School of Finance & Management)* combined the short- and long-term view by comparing the crisis experience of CESEE and euro area periphery countries. He highlighted the need to limit vulnerabilities related to strong capital inflows and emphasized that “speed can kill” the positive finance-growth nexus. He stressed the role of cross-border banking and highlighted that foreign banks in CESEE acted as a shock absorber after the crisis. In the euro area periphery countries, by contrast, shock absorption took place via public institutions. In conclusion, he argued that a multi-country currency union can only be sustainable if supported by banking and fiscal union.

### **Economic Convergence across CESEE: Achievements and Challenges**

In his dinner speech, *Jörg Asmussen*, at that time Member of the Executive Board of the *European Central Bank*, contrasted positive and negative examples of how CESEE countries have been experiencing convergence: While benefiting from increasing living standards, deepening integration and the positive role of foreign capital flows in financing the transition process, they also experienced credit-fueled domestic demand booms, which made their growth models unsustainable. Hence, pre-crisis credit booms turned into post-crisis credit busts, and the resulting deleveraging has since complicated economic recovery. Yet, in Asmussen’s view, the most worrying development is that real convergence in CESEE has virtually come to a halt. Against this backdrop, Asmussen concluded that more and – even more importantly – better European integration was needed, meaning in particular the implementation of new EU and euro area governance rules and, as regards the wider picture, the dismantling of remaining trade barriers between the Western Balkans and the EU. Moreover, he urged that policy should strive for sustainable economic and institutional convergence through a proper mixture of macroeconomic and structural policies.

### **Do We Need New Modeling Approaches in Macroeconomics?**

The second conference day was opened by a keynote speech delivered by *Claudia Buch (Halle Institute for Economic Research)*, which took its cue from numerous



points of criticism voiced against macroeconomic modeling: First, economists have been blamed for failing to predict the crisis and come up with early warning exercise systems. Buch admitted that forecasters had failed to predict the crisis and that forecasting accuracy has not increased within the last decades. However, she put forth several reasons why economic forecasting cannot be more precise, e.g. because uncertainty is fundamental and not the result of bad methods. Second, Buch addressed the claim that economists fail to integrate financial markets in their models by pointing at several macroeconomic models that have incorporated issues related to the financial system and the banking sector. Last but not least, she stressed the importance of finding more links between micro- and macroeconomic developments in economic models in order to overcome unrealistic assumptions about human behavior. As a conclusion, she stated that the economics profession has responded to the crisis in many promising ways and that only time will tell which of the new approaches will be successful.

### **The Policy Response in Europe: How to Deal with the Financial Cycle?**

Session 3, chaired by OeNB Executive Director *Peter Mooslechner*, dealt with the question of how policy should respond to financial cycles in Europe. The first speaker, *Katia D'Hulster*, senior financial sector specialist at the *World Bank Vienna Financial Sector Advisory Center*, explained the activities undertaken by the World Bank to make CESEE and its financial sectors more crisis resilient. The Vienna Financial Sector Advisory Center, for instance, offers tailored technical assistance, analytical output and regional conferences and workshops on topics such as nonperforming loans (NPLs) and Basel III. She highlighted NPLs as one of the major challenges in CESEE, stressed the differences in methodologies in different countries and presented a roadmap for NPL resolution. Moreover, D'Hulster noted that consumer protection and financial literacy are essential but often neglected issues. Concerning the policy response to the crisis in Europe, she underlined the importance of having a single resolution mechanism in place. Subsequently, *Bojana Mijailović* (*National Bank of Serbia*) focused on the business and financial cycle in Serbia as well as on measures taken to strengthen financial stability and their effectiveness. She emphasized that output growth in Serbia is currently lower but more sustainable than before the crisis and confirmed that Serbia has also seen a period of significant credit growth followed by a more recent contraction of the credit stock. The economic downturn and credit contraction have led to an increase in the country's NPL ratio. Furthermore, Mijailović reviewed the Serbian policy response to the crisis and the measures taken earlier during the boom phase to tackle the excessive growth of loan portfolios and the growing exposure to foreign currency risk and foreign currency-induced credit risk. Inter alia, she mentioned that capping lending to households by requiring banks not to exceed a maximum ratio of household loans to tier 1 capital has led to a considerable increase in banks' capitalization ratios. In general, she concluded that countercyclical prudential measures created adequate buffers for loss absorption. Efforts to support NPL resolution have had weak effects so far, however. The session was closed by *Jan Willem van den End* (*De Nederlandsche Bank*), who addressed financial cycles and macroprudential policies in the Netherlands, singling out the tools designed to mitigate excessive credit growth (countercyclical capital buffers) and excessive liquidity risks (maximum loan-to-deposit ratio). Van den End

