



OESTERREICHISCHE NATIONALBANK

EUROSYSTEM

# FOCUS ON EUROPEAN ECONOMIC INTEGRATION

Stability and Security.

Q3/13

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

**Publisher and editor**

Oesterreichische Nationalbank  
Otto-Wagner-Platz 3, 1090 Vienna  
PO Box 61, 1011 Vienna, Austria  
www.oenb.at  
oenb.info@oenb.at  
Phone (+43-1) 40420-6666  
Fax (+43-1) 40420-046698

**Editor in chief**

Doris Ritzberger-Grünwald

**General coordinator**

Peter Backé

**Scientific coordinators**

Martin Feldkircher, Thomas Reininger, Tomáš Slačák, Jarmila Urvova, Julia Wörz

**Editing**

Dagmar Dichtl, Jennifer Gredler, Rena Mühldorf, Susanne Steinacher

**Layout and typesetting**

Walter Grosser, Franz Pertschi, Birgit Vogt

**Design, printing and production** Communications and Publications Division

DVR 0031577

© Oesterreichische Nationalbank, 2013. All rights reserved.

May be reproduced for noncommercial, educational and scientific purposes provided that the source is acknowledged.

Printed according to the Austrian Ecolabel guideline for printed matter.



**EMAS**  
Verified  
environmental  
management  
REG. NO. AT 000211



# Contents

|  |   |
|--|---|
| Call for Entries:<br>Olga Radzyner Award 2013 for Scientific Work on European Economic Integration | 4 |
|--|---|

|   |   |
|---|---|
| Call for Applications:<br>Visiting Research Program | 5 |
|---|---|

## Studies

|   |   |
|---|---|
| Determinants of Households' Savings in Central, Eastern and Southeastern Europe<br><i>Elisabeth Beckmann, Mariya Hake, Jarmila Urvova</i> | 8 |
|---|---|

|   |    |
|---|----|
| Private Sector Debt in CESEE EU Member States<br><i>Mathias Lahnsteiner</i> | 30 |
|---|----|

|  |    |
|--|----|
| Determinants of Nonperforming Loans in Central, Eastern and Southeastern Europe<br><i>Petr Jakubík, Thomas Reininger</i> | 48 |
|--|----|

|  |    |
|--|----|
| Nonperforming Loans in CESEE – An Even Deeper Definitional Comparison<br><i>Stephan Barisitz</i> | 67 |
|--|----|

|   |    |
|---|----|
| Residential Property Prices in Central, Eastern and Southeastern European Countries:<br>Stocktaking of Data and a View on New Developments in Data Availability<br><i>Katharina Steiner</i> | 85 |
|---|----|

|  |    |
|--|----|
| CESEE-Related Abstracts from Other OeNB Publications | 98 |
|--|----|

## Event Wrap-Ups

|   |     |
|---|-----|
| OeNB Seminar: Monetary Policy Regimes in CIS Economies and Their Ability to Provide<br>for Price and Financial Stability<br><i>Compiled by Julia Wörz</i> | 100 |
|---|-----|

|  |     |
|--|-----|
| 73 <sup>rd</sup> East Jour Fixe: Croatia – The 28 <sup>th</sup> EU Member State<br><i>Compiled by Isabella Moder and Katharina Steiner</i> | 102 |
|--|-----|

## Notes

|                         |     |
|-------------------------|-----|
| Periodical Publications | 110 |
| Addresses               | 112 |

*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 2013 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 had died in a tragic accident in August 1999. The award is bestowed on young economists for excellent research on topics of European economic integration and is conferred annually. In 2013, 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 e-mail to [eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at) or by postal mail – with the envelope marked “Olga Radzyner Award 2013” – to the Oesterreichische Nationalbank, Foreign Research Division, Otto-Wagner-Platz 3, POB 61, 1011 Vienna, Austria. Entries for the 2013 award should arrive by September 20, 2013, 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 [http://www.oenb.at/en/ueber\\_die\\_oenb/foerderung/stipendien/radzyner/teilnahme/teilnahme.jsp](http://www.oenb.at/en/ueber_die_oenb/foerderung/stipendien/radzyner/teilnahme/teilnahme.jsp) or contact Ms. Eva Gehringer-Wasserbauer in the OeNB's Foreign Research Division either by e-mail ([eva.gehringer-wasserbauer@oenb.at](mailto:eva.gehringer-wasserbauer@oenb.at)) or by phone (+43-1-40420-5205).

# 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 November 1, 2013.

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

Studies

# Determinants of Households' Savings in Central, Eastern and Southeastern Europe

Elisabeth Beckmann,  
Mariya Hake,  
Jarmila Urvova<sup>1</sup>

*This paper uses data from the Euro Survey of the Oesterreichische Nationalbank (OeNB) for ten Central, Eastern and Southeastern European (CESEE) countries to analyze the saving behavior of CESEE households between 2010 and 2011. We investigate households' decisions to save and their subsequent portfolio choices based on the life-cycle hypothesis, i.e. by analyzing sociodemographic determinants of saving, most notably age. Understanding households' saving behavior is particularly relevant for CESEE countries to properly address public policy challenges related to promoting financial market development and financial stability. Our findings suggest that age as well as education and income drive the propensity to save and reveal that the hump-shaped relationship between age and savings as predicted by the life-cycle hypothesis holds for CESEE. Age also plays a role in households' portfolio choices, with younger persons having a higher propensity to own life insurance, while older persons are more likely to have savings deposits.*

*JEL classification: D14, D80, D84, G11*

*Keywords: Households, savings, portfolio choice, life-cycle hypothesis, survey data, Central, Eastern and Southeastern Europe*

## 1 Introduction

Saving is a key macroeconomic variable, as it is a potential source of investment and thus economic growth. It also plays a role in the monetary transmission mechanism. Usually, the private sector,<sup>2</sup> including households, provides the bulk of savings in an economy. Households are heterogeneous in terms of size, economic activity, income, net wealth and cultural background. This means that investigating households' behavior at the aggregate level only by looking at the "average" household ignores many potentially important aspects. Therefore, in the recent years, several central banks have increasingly invested effort into exploring households' behavior and balance sheets at the individual, i.e. the micro level. The most recent venture in this vein is the Eurosystem's Household Finance and Consumption Survey (HFCN, 2013).<sup>3</sup>

The analysis of household savings at a more disaggregated level is important not only for understanding economic growth but also for assessing the stability of a country's financial system and its public finances. The financial systems of Central, Eastern and Southeastern European (CESEE) countries are mostly dominated by foreign-owned banks with relatively high loan-to-deposit ratios. During the 2008–2009 crisis, policymakers and banks started initiatives to bring these ratios closer to balance.<sup>4</sup> Such a policy should strengthen and stabilize the

<sup>1</sup> Oesterreichische Nationalbank, Foreign Research Division, [elisabeth.beckmann@oenb.at](mailto:elisabeth.beckmann@oenb.at), [mariya.hake@oenb.at](mailto:mariya.hake@oenb.at), [jarmila.urvova@oenb.at](mailto:jarmila.urvova@oenb.at). The views expressed are those of the authors and not necessarily those of the Oesterreichische Nationalbank or the Eurosystem. The authors would like to thank Peter Backé, Aleksandra Riedl, Doris Ritzberger-Grünwald, Thomas Scheiber and Tomáš Slačák as well as two anonymous referees for helpful comments and suggestions.

<sup>2</sup> In the countries under investigation, the average share of private saving in 2010 amounted to more than 90% of total saving in the economy, according to the IMF Article IV Reports.

<sup>3</sup> For an overview of how household survey data have been used to inform policy on household finance and consumption decisions in advanced economies, see HFCN (2009).

<sup>4</sup> E.g., the joint measures of the Austrian Financial Market Authority (FMA) and the OeNB seek to strengthen the business model sustainability of Austrian banks operating in the CESEE and include imposing a 110% limit for the loan-to-deposit ratio of new businesses (OeNB, 2011).

funding base of banks operating in CESEE, as it intends to diversify away banks' dependency on foreign financing. In addition, the ageing of society in many countries drives up costs in particular within the pension and healthcare systems and thus puts a great strain on public finances and more emphasis on individuals' future saving behavior.<sup>5</sup>

To affect the volume of household savings (e.g. by regulatory measures or policy incentives), policymakers first need to understand what households' saving motives are (i.e. those other than benefiting from the applicable interest rates) and how these motives differ across households. Moreover, by knowing more about the financial behavior of various types of households, policymakers gain insight into which groups might be vulnerable to certain types of shocks (e.g. income or interest rate shocks) and how well they are hedged against these shocks. Irrespective of which policy decision makers choose to apply, the chosen policy will always have to take into account households' saving behavior and portfolio choices and will, in turn, affect households at the same time.

Furthermore, the CESEE region has some specific features which themselves justify an analysis of household savings in these countries compared with other countries. For example, many CESEE countries are highly euroized, and remittances are an important source of income, especially in some countries of South-eastern Europe. In addition, local capital markets are often not as developed and alternative financial instruments (e.g. life insurance) are not as widely used as in other high-income countries (see chart 1). All these factors might have an impact on the saving and portfolio decisions of different types of individuals.

In this paper, we analyze how households' saving decisions (*whether* to save and *which financial instruments* to use) in the CESEE region differ across individuals, depending on their sociodemographic characteristics, which means we look beyond the aggregate "average household." We do so by testing the life-cycle hypothesis, which, put broadly, predicts that different types of individuals (classified in particular – but not solely – by age) differ in their saving behavior. Our findings suggest that age, in addition to other sociodemographic factors, specifically education and income, drives individuals' propensity to save. As predicted by the life-cycle hypothesis, younger and older respondents are less likely to save, but older persons in CESEE dissave less than predicted by the hypothesis. Age also plays a role in portfolio choice, with younger persons having a higher propensity to own life insurance, while older persons are the most likely to have savings deposits.

The paper is structured as follows: Section 2 highlights the relevant theoretical literature and empirical findings on households' saving behavior and portfolio choices in general and in the CESEE countries in particular. Section 3 presents the data and some stylized facts on the development of the financial markets in CESEE, while section 4 introduces the empirical strategy applied. Our main results on the determinants of saving and of choosing financial instruments follow in section 5, with robustness checks in section 6. Section 7 concludes with policy implications.

<sup>5</sup> For an analysis of the ageing problem in the EU Member States, including the CESEE EU countries, and of possible policy measures and measures already taken, see European Commission (2012).

## 2 Literature Review

### 2.1 The Life-Cycle Hypothesis

The life-cycle hypothesis (LCH; Modigliani and Brumberg, 1954; Modigliani, 1986) and the permanent income hypothesis (PIH; Friedman, 1957) have become the standard framework used to analyze consumption and saving decisions. An important implication of these theories is a hump-shaped wealth-age profile: Midlife households have higher wealth (accumulated savings) than households consisting of retired or young persons, which may even have negative wealth (debt exceeding assets). A related major prediction of LCH/PIH is a consumer's reaction to income shocks: Permanent income shocks should affect both consumption and savings, whereas income shocks that are only temporary should affect savings only.

Since the introduction of the LCH and PIH, the empirical literature testing them has primarily focused on the advanced economies due to the quality and availability of data (especially micro data); it has produced mixed results: Studies that found evidence of the LCH (e.g. Attanasio and Weber, 1995, for the U.S.A.; Kapteyn et al., 2005, for the Netherlands; Pistaferri, 2001, for Italy; HFCN, 2013, for the euro area) stress methodological caveats that have to be addressed properly.

Other papers have found that household consumption and saving decisions are driven by additional motives next to consumption-smoothing over the life cycle. For instance, if consumers face uncertainty and accumulate precautionary savings (Friedman, 1957; Carroll, 1994) and/or are subject to borrowing constraints (Zeldes, 1989), their consumption (and thus saving) is indeed sensitive to changes in current income. In addition to retired persons' increased awareness of higher life expectancy and/or potential health costs, the motive to leave bequests might help explain the "retirement saving puzzle," i.e. some authors' unexplained finding that retired persons consume and dissave less than predicted by the PIH (Alessie et al., 1999).

A small number of studies empirically investigate the LCH for one or more of the CESEE countries covered by our analysis. Denizer et al. (2002) study Bulgaria, Hungary and Poland based on survey data from 1993 to 1995 and find that the determinants of saving are generally similar for transition and market economies. However, they find a U-shaped relation between age and savings that runs counter to the LCH. In addition, they find that the educational status, which they interpret as an approximation of future income, increases savings whereas the impact of the employment status is insignificant. Hanousek and Tuma (2002) investigate the PIH for the Czech Republic using the example of voucher privatization from 1993 to 1996. They find that irrespective of the respondents' age profiles, only a small number of transferred assets were consumed, which corroborates the PIH. A recent study by Leszkiewicz-Kedzior and Welfe (2012) verifies the validity of the LCH for Polish households in the period from 1990 to 2008 and is motivated by the need to investigate the underlying assumption of macroeconomic models. They confirm that the LCH is legitimate for Poland but only applies to less than 10% of households in the long run, explaining this with the income constraints of the majority of Polish households in the early years of transition due to elevated macroeconomic instability.

## 2.2 Households' Portfolio Choices

Once a household decides *whether and how much* to save, a decision about *how* to save, i.e. a portfolio choice, will have to follow. Attempts to investigate whether the life cycle also plays a role in this process are much scarcer than those testing the general LCH, because authors assume that in a frictionless setting, optimal portfolio allocations are determined by the expected risks and returns of the respective assets, given the investor's risk aversion. Consequently, the demographic or life-cycle characteristics of the investor, or even of his wealth, do not play a direct role in his portfolio choice above and beyond their possible indirect effect on his risk aversion. However, authors who added "real-life" assumptions to the portfolio choice problem, e.g. risky labor income and borrowing constraints (e.g. Cocco et al., 2005) or the role housing (a highly illiquid and nondivisible asset) plays in households' portfolios (Flavin and Yamashita, 2002), found that the optimal asset allocations in households' portfolios do indeed change over households' life cycles. Market frictions might help explain some patterns found in the micro data, e.g. the "stock market participation puzzle"<sup>6</sup> or the "underdiversification"<sup>7</sup> problem.<sup>8</sup>