showed how calibrating countercyclical buffers based on the credit-to-GDP ratio would have worked in the Netherlands. He also found the loan-to-deposit ratio to be a very useful indicator for banking crises. Van den End presented countercyclical rules for upturn as well as downturn episodes. In an upturn episode, an upper bound for the loan-to-deposit ratio would result in a better coverage of loans by deposits and thus reduce liquidity risks, while in a downturn phase, a lower bound for the loan-to-deposit ratio would help avoid a credit crunch.

### **Macrofinancial Stability: New Challenges for Banks, Entrepreneurs and Policymakers**

The CEEI 2013 concluded with a panel discussion of high-level management representatives from the *European Investment Bank*, Austrian commercial banks, and enterprises operating in CESEE markets. OeNB Vicegovernor *Andreas Ittner*, who chaired this session, invited the panelists to share their views on the crisis and to elaborate on the lessons they draw from the crisis with a view to macrofinancial stability. *Debora Revoltella*, Director of the Economics Department at the *European Investment Bank*, stressed the importance of getting a better grasp of the credit cycle. She recommended establishing an accounting regime which would force banks to base their business models on the true cost of risk over the whole credit cycle. As a lesson from crisis management over the last five years, the institutions of the designated fiscal and banking union will need clearly defined responsibilities and adequate powers in order to effectively steer against unsustainable developments. *Willibald Cernko* (CEO of *UniCredit Bank Austria AG*) and *Karl Sevelde* (CEO of *Raiffeisen Bank International AG*) outlined recent challenges for the banking sector with respect to macrofinancial stability. Although both panelists advocated stricter regulation of the financial industry, higher capital requirements and more transparency throughout the banking system, they cautioned that the transition to the new rules of Basel III will need time. A fast enforcement of the new capital and liquidity adequacy ratios risks prompting a credit crunch and depressing economic growth by overburdening the banking sector. *David C. Davies* (CFO of *OMV AG*) explained how both the sudden crash of the oil price and the collapse of the interbank market after the fall of Lehman Brothers led the OMV to fundamentally change its liquidity management in order to avoid financial distress. With banks struggling to fulfil their role as financial intermediaries given the severe problems in the interbank market, large enterprises such as the OMV started to approach financial markets directly, bypassing the banking sector. The rebound of oil prices since 2010 has prevented the OMV from undertaking a more fundamental overhaul of its business model. *Eduard Zehetner* (CEO of *Immofinanz AG*) found fault with the role banks played before and during the crisis. In particular, he criticized that prior to the crisis banks had often provided credit without sufficient assessment of counterparty risk while during the crisis they were unwilling and unable to provide sufficient financial resources when some companies (such as Immofinanz AG) needed them most. *David Hauner* (Head of CEEMEA Economics and FI/FX Strategy at the *Bank of America Merrill Lynch*) presented a rather optimistic outlook for the recovery of emerging economies. Nevertheless, he warned that emerging economies are not immune to credit cycles and stressed that capital accumulation alone does not create long-term growth.

Sustainable growth in the future will rely predominantly on countries' ability to spur productivity.

In addition to official debates, the two conference days provided a welcome opportunity for informal discussions and networking among central bankers, government officials, business and financial sector managers, researchers and journalists. Both media coverage and the positive feedback from participants confirmed the CEEI's status as one of the leading forums of discussion on economic and monetary integration in CESEE. In his concluding remarks, OeNB Governor Ewald Nowotny invited participants to come back for the next CEEI, which will be held in Vienna on November 24 and 25, 2014.