Both patterns, as well as the hump-shaped age profile of the probability (i.e. the participation rates) of owning particular financial asset classes, have been found in the euro area (HFCN, 2013). They are, however, valid for mutual funds, bonds, shares, voluntary private pensions and whole life insurance, and other financial assets, but not for deposits and money owed to households. When looking at amounts and the resulting portfolio shares rather than participation rates, the hump-shaped relationship turns into a linear one with household age for most asset classes, e.g. bonds, mutual funds and shares; the portfolio share of deposits is U-shaped. The hump-shaped age profile driven by ownership probability as opposed to values or shares of individual assets was found in U.S. data by Ameriks and Zeldes (2004).<sup>8</sup> While controlling not only for age but also for other life cycle factors (e.g. having children of various ages, marital status, employment status), Xiao (1996) found that the probability of ownership of several financial asset classes does vary with these variables.<sup>9</sup>

To our knowledge, Revoltella and Mucci (2004) is the only study that empirically investigates the portfolio choice of households in a sample of 11 CESEE countries. Their study is based on aggregate data for the period from 2000 to 2003 and focuses on the effects of the macroeconomic environment (e.g. inflation, GDP growth), the level of financial market development, the institutional framework (i.e. pension reforms, health insurance) and income distribution within a country on the demand for different financial instruments. They conclude that deposits are

<sup>6</sup> The stock market participation puzzle refers to the phenomenon that survey data (e.g. U.S. data in Mankiw and Zeldes, 1991) often find a considerably lower share of households holding stocks than standard portfolio theory would predict.

<sup>7</sup> Underdiversification means that a large share of households holds a portfolio which contains only a few financial assets (often only one). The risk and return properties are such that the resulting portfolio is not optimally diversified according to the standard portfolio theory (see Roche et al., 2013, for an overview of empirical findings and a possible life cycle-related theoretical explanation).

<sup>8</sup> However, they also stress that it is virtually impossible to disentangle and identify all three of the possible effects (age, cohort and time effects) at the same time.

<sup>9</sup> However, a clear, unifying pattern is hard to identify.

perceived as liquid instruments and are the preferred saving instrument of low-income groups, while preference for mutual funds increases as households' income goes up.

More recently, also based on survey evidence from the Euro Survey, Stix (2011) provides insights into determinants of savings in foreign currency, and Stix (2012) studies why people choose to hold cash (frequently foreign currency cash) rather than making use of financial intermediaries and investing in interest-bearing assets.

### 3 Composition of Households' Savings and Portfolios: Data and Descriptive Statistics

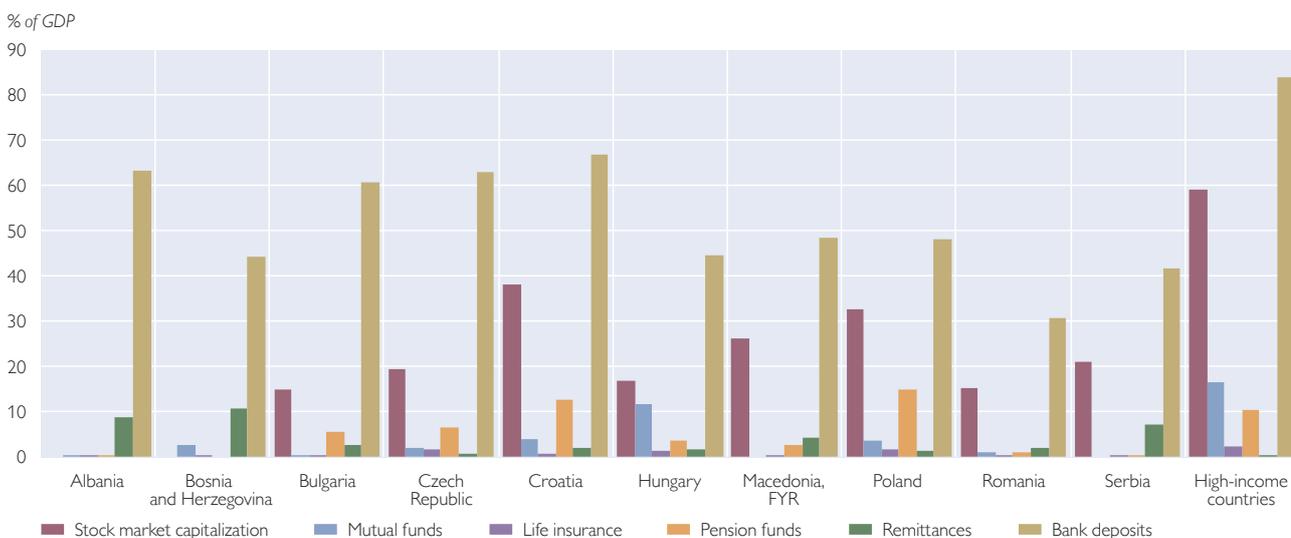
This section will first present some stylized evidence of financial development in CESEE, putting it into a historical and institutional perspective, and will then briefly introduce our dataset as well as descriptive statistics.

#### 3.1 Institutional Background of Households' Saving Decisions

Chart 1 presents selected financial indicators in CESEE and compares them with the respective indicators for high-income countries. It shows that in CESEE, bank deposits dominate among assets. The share of CESEE households' deposits in GDP increased steadily in the first decade of the millennium, especially after the 2008–2009 crisis. However, chart 1 also shows that there are significant differences across CESEE countries, with the share of deposits in GDP ranging between 67% in Croatia and 31% in Romania. Compared with an average 84% in the high-income countries aggregate, these figures are still rather low in CESEE. Stock market capitalization of 59% of GDP in high-income countries puts into perspective the corresponding figures for the CESEE countries with the highest stock

Chart 1

#### Selected Financial Indicators in CESEE and in High-Income Countries in 2011



Source: World Bank Global Financial Development Database.

Note: Data as of 2011 or 2010, if 2011 data are not available. High-income countries are those in which 2011 gross national income per capita was USD 12,476 or more. This aggregate covers 70 countries, including the Czech Republic, Croatia, Hungary and Poland. The values depicted for the high-income aggregate are medians.

market capitalization in Croatia at 38% of GDP and the lowest in Bulgaria and Romania at 15% of GDP.

Compared to high-income countries, where the share of pension fund assets in GDP is 11%, both Poland (15%) and Croatia (13%) have a higher share of pension fund assets in GDP. The level of mutual fund assets is still well below that in high-income countries (17% of GDP), but it grew rapidly after transition in some countries: Hungary has the most highly developed mutual fund industry (12% of GDP) among CESEE countries.

### 3.2 OeNB Euro Survey: Data and Descriptive Statistics

The data analyzed in this paper are taken from the OeNB Euro Survey, which has been carried out on commission of the OeNB on a semiannual basis since fall 2007 in Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, the FYR Macedonia, Hungary, Poland, Romania and Serbia. Each survey wave polls a representative sample of 1,000 respondents aged 14 years and older in each country with the exception of Poland, where only the ten largest cities are sampled. For the purpose of this analysis, we exclude respondents who are younger than 18 years, as the majority of respondents aged 14 to 17 years will not take saving decisions.