## Olga Radzyner Award Winners 2013

The Olga Radzyner Award has been bestowed annually on young economists from Central, Eastern and Southeastern Europe (CESEE) for excellent scientific work on European economic integration since the year 2000. The Oesterreichische Nationalbank (OeNB) established this award to commemorate the former head of the OeNB's Foreign Research Division, Olga Radzyner, who pioneered the OeNB's CESEE-related research activities.

In 2013, the OeNB received 33 submissions for the Olga Radzyner Award from candidates from 15 countries. The submitted papers covered a wide range of topics related, inter alia, to the impact of financial liberalization, trade, social diversity, the quality of public institutions or the management of energy sources on economic development; the integration of real estate and stock markets; the assessment of financial sector stability risks; the economic effects of fiscal adjustments; the role of remittances and infrastructure investment; or the determinants of money demand. In terms of regional coverage, most papers provided empirical evidence for countries in CESEE, with a particular strong focus on countries in the Western Balkans.

From these submissions, the jury of OeNB reviewers chose four papers for distinction with the Olga Radzyner Award because they were considered outstanding in terms of originality, motivation and analysis as well as the use of state-of-the-art methods. The awards were conferred by OeNB Governor Ewald Nowotny on November 18, 2013, at the OeNB's Conference on European Economic Integration, and the winners are<sup>1</sup>:

*Calin Vlad Demian* (from Romania), PhD student at the Central European University in Budapest, who analyzed welfare gains EU membership offers through cheaper trade in a multi-country Ricardian model with interindustry linkages within countries. He calibrates this model to the EU Member States for the years 2003, 2006 and 2009. Comparing the trade costs before and after EU enlargement, he finds that EU enlargement had a positive, trade cost-reducing effect for all Member States. These welfare gains were found to be comparatively larger for the new EU Member States in CESEE.

*Biljana Jovanovic*, analyst at the National Bank of the Republic of Macedonia, and *Branimir Jovanovic*, PhD student at the University of Rome "Tor Vergata," (both from FYR Macedonia), who investigated whether the ease of doing business, as measured by the World Bank's Ease of Doing Business Indicator, matters for investment in 28 CESEE countries. This study contributes to the existing literature in a twofold way: first, by using the individual subindicator values instead of the overall economy ranking (i.e. the aggregated indicator) and second, by investigating not only how the indicated ease of doing business affects foreign direct investment (FDI) but also total investment. Across a wide range of specifications, the ease of doing business robustly proves to have a considerable positive impact on FDI from OECD countries in the country sample. The impact on total investment is also found to be positive but somewhat smaller.

*Balint Menyhart* (from Hungary), PhD student at the Central European University in Budapest, who studied the impact of social (ethnic and religious) diversity

<sup>1</sup> In alphabetical order.

on economic development (as measured i.a. by changes in direct tax bases), using a sample of about 1,700 historical Hungarian townships and comparing data from between 1880 and 1910. This is one of the first papers to systematically investigate the relationship between economic performance and social patterns in urban communities. He puts strong efforts in identifying a causal relationship and finds that social diversity has a sizeable and positive impact on economic development. Apparently, localities with a more diverse social structure grew faster than others because they had a broader pool of persons with specialized skills.

*Peter Tóth* (from Slovakia), senior economic analyst at the Ministry of Finance of the Slovak Republic, who introduces an exchange rate pass-through into a partial equilibrium model that takes into account heterogeneous firms. He then uses this model to investigate empirically to which extent manufacturing firms in the Czech Republic can dampen the impact of exchange rate appreciation shocks. He finds that importing firms partially cushion the negative effects exchange rate appreciations have on their export sales by importing intermediate goods and services of greater variety and higher quality.

# EBRD Transition Report 2013: Stuck in Transition?

Compiled by  
Antje Hildebrandt

On January 27, 2014, the Oesterreichische Nationalbank (OeNB) and the Austrian Ministry of Finance (BMF) co-hosted a presentation of the 2013 Transition Report of the European Bank for Reconstruction and Development (EBRD), including January 2014 GDP growth forecast updates for the “EBRD region.”<sup>1</sup> The event took place at the ministry’s premises and was opened by *Harald Waiglein*, Head of the BMF’s Directorate General Economic Policy and Financial Markets, and by *Doris Ritzberger-Grünwald*, Director of the OeNB’s Economic Analysis and Research Department.

In his opening remarks, Waiglein emphasized the importance of the EBRD Transition Report as a source of up-to-date information about CESEE countries. Given the high share of trade between Austria and CESEE and the catalytic effect of eastward EU enlargement for the Austrian economy, Waiglein expressed some concerns about the latest developments in the region, as evidenced by the Transition Report: For instance, reforms are stalling or have even been reversed somewhat in some countries, and unemployment rates are running high, with youth unemployment constituting a particular challenge. At the same time, as pointed out by Waiglein, the region is characterized by heterogeneous developments: The Baltic economies, for example, are growing quite dynamically according to forecasts for 2013 and 2014 while others, such as Croatia or Slovenia, are showing no or very low GDP growth.

Ritzberger-Grünwald stressed that the title of the 2013 EBRD Transition Report comes with a question mark, which would imply that the gloomy assessment of recent developments may leave some room for optimism. While economic convergence of CESEE with the euro area will without doubt be a more protracted process than expected and while CESEE countries have lost some of their price competitiveness, these aspects are only one side of the coin. Indeed, CESEE countries have seen some improvements in other fields. For example, they were able to improve the quality of their exports, which has more than compensated the loss in price competitiveness. Under the heading “Stuck in Euroization?” Ritzberger-Grünwald went on to share the latest findings of the OeNB’s Euro Survey of households in CESEE. Households continue to report holding large parts of their savings in euro, which continues to inspire more confidence than the local currencies. Evidently, the degree of euroization has not decreased substantially following the stabilization of economic conditions. One further finding is that CESEE countries are not overbanked in general but that large regional differences prevail.

After the introductory remarks, Jeromin Zettelmeyer, the EBRD’s Deputy Chief Economist and Director of Research, summarized the EBRD’s latest growth forecasts for the countries in the EBRD region and outlined the major messages of the EBRD Transition Report 2013 “Stuck in Transition?” He also addressed the key question of the report, namely whether the CESEE countries will ever catch up with the living standards of the most advanced market economies of the world. Last but not least, Zettelmeyer pointed out the importance of democratization and economic institutions for creating a reform-oriented environment.

<sup>1</sup> The EBRD currently operates in 34 countries, ranging from Central, Eastern and Southeastern Europe, to Central Asia and the Southern and Eastern Mediterranean.

## **Part I: The Short-Term Perspective: State of the Recovery and Outlook for 2014**

According to the EBRD, economic recovery will be slow in the transition region. While SEE on average is expected to see some acceleration of growth in 2013 compared to 2012, other countries, such as Russia, Croatia, Slovenia or some Caucasian economies will miss out on growth. This outlook reflects the fact that, across the region, exports are still the main driver of economic growth (apart from Central Asia, where growth is mainly commodity driven). For growth to be higher, it would need to be driven by investments as well, but against the backdrop of low credit growth and high unemployment rates no recovery can be expected for the next year or two.

Moreover, as outlined by Zettelmeyer, concerns over monetary tightening in the United States prompted capital outflows from the region for the first time since the first quarter of 2011. CESEE also faced sluggish credit growth, of which local-currency loans have been the main driver. Last but not least, nonperforming loans and unemployment rates increased significantly from 2007 to 2012, indicating persistent legacies of the crisis.

Specifically, the EBRD expects real GDP growth in the transition region to reach 2.7% in 2014 compared to 2.0% in 2013. According to the forecast, Central Europe and the Baltic states will grow on average by 2.2% in 2014 (2013: 1.1%), largely driven by better growth prospects in the Baltics, Poland and the Slovak Republic. Slovenia, in contrast, is expected to remain in recession. Growth in SEE is almost unchanged in 2014 compared to 2013 (around 2%) while Turkey will see some deceleration of real GDP growth (from 3.7% in 2013 to 3.3% in 2014). In Russia economic growth will amount to 2.5% in 2014 (1.3% in 2013). Zettelmeyer summarized the first part of his presentation by stating that the overall picture for the 2014 outlook is blurred by a weak external environment, tight financing conditions as well as negative impacts of the crisis leading to slow economic recovery.