The survey collects information on households' saving and loan decisions as well as their economic sentiments and expectations. The central variable of our analysis is based on the following question, which was put to all respondents in the surveys from spring 2010 to fall 2011, providing us with a total of around 40,000 observations:

Box 1

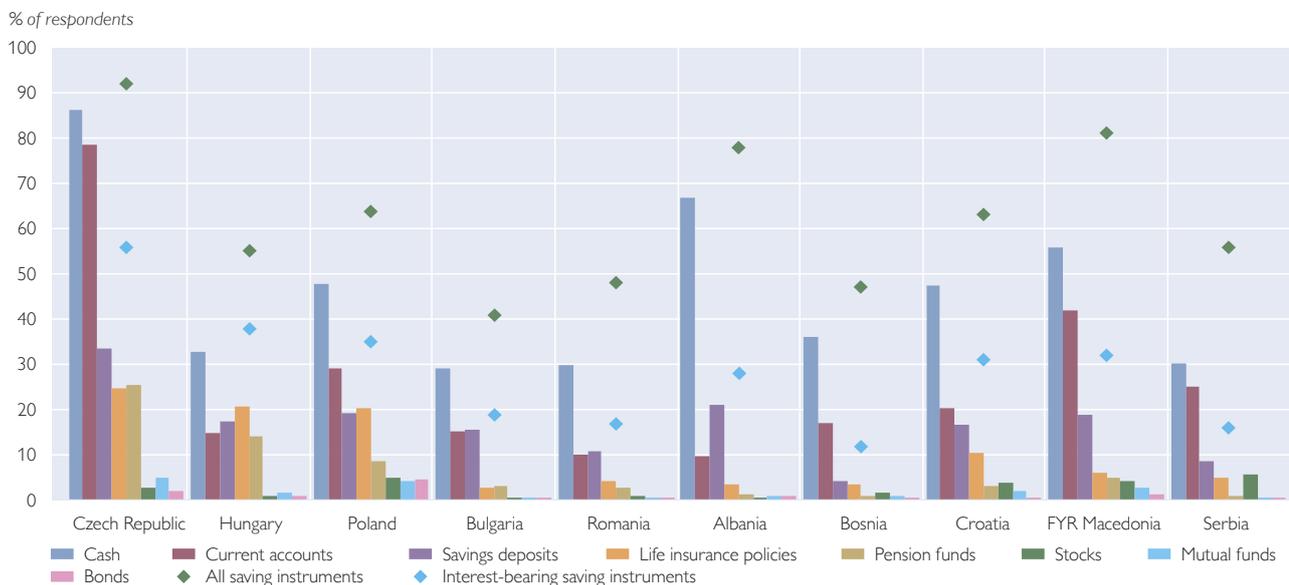
*“There are several ways in which you can hold savings. For example, one can hold cash, use bank accounts, have life insurances, hold mutual funds, etc. Please take a look at this card that lists various savings instruments – could you please select the ones you are using and rank them according to the amounts you have saved on the respective instrument. Please refer to savings you hold personally or together with your partner.”*

#### SHOW CARD

|   |    |
|---|----|
| Cash  | 1  |
| Savings deposits (in foreign currency or in [LOCAL CURRENCY]) | 2  |
| Life insurance  | 3  |
| Mutual funds  | 4  |
| Stocks  | 5  |
| Pension funds (voluntary contributions)                       | 6  |
| Bonds   | 7  |
| Current account / transaction account / wage card             | 8  |
| Other   | 9  |
| <br>  |    |
| I have no savings   | 77 |
| Don't know  | 88 |
| No answer   | 99 |

It is important to point out that the answers to the above question do not contain information on amounts saved and the shares of each saving instrument in individual portfolios that would be based on volumes saved.

## Saving Instruments



Source: OeNB Euro Survey, 2010–2011.

Note: Excluding respondents answering “Don’t know” and “No answer.”

Chart 2 shows the percentage of respondents that hold one or more of the above saving instruments.<sup>10</sup> If we aggregate across saving instruments and look at the percentage of respondents holding savings, which we will refer to as “*all savings*,” we see a large variation between countries, ranging from an average of 92% in the Czech Republic to 41% in Bulgaria. Chart 2 illustrates that cash is the most widespread saving instrument in all countries surveyed, followed by current accounts or savings deposits. There is a marked difference between Central and Eastern European countries and Southeastern European countries in the use of life insurance policies and pension funds. In all CESEE countries, however, less than 10% of respondents invest in stocks, bonds or mutual funds.

On average across countries, the two non-interest-bearing instruments are the dominant saving instruments, as they are used by 46% (cash) and 26% (current account) of respondents.<sup>11</sup> These instruments might have a high incidence because respondents might not differentiate between cash or current accounts held with the intention to save and cash or current accounts held for day-to-day transactions. However, cash does serve as an important saving instrument in CESEE (Stix, 2012).

Nevertheless, we exclude cash and current accounts from the subsequent presentation and discussion of results for several reasons:<sup>12</sup> (1) Regarding cash, Stix (2012) provides an in-depth analysis of the factors that drive households to save in cash. He shows that households’ decision to save in cash is influenced by a lack of trust in banks, memories of past banking crises, the size of the shadow economy

<sup>10</sup> Percentages do not add up to 100%, as respondents could choose to name more than one saving instrument.

<sup>11</sup> Averages across countries are not weighted by country size.

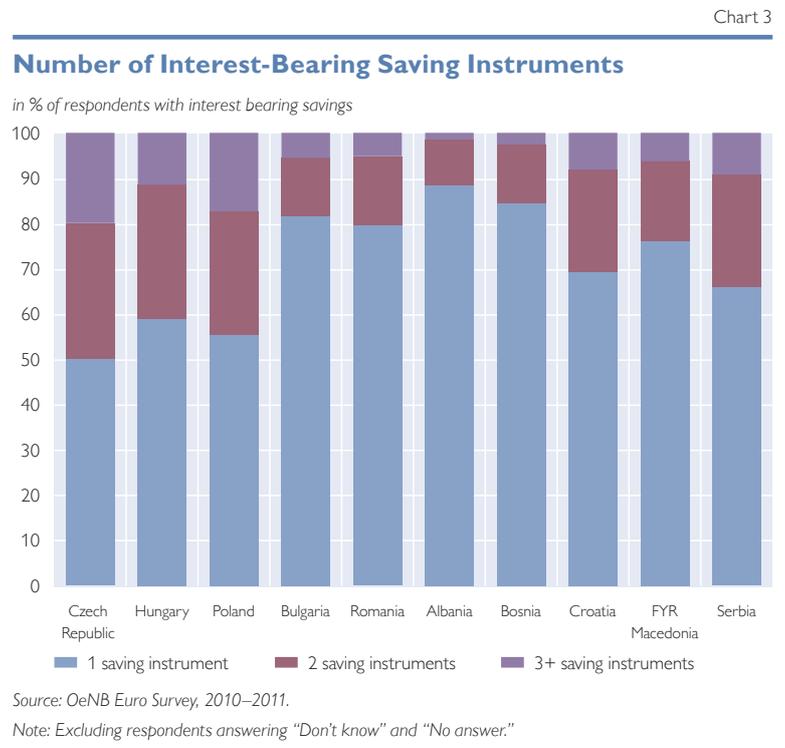
<sup>12</sup> Results including cash and current accounts as saving instruments are available from the authors on request.

and dollarization. Hence, saving in cash is driven by fundamentally different factors than those that drive the decision to save at a financial institution. Indeed, we find that as expected, the relationship between age and savings in cash is U-shaped, confirming that memories of previous economic crises are one important determinant. (2) Current accounts can be used as saving instruments but are often not. The word for “current account” can be synonymous with “wage card” in some countries, a concept which is clearly not related to savings as such. To prevent our measure of “savings” from including current accounts which are actually used for day-to-day transactions, we exclude current accounts. However, we re-ran regressions including current accounts. Results for overall savings do not change with regard to the LCH determinants, but LCH determinants are not significant for current accounts alone as the dependent variable. (3) Finally, in the LCH literature, cash and current accounts would normally not be regarded as saving instruments. Including these in our analysis would render our results more difficult to compare with previous research.<sup>13</sup>

If we aggregate savings excluding cash and current accounts (i.e. interest-bearing savings) – a group we will refer to as “*interest savings*” below – we also observe a strong variation between countries, ranging from an average of 56% of respondents holding interest savings in the Czech Republic to 12% in Bosnia and Herzegovina.