## **Part II: The Medium- and Long-Run Perspective: Resumption of Convergence?**

In the second part of the presentation, Zettelmeyer explained that convergence is unlikely to take place in the absence of a reform of current economic and institutional policies. This negative view is largely driven by two facts: first, productivity catch-up is largely completed in CESEE and second, reforms have stagnated since the mid-2000s with the exception of SEE where the EU accession process of Bulgaria and Romania and the end of the war in the Western Balkan countries had prompted further reforms. Recent sector-level reform reversals were particularly pronounced in the energy and financial sector. In 2013, downgrades of country-level transition indicators will surpass upgrades for the first time.

Zettelmeyer elaborated that one cause of stagnation is an “underreform trap,” which involves imperfectly democratic and autocratic regimes, weak economic institutions, and low growth outside the resource sector. In the transition region, democracy and economic reforms are highly correlated – and causality can work both ways: Democracy can support the implementation of economic reforms (but, as evidenced by Belarus, a lack of democracy can also cause economic reforms to dry up). Vice versa, economic development and reforms can help support the



creation of democracy by making societies richer and fostering private sector growth. The private sector is strongly interested in the creation of democratic reforms. In addition, the creation of competition and the weakening of special interest groups opposed to democracy can help create a democratic society. Admittedly, natural resources may break the link between rising incomes and democracy.

Zettelmeyer continued by raising the question how countries can break out of the underreform trap. In imperfect democracies moderate political shocks can positively influence economic institutions, such as the rule of law, regulatory quality and control of corruption. Apart from political shocks, feasible political reforms, openness to trade and foreign direct investment as well as education, in particular higher education, can improve economic institutions. He mentioned the Slovak Republic (pivotal election, 1998) and Georgia (Rose Revolution, 2003) as positive examples where the windows of opportunities were used to enhance economic institutions. In contrast, Romania (pivotal election, 1996) and Ukraine (Orange Revolution, 2004) missed windows of opportunity.

Zettelmeyer concluded by highlighting the factors that are decisive for a successful use of windows of opportunity. Thus, the priorities of the political leaders matter for the reform path a country takes. Additionally, experience has shown that success depends on external anchors and support. For many of the relatively new EU Member States the prospect of EU membership spurred reforms. Similarly foreign financial and technical assistance supported the implementation of economic reforms. In other words, deeper international integration can promote economic reforms, rising incomes and democratic changes.

The discussion after the presentation addressed a wide range of questions, including the complexity of the convergence process, which is, after all, not limited to a catch-up of GDP per capita. For example, quality of living standards or environmental issues can play an important role. The question was raised which countries have managed to catch up with advanced market economies. Japan and South Korea were mentioned as success stories. China, in contrast, holds no favorable indicators with respect to democratic structures. Despite its high growth of GDP it will take quite a long time for China to converge. In addition, large differences remain even within (EU) countries, as evidenced by the level of economic development of Northern and Southern Italy. Turning to the issue of migration, it was argued that migration from East to West mostly affected countries with poor returns to education. Furthermore it is an open question to what extent migration has an effect on factor productivity. Poland was mentioned as a country that is, in fact, seeing re-migration, having managed to get through the crisis with positive economic growth. Further questions related to tapering in the United States, the impact of which was found to differ considerably across CESEE countries. Generally one can observe some flight to safety (e.g. Poland), while countries with fragile macrofinancial fundamentals were hit more strongly (e.g. Turkey). Overall there was a general loss of confidence in emerging economies. Finally, it was noted that the macroeconomic indicators of Russia are looking relatively positive. The unemployment rate and external indebtedness, for example, are comparably low, and the country has substantial official reserves. However, as argued in the discussion, a resource-rich country should reach higher growth rates.



Notes

# Studies Published in Focus on European Economic Integration in 2013

For more information, see [www.oenb.at](http://www.oenb.at).