It is difficult to compare these results to aggregate data. First, our results do not refer to amounts but to the percentage of respondents that hold savings. Second, no data are available on households' saving rates on an aggregate level that would be comparable across all CESEE countries. Nevertheless, the question was asked in four consecutive survey waves and results did not change substantially from one wave to the next. This gives us confidence that results are robust and in fact provide very valuable evidence on the saving behavior of households.

The majority of *interest savings* portfolios are dominated by one-asset portfolios (chart 3). A similar “underdiversified” portfolio pattern has also been found recently for the euro area (HFCN, 2013). For CESEE, there is a substantial difference between Central and Eastern European countries and Southeastern European countries: On average, 45% of respondents with *interest savings* have more than one saving



<sup>13</sup> If we include cash and current accounts data, we see that the majority of all savings portfolios are also one-asset portfolios. “Underdiversification” can therefore not be explained by excluding these two saving instruments.

instrument in Central and Eastern European countries, while only 21% of *interest savers* have diversified portfolios in Southeastern European countries. The lowest degree of diversification is found in Albania, where only 11% of *interest savers* hold more than one saving instrument.

#### 4 Empirical Strategy

Our aim is to investigate the LCH with regard to saving in CESEE. We first estimate a probit model to analyze LCH determinants of interest savings denoted by  $S$ :

$$P(S=1)=\Phi_S(X_S\beta_S+u_S)$$

We extend this estimation by CESEE-specific factors affecting households' saving behavior. We then investigate the type of saving instruments households use. The intention to invest in a given financial instrument is observed only if a respondent has savings in the first place. Modeling the probability for holding an asset and neglecting the sample selectivity would result in biased estimators. Therefore, we follow the empirical approach proposed by Heckman (1979) and jointly estimate the probability of having savings (based on the equation above) and the probability of holding a specific saving instrument ( $F$ ):

$$P(F=1|S=1)=\Phi_F(X_F\beta_F+u_F)$$

where error terms are normally distributed,  $u_S \sim N(0,1)$ ,  $u_F \sim N(0,1)$  and correlated,  $\text{corr}(u_S, u_F) = \rho$ .

It is extremely difficult to come up with strong selection instruments, as respondents who are able to save are likely to put some effort into choosing the right saving instrument. Nevertheless, we propose four selection instruments, which should be correlated with the decision to save but not with the decision how to save. First, similar to Stix (2012), we include the perceived distance to the nearest bank (*bank perceived as far*<sup>14</sup>), assuming it increases the costs of using a bank and not the cost of investing in a specific saving instrument. Furthermore, we assume that plans to take out a loan (*plan a loan*) have an impact on savings but not on the choice of a certain financial asset. It could be argued that collateral requirements for loan contracts drive the choice of saving instruments. However, while we find that saving instruments, in particular life insurance, are correlated with existing loans, we do not find this correlation for planned loans. We also include *remittances* as a selection instrument, as recipients of remittances are unlikely to receive and consume them simultaneously, therefore increasing their propensity to save while not binding them to a particular saving instrument. Finally, positive expectations regarding the development of the economy (*expected economic situation better*) are likely to influence respondents' decision to save<sup>15</sup> but not their decision to invest in a particular financial asset.

<sup>14</sup> We will denote variable names in italics. A detailed explanation of the variables can be found in the online annex, table A.1. Descriptive statistics are in table A.2.

<sup>15</sup> From the perspective of precautionary savings, we would expect a negative sign. Alternatively, positive expectations may boost savings.

Following the standard estimation in the LCH literature, we analyze the relation between age and savings. We use age as a continuous variable and additionally include *age squared* to capture possible nonlinearities.

A further LCH determinant of saving is the presence of children in a household. Having dependent children shifts parents' consumption expenditure needs upward and thus should reduce saving. However, some researchers found that having children might increase parents' saving rate (Crossley and O'Dea, 2010),<sup>16</sup> which might be due to a stronger precautionary motive associated with having children. We include the number of children in the household in two categories: the number of children up to six years of age ( $N \text{ children} \leq 6\text{yrs}$ ) and the number of children between 7 and 15 years of age ( $N \text{ children} \leq 15\text{yrs}$ ).

We also control for household size, distinguishing between one- and two-person households (*one-person household / two-person household*) and larger households by using dummy variables. The expected effects associated with this variable reflect the economies of scale, i.e. the relatively higher savings of larger households. By contrast, having controlled for the presence of children for larger households, there is also a higher probability that some of the other household members are nonearners, and if this effect prevails, it should decrease the saving prevalence of larger households.

We further include information on whether the respondents are a *head of household* and whether they are employed or not. Both variables are assumed to have a positive effect on saving under the assumption that the (permanent) income of both the head of household and the employed person is relatively higher and their liquidity constraints are lower. We control for those who are *self-employed*, as self-employment may lead to higher precautionary savings and to the allocation of a lower fraction of the respective portfolio to risky assets such as stocks (Campbell, 2006). We also include a dummy variable for *female* respondents. This may affect saving behavior e.g. through higher life expectancy for women. Higher *education* is also often found to have a positive effect on saving, mainly because of the higher expected lifetime earnings of those with an above-average education. Finally, we control for *income*, which previous research documents show to be positively correlated with saving.

Saving in the CESEE region is likely to be affected by specific determinants related to the economic history of these countries, their institutions and the resulting individual sentiments. One effect of this transition experience is that households often save in foreign rather than local currency. We explicitly do not address the currency dimension of savings in this paper. Nevertheless, following previous research based on OeNB Euro Survey data,<sup>17</sup> we include variables capturing whether respondents remember past periods of high inflation (*remembers inflation*), whether they receive *remittances* or *income in euro*, their expectations of their country's

<sup>16</sup> Crossley and O'Dea (2010) found that the saving rate of U.K. couples with children was statistically insignificantly higher than that for couples without children if saving did not include durables and statistically significantly higher if saving included durables.

<sup>17</sup> Stix (2012), and Beckmann and Scheiber (2012).

Table 1

**Determinants of Savings**

| Dependent variable                 | (1)<br>Interest savings | (2)<br>Interest savings |
|------------------------------------|-------------------------|-------------------------|
| Age                                | 0.060 ***<br>(0.014)    | 0.057 ***<br>(0.014)    |
| Age squared                        | -0.005 ***<br>(0.001)   | -0.004 **<br>(0.001)    |
| Female                             | 0.006<br>(0.005)        | 0.006<br>(0.011)        |
| One-person household               | 0.011<br>(0.015)        | 0.012<br>(0.019)        |
| Two-person household               | 0.014 **<br>(0.006)     | 0.011<br>(0.01)         |
| Children ≤6 years                  | 0.01<br>(0.01)          | 0.012<br>(0.008)        |
| Children ≤15 years                 | -0.001<br>(0.004)       | 0.004<br>(0.006)        |
| Household head                     | 0.003<br>(0.005)        | 0.003<br>(0.005)        |
| High income                        | 0.137 ***<br>(0.018)    | 0.130 ***<br>(0.021)    |
| Medium income                      | 0.060 ***<br>(0.013)    | 0.059 ***<br>(0.011)    |
| Don't know /no answer income       | 0.036 *<br>(0.022)      | 0.065 **<br>(0.032)     |
| Medium education                   | 0.072 ***<br>(0.016)    | 0.075 ***<br>(0.013)    |
| High education                     | 0.193 ***<br>(0.026)    | 0.199 ***<br>(0.022)    |
| Employed                           | 0.068 ***<br>(0.009)    | 0.065 ***<br>(0.015)    |
| Self-employed                      | 0.097 ***<br>(0.02)     | 0.105 ***<br>(0.019)    |
| Remembers high inflation           |                         | 0.038 ***<br>(0.011)    |
| Income in euro                     |                         | 0.245 ***<br>(0.042)    |
| Risk averse                        |                         | 0.042 **<br>(0.016)     |
| Bank perceived as far              |                         | -0.013 ***<br>(0.004)   |
| Expected economic situation better |                         | 0.050 **<br>(0.022)     |
| Plan a loan                        |                         | 0.055 ***<br>(0.015)    |
| Remittances                        |                         | 0.111 ***<br>(0.026)    |
| Log-L                              | -20,272.8               | -9,856.6                |
| N                                  | 38,519                  | 18,497                  |
| P(dependent variable=1)            | 0.28                    | 0.3                     |

Source: Authors' calculations.

Note: Marginal effects from probit model, standard errors (adjusted for clustering at the country level) in parentheses. \*: significant at the 10% level, \*\*: significant at the 5% level, \*\*\*: significant at the 1% level. For a definition of the variables, see annex. All estimations include time-fixed and country-fixed effects. P(dependent variable=1) denotes the unconditional sample probability that a respondent has savings.

future economic situation and whether they perceive themselves as *risk averse*.<sup>18</sup> See the annex for a detailed description of all the variables used and descriptive statistics.

The countries covered by the OeNB Euro Survey have important structural and institutional differences. To account for these, we include country-fixed and time-fixed effects. A logical second step of the analysis, which is beyond the scope of this paper, would be to account explicitly for the country and regional-level factors affecting saving and to examine the cross-country differences and the regional as well as individual heterogeneities more closely.

## 5 Results

Table 1 presents marginal effects from a probit estimation where the dependent variable is *interest savings* and the controls include the basic LCH determinants (column 1). In line with saving propensity findings for the U.S.A. (Ameriks and Zeldes, 2004), our results indicate a hump-shaped relationship between age and saving: Older and younger respondents are less likely to save while middle-aged respondents are most likely to save. However, the hump shape is not particularly pronounced. It flattens with age, which is in line with the “bequest motive” literature. In chart 4, we visualize the hump shape based on the results in table 1 (column 2). A further important determinant of saving propensity is education. Respondents with university degrees or medium education are more likely to save. This is in line with previous research and could indicate both an income effect and the effect of higher financial literacy.

<sup>18</sup> We also experiment with measures of trust in the financial system. Trust in both local and foreign banks is found to be highly significant. However, this is very likely endogenous to interest savings. Therefore, we do not include it in the baseline specification. Furthermore, we do not include “memories of restricted access to deposits,” as this refers to the respondents who tend to save in cash (Stix, 2012) and is insignificant for interest savings.

Chart 4

Income itself has the expected positive and significant effect on savings. Households with high or medium income as well as those who refuse to declare their income are more likely to save than low-income households.

We also find that compared to non-working (i.e. retired and unemployed) respondents, the *employed* are more likely to save by 7 percentage points and the *self-employed* by 11 percentage points. The latter finding may be related to precautionary motives.

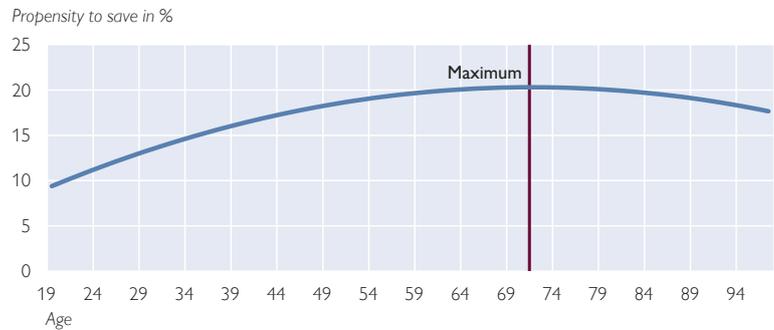
With regard to further LCH determinants that have been analyzed in the literature, we do not find a clear-cut pattern. The number of young children in a household has a positive but insignificant effect on savings, while the number of teenage children has a weakly negative but also insignificant effect. We find some indication that two-person households are more likely to save compared with single-person households and those with three or more members. This might be because two-person households more frequently consist of two adults, i.e. two potential income earners, than of one adult and one child.

In column 2 of table 1, we investigate further determinants of savings that are not derived from the LCH. First, we find that *risk averse* individuals are more likely to save. This could be interpreted in line with previous research on “precautionary savings.”

Stix (2012) shows that memories of past economic turbulence drive households to save in cash. Stix (2011) investigates the link between these memories and the currency choice for savings in detail. In column 3, we control for *memories of hyperinflation* and find that the likelihood of those who *remember high inflation* having savings is 5 percentage points higher than of those who do not. We posit that this could be one reason for the flattening-out hump-shaped pattern with regard to age. First, CESEE households “(re-)started” saving comparatively late because of the transition period. Second, those whose savings were depleted by hyperinflation might be driven to save by precautionary motives. Finally, respondents with a regular income in euro, which on average across countries applies to only 2% of respondents, are 25 percentage points more likely to save than respondents without a regular income in euro. We presume that this captures an income effect, i.e. salaries in euro are higher than in local currency.

To analyze the determinants of the choice of saving instruments, we have to account for the selection bias. As discussed in section 4, we employ *bank perceived as far*, *expected economic situation better*, *remittances*, and *plan a loan* as selection instruments. Table 1, column 2 presents the marginal effects of our probit estimation and shows that respondents who perceive the nearest bank to be far away are 1 percentage point less likely to save than those who consider their bank to be close. Those who are optimistic about the economic development of their country are 5 percentage points more likely to save than less optimistic respondents. Planning to take out a loan also raises the probability of saving by 6 percentage points.

### The Estimated Relationship Between Age and the Propensity to Save



Source: Authors' calculations.