## Issue Q1/13

How Important Is Total Factor Productivity for Growth in Central, Eastern and Southeastern European Countries?

*Konstantins Benkovskis, Ludmila Fadejeva, Robert Stehrer, Julia Wörz*

Nonperforming Loans in Western Europe –  
A Selective Comparison of Countries and National Definitions  
*Stephan Barisitz*

Understanding Central Banks' Role in Enlargement – Governance Issues  
*Isabella Lindner, Gabriela Mihailovici*

The Dynamics of Deposit Euroization in European Post-Transition Countries:  
Evidence from Threshold VAR  
*Marina Tkalec, Olga Radzyner Award winner 2011*

## Issue Q2/13

Residential Property Prices in Central, Eastern and Southeastern European Countries: The Role of Fundamentals and Transition-Specific Factors  
*Duy T. Huynh-Olesen, Katharina Steiner, Antje Hildebrandt, Karin Wagner*

Trust in the EU in CESEE: Did the Crisis and EU Integration Have an Impact?  
Evidence from the OeNB Euro Survey  
*Elisabeth Beckmann, Sandra Dvorsky, Thomas Scheiber*

## Issue Q3/13

Determinants of Households' Savings in Central, Eastern and Southeastern Europe  
*Elisabeth Beckmann, Mariya Hake, Jarmila Urvova*

Private Sector Debt in CESEE EU Member States  
*Mathias Lahnsteiner*

Determinants of Nonperforming Loans in Central, Eastern and Southeastern Europe  
*Petr Jakubík, Thomas Reiningger*

Nonperforming Loans in CESEE – An Even Deeper Definitional Comparison  
*Stephan Barisitz*

Residential Property Prices in Central, Eastern and Southeastern European Countries: Stocktaking of Data and a View on New Developments in Data Availability  
*Katharina Steiner*

### Issue Q4/13

Economic Spillovers from the Euro Area to the CESEE Region via the Financial Channel: A GVAR Approach

*Peter Backé, Martin Feldkircher, Tomáš Sláčík*

Households' Expectations and Macroeconomic Outcomes – Evidence from the Euro Survey

*Elisabeth Beckmann, Isabella Moder*

Oil Prices, Excess Uncertainty and Trend Growth: A Forecasting Model for Russia's Economy

*Jouko Rautava*

# Periodical Publications

See [www.oenb.at](http://www.oenb.at) for further details.

## **Geschäftsbericht (Nachhaltigkeitsbericht) Annual Report (Sustainability Report)**

German | annually

English | annually

This report informs readers about the Eurosystem's monetary policy and underlying economic conditions as well as about the OeNB's role in maintaining price stability and financial stability. It also provides a brief account of the key activities of the OeNB's core business areas. The OeNB's financial statements are an integral part of the report.

<http://oenb.at/Publikationen/Oesterreichische-Nationalbank/Geschaeftsbericht.html>

<http://oenb.at/en/Publications/Oesterreichische-Nationalbank/Annual-Report.html>

## **Konjunktur aktuell**

German | seven times a year

This online publication provides a concise assessment of current cyclical and financial developments in the global economy, the euro area, Central, Eastern and Southeastern European countries, and in Austria. The quarterly releases (March, June, September and December) also include short analyses of economic and monetary policy issues.

<http://oenb.at/Publikationen/Volkswirtschaft/Konjunktur-aktuell.html>

## **Monetary Policy & the Economy**

English | quarterly

This publication assesses cyclical developments in Austria and presents the OeNB's regular macroeconomic forecasts for the Austrian economy. It contains economic analyses and studies with a particular relevance for central banking and summarizes findings from macroeconomic workshops and conferences organized by the OeNB.

<http://oenb.at/Publikationen/Volkswirtschaft/Monetary-Policy-and-the-Economy.html>

## **Fakten zu Österreich und seinen Banken Facts on Austria and Its Banks**

German | twice a year

English | twice a year

This online publication provides a snapshot of the Austrian economy based on a range of structural data and indicators for the real economy and the banking sector. Comparative international measures enable readers to put the information into perspective.