Respondents who receive remittances are 11 percentage points more likely to save than those who do not.

We use this specification to estimate a Heckman selection model of the choice of saving instruments; table 2 presents the results. The correlation between the selection and outcome equations, as indicated by  $\rho$ , shows that our selection instruments are not perfect but valid for most specifications. The literature on portfolio choice uses the LCH determinants as controls rather than discussing their effect on the choice of investment in detail. As our data do not allow us to estimate a portfolio choice model as such, we focus on analyzing which socio-demographic groups are likely to diversify their portfolios. Columns 1 and 2 in table 2 show who diversifies their saving portfolios. In column 1, the dependent variable is a categorical variable ranging from 1 to 7, depending on the number of saving instruments respondents hold, given that they have *interest savings*. Column 2 presents an alternative specification of column 1; the dependent variable is a dummy that takes the value one if the respondent holds two or more interest-bearing saving instruments. In line with results for savings as such, we find that higher income, higher education and/or higher employment status cohorts are more likely to hold more interest-bearing saving instruments. We find that respondents who perceive themselves as *risk averse* do not diversify their portfolios. This is interesting, as it runs counter to concepts of risk diversification, but it might be explained by the assumption that *risk averse* respondents “stick” to one well-known saving instrument.

Interestingly, we find that the hump-shaped relation between age and savings also holds for age and the choice of a number of saving instruments, as also confirmed by the preliminary descriptive results for the euro area (HFCN, 2013). Younger and older respondents are not only less likely to save; they are also less likely to hold several saving instruments at the same time. This could be related to lower financial literacy. In a comparative analysis of financial literacy across the world, Lusardi and Mitchell (2011) find that financial literacy is particularly low among younger and older respondents.

In a further step, we analyze the determinants of individual saving instruments. Results should be viewed with the necessary degree of caution, as some of the saving instruments in question – in particular stocks, bonds and mutual funds – are hardly used in some countries. Therefore, results only give an indication and should not be regarded as robust. It is beyond the scope of this paper, however, to analyze the specific determinants of each individual saving instrument in detail. Instead, we use the specification from columns 1 and 2 of table 2 and shed some light on whether certain sociodemographic groups tend to invest in specific saving instruments. We find that many of the sociodemographic controls are insignificant, which is not surprising, as it is unlikely that sociodemographic factors alone determine portfolio choice.

Nevertheless, some results are fairly intuitive: Employed respondents are more likely to hold pension funds, which may be related to the pension schemes attached to their jobs. Risk averse respondents are less likely to invest in stocks, but also less likely to invest in pension funds. More importantly, however, the results with regard to the LCH determinants, in particular age, are also intuitive: We find a hump-shaped relation for age and most of the saving instruments in question. Savings deposits constitute an important exception, as we find a U-shaped relation,

Table 2

**Determinants of Saving Instruments**

|                              | (1)                      | (2)                      | (3)                   | (4)                   | (5)                   | (6)                   | (7)                  | (8)                   |
|------------------------------|--------------------------|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|
|                              | N instru-<br>ments (1/7) | ≥2 saving<br>instruments | Deposits              | Life<br>insurance     | Pension<br>funds      | Stocks                | Mutual funds         | Bonds                 |
| Age                          | 0.133 ***<br>(0.045)     | 0.100 ***<br>(2.965)     | -0.070 **<br>(2.026)  | 0.124 ***<br>(3.376)  | 0.082<br>(1.462)      | 0.039<br>(0.976)      | 0.001<br>(0.042)     | -0.019 *<br>(1.902)   |
| Age squared                  | -0.015 ***<br>(0.005)    | -0.012 ***<br>(3.176)    | 0.010 **<br>(2.367)   | -0.015 ***<br>(3.530) | -0.01<br>(1.578)      | -0.005<br>(1.106)     | 0<br>(0.329)         | 0.002 **<br>(2.001)   |
| Female                       | -0.037<br>(0.035)        | -0.005<br>(0.419)        | -0.021<br>(1.551)     | 0.01<br>(0.77)        | -0.002<br>(0.152)     | -0.003<br>(0.199)     | -0.005<br>(0.800)    | -0.006<br>(0.905)     |
| One-person household         | -0.039<br>(0.086)        | 0<br>(0.001)             | 0.02<br>(0.674)       | -0.012<br>(0.252)     | -0.048 **<br>(1.967)  | -0.044 *<br>(1.861)   | 0.014<br>(1.14)      | -0.002<br>(0.207)     |
| Two-person household         | -0.062<br>(0.052)        | -0.019<br>(0.913)        | -0.008<br>(0.731)     | 0.014<br>(1.015)      | -0.023<br>(1.361)     | -0.030 ***<br>(2.602) | 0.007<br>(0.63)      | -0.025 ***<br>(4.530) |
| Children ≤6 years            | -0.034 *<br>(0.020)      | -0.017 *<br>(1.768)      | -0.030 ***<br>(2.966) | 0.015<br>(1.372)      | 0<br>(0.024)          | -0.016<br>(1.402)     | -0.002<br>(0.248)    | 0.002<br>(0.43)       |
| Children ≤6 years            | 0.024<br>(0.018)         | -0.002<br>(0.155)        | -0.016<br>(1.041)     | 0.015<br>(1.485)      | 0.011<br>(1.007)      | -0.009<br>(1.250)     | 0.004 ***<br>(3.119) | -0.003<br>(0.779)     |
| Household head               | 0.021<br>(0.025)         | 0.014<br>(1.558)         | 0.003<br>(0.273)      | -0.012<br>(1.591)     | 0.002<br>(0.197)      | 0.018<br>(1.606)      | 0.006<br>(0.989)     | 0.005<br>(1.469)      |
| High income                  | 0.106 **<br>(0.052)      | 0.058<br>(1.555)         | 0.045 **<br>(2.023)   | 0.042<br>(0.759)      | -0.029<br>(1.588)     | 0.017<br>(0.341)      | 0.012<br>(0.38)      | 0.006<br>(0.45)       |
| Medium income                | -0.012<br>(0.020)        | 0.002<br>(0.136)         | 0.024<br>(1.526)      | 0.012<br>(0.403)      | -0.037 ***<br>(2.970) | -0.018<br>(1.107)     | 0.001<br>(0.053)     | -0.014<br>(1.025)     |
| Don't know /no answer income | 0.143 **<br>(0.058)      | 0.042<br>(1.608)         | 0.049 **<br>(2.106)   | 0.005<br>(0.112)      | -0.006<br>(0.303)     | 0.041<br>(1.279)      | 0.018 *<br>(1.746)   | 0.007<br>(0.457)      |
| Medium education             | 0.074 *<br>(0.045)       | 0.066 *<br>(1.868)       | 0.008<br>(0.495)      | 0.032<br>(1.396)      | 0.021<br>(1.048)      | 0.019<br>(0.705)      | -0.001<br>(0.027)    | 0.014<br>(0.883)      |
| High education               | 0.196 ***<br>(0.055)     | 0.115 *<br>(1.827)       | 0.061 ***<br>(4.198)  | 0.059 *<br>(1.757)    | 0<br>(0.000)          | 0.038<br>(0.854)      | 0.01<br>(0.249)      | 0.02<br>(0.904)       |
| Employed                     | 0.014<br>(0.050)         | 0.028<br>(1.267)         | -0.034 **<br>(2.193)  | 0.027<br>(1.115)      | 0.053 **<br>(2.404)   | -0.016<br>(1.526)     | 0.001<br>(0.071)     | -0.014<br>(0.989)     |
| Self-employed                | 0.217 ***<br>(0.076)     | 0.070 *<br>(1.771)       | 0.011<br>(0.648)      | 0.080 ***<br>(2.776)  | -0.002<br>(0.080)     | -0.009<br>(0.210)     | 0.015<br>(0.84)      | 0.033 **<br>(2.318)   |
| Remembers high inflation     | 0.038<br>(0.037)         | 0.035 **<br>(2.363)      | -0.021<br>(1.284)     | 0.026 *<br>(1.8)      | 0.022 **<br>(2.507)   | -0.003<br>(0.122)     | 0.006<br>(0.51)      | -0.003<br>(0.276)     |
| Income in euro               | 0.147 *<br>(0.084)       | 0.045<br>(0.745)         | 0.064<br>(1.284)      | 0.076 *<br>(1.724)    | -0.037<br>(1.276)     | -0.021<br>(0.339)     | 0.028<br>(0.651)     | 0.019<br>(0.988)      |
| Risk averse                  | -0.101 *<br>(0.057)      | -0.034 ***<br>(2.886)    | -0.014<br>(0.761)     | 0.01<br>(0.772)       | -0.012<br>(1.186)     | -0.035 *<br>(1.687)   | -0.013<br>(0.782)    | -0.01<br>(0.547)      |
| Rho                          | -0.14 ***                | -0.29                    | -0.43 ***             | 0.3                   | -0.13                 | -0.26                 | 0.23                 | -0.1                  |
| Log-L                        | -17,058.84               | -13,044.52               | -13,214.16            | -13,108.83            | -12,453.1             | -11,358.83            | -11,150.37           | -10,766.09            |
| N(selection equation)        | 18,497                   | 18,497                   | 18,497                | 18,497                | 18,497                | 18,497                | 18,497               | 18,497                |
| N(outcome equation)          | 5.531                    | 5.531                    | 5.531                 | 5.531                 | 5.531                 | 5.531                 | 5.531                | 5.531                 |
| P(dependent variable=1)      |                          | 0.33                     | 0.19                  | 0.12                  | 0.07                  | 0.03                  | 0.02                 | 0.01                  |