<http://oenb.at/Publikationen/Finanzmarkt/Fakten-zu-Oesterreich-und-seinen-Banken.html>

<http://oenb.at/en/Publications/Financial-Market/Facts-on-Austria-and-Its-Banks.html>

## **Financial Stability Report**

English | twice a year

The Reports section of this publication analyzes and assesses the stability of the Austrian financial system as well as developments that are relevant for financial stability in Austria and at the international level. The Special Topics section provides analyses and studies on specific financial stability-related issues.

<http://oenb.at/en/Publications/Financial-Market/Financial-Stability-Report.html>

## **Focus on European Economic Integration**

English | quarterly

This publication presents economic analyses and outlooks as well as analytical studies on macroeconomic and macrofinancial issues with a regional focus on Central, Eastern and Southeastern Europe.

<http://oenb.at/en/Publications/Economics/Focus-on-European-Economic-Integration.html>

## **Statistiken – Daten & Analysen**

German | quarterly

This publication contains analyses of the balance sheets of Austrian financial institutions, flow-of-funds statistics as well as external statistics (English summaries are provided). A set of 14 tables (also available on the OeNB's website) provides information about key financial and macroeconomic indicators.

<http://oenb.at/Publikationen/Statistik/Statistiken – Daten-und-Analysen.html>

## **Statistiken – Daten & Analysen: Sonderhefte** **Statistiken – Daten & Analysen: Special Issues**

German | irregularly  
English | irregularly

In addition to the regular issues of the quarterly statistical series “Statistiken – Daten & Analysen” the OeNB publishes a number of special issues on selected statistics topics (e.g. sector accounts, foreign direct investment and trade in services).

<http://oenb.at/Publikationen/Statistik/Statistiken-Sonderhefte.html>

<http://oenb.at/en/Publications/Statistics/Special-Issues.html>

## **Research Update**

English | quarterly

This online newsletter informs international readers about selected research findings and activities of the OeNB's Economic Analysis and Research Department. It offers information about current publications, research priorities, events, conferences, lectures and workshops. Subscribe to the newsletter at:

<http://oenb.at/Publikationen/Volkswirtschaft/Research-Update.html>

## **CESEE Research Update**

English | quarterly

This online newsletter informs readers about research priorities, publications as well as past and upcoming events with a regional focus on Central, Eastern and Southeastern Europe. Subscribe to the newsletter at:

<http://oenb.at/Publikationen/Volkswirtschaft/CESEE-Research-Update.html>

## **OeNB Workshops Proceedings**

German, English | irregularly

This series, launched in 2004, documents contributions to OeNB workshops with Austrian and international experts (policymakers, industry experts, academics and media representatives) on monetary and economic policymaking-related topics.

<http://oenb.at/en/Publications/Economics/Proceedings-of-OeNB-Workshops.html>

## **Working Papers**

English | irregularly

This online series provides a platform for discussing and disseminating economic papers and research findings. All contributions are subject to international peer review.

<http://oenb.at/en/Publications/Economics/Working-Papers.html>

## **Proceedings of the Economics Conference**

English | annually

The OeNB's annual Economics Conference provides an international platform where central bankers, economic policymakers, financial market agents as well as scholars and academics exchange views and information on monetary, economic and financial policy issues. The proceedings serve to document the conference contributions.

<http://oenb.at/en/Publications/Economics/Economics-Conference.html>

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

English | annually

The OeNB's annual Conference on European Economic Integration (CEEI) deals with current issues with a particular relevance for central banking in the context of convergence in Central, Eastern and Southeastern Europe as well as the EU enlargement and integration process. For an overview see:

<http://oenb.at/en/Publications/Economics/Conference-of-European-Economic-Integration-CEEI.html>

The proceedings have been published with Edward Elgar Publishers, Cheltenham/UK, Northampton/MA, since the CEEI 2001.

[www.e-elgar.com](http://www.e-elgar.com)

## **Publications on Banking Supervisory Issues**

German, English | irregularly

Current publications are available for download; paper copies may be ordered free of charge. See [www.oenb.at](http://www.oenb.at) for further details.

<http://oenb.at/en/Publications/Financial-Market/Publications-of-Banking-Supervision.html>

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