Source: Authors' calculations.

Note: In column 1, the dependent variable ranges from 1 to 7 and indicates the number of saving instruments the respondent has. In column 2, the dependent variable is a dummy variable that takes the value 1 if the respondent has 2 or more saving instruments. In columns 3 to 8, the dependent variable is a dummy variable that takes the value 1 if the respondent has a savings deposit (c.3), a life insurance (c.4), a pension fund (c.5), holds stocks (c.6), mutual funds (c.7) or bonds (c.8). P(dependent variable=1) denotes the sample probability of the respective dependent variable. Coefficients report the average marginal effects. The coefficients are based on a Heckman sample selection probit model (except in column 1, which is not a probit model), where the selection is whether the respondent has savings (see table 1, column 2). We employ distance to bank, exp econ sit better, plan a loan and remittances for identification. t-statistics are adjusted for clustering at the country level and are presented in parentheses below coefficients. Rho denotes the correlation between the selection and the outcome equation. \*: significant at the 10% level, \*\*: significant at the 5% level, \*\*\*: significant at the 1% level.

which is in line with results from the HFCN (2013). This shows that older respondents mainly save in the form of savings deposits (or cash). Saving instruments such as life insurance policies, where the hump shape is particularly pronounced, may in fact not be available for older respondents.

## 6 Robustness Checks

The results presented in the LCH literature often depend on how age is defined (HFCN, 2009) – authors using broader and fewer age categories more often find a linear rather than a hump-shaped relationship. We therefore experimented with different specifications of age brackets and confirm the sensitivity of results to the definition of age brackets. Using fewer age brackets indicates a linear relationship, whereas using ten age brackets results in a hump-shaped relationship.<sup>19</sup>

Second, we cannot control for marital status in the baseline specification, as this information is available for households in only six countries. In table 3, we first present, in column 2a, the baseline estimation for the sample of countries for which data on households' marital status is available and then include marital status information in column 2b. We find that being married is positively and significantly correlated with saving probability.

Third, a further concern in our estimation is that we do not control for wealth (nonfinancial assets). For robustness purposes, we use information on whether the respondent owns a house, a car or a secondary residence as proxies for wealth. These data are available only for one wave. Column 1a of table 3 therefore presents the results of fall 2011, while column 1b presents the results of fall 2011 including the three above-mentioned proxies for wealth. Our results show that owning a house, a car or a secondary residence is indeed positively and significantly correlated with savings. In this specification, age squared becomes insignificant. In column 1a, it is marginally significant at 10.01%. Furthermore, we find that age and ownership of a house or secondary residence are positively correlated while age and ownership of a car are negatively correlated. However, the proxies for wealth might be endogenous, especially as they do not refer to amounts and thus cannot capture accumulation over time. Lastly the number of observations is down to 7,000, as we have to exclude three survey waves.

Finally, given that our country sample is very heterogeneous, our results may be driven by one particular country, or country fixed effects may not fully control for the differences in structure and development of the financial system in these countries. While we acknowledge that these issues should be addressed in multi-level models, we pursue different strategies to check for the robustness of our results. First, we dropped one country at a time from our sample. This procedure did not change the quality of the results. Second, to account for the fact that some of the countries in our sample are highly euroized, we split the sample into respondents with a preference for foreign currency savings and those with a preference for local currency savings. The respective results do not change the overall picture with regard to the LCH. Finally, we include interaction terms for LCH determinants (age) and country dummy variables. Specifically, we repeat the baseline estimation in table 1, column 2 for each of the ten countries in our sample and include a country-specific interaction term for age and test whether this differs significantly from the noninteracted, i.e., cross-country average age coefficient. The significance of the F-test indicates in the respective country that the age-savings hump shape differs from the average hump shape displayed in chart 4. Where this is the case, the hump shape is more pronounced; moreover, these countries are countries with more developed financial systems, e.g., the Czech

<sup>19</sup> Results are available from the authors upon request.

Table 3

**Robustness Analysis**

|                                    | (1a)                    | (1b)                 | (2a)                    | (2b)                 |
|------------------------------------|-------------------------|----------------------|-------------------------|----------------------|
| sample                             | fall 2011 only          |                      | AL, BA, MK, BG, HR, RO  |                      |
| Dependent variable                 | <i>Interest savings</i> |                      | <i>Interest savings</i> |                      |
| Own house                          |                         | 0.067 ***<br>(0.019) |                         |                      |
| Own second residence               |                         | 0.148 ***<br>(0.034) |                         |                      |
| Own car                            |                         | 0.091 ***<br>(0.016) |                         |                      |
| Married                            |                         |                      |                         | 0.014<br>(0.014)     |
| Age                                | 0.070 ***<br>(0.027)    | 0.053 *<br>(0.027)   | 0.044 **<br>(0.018)     | 0.050 **<br>(0.025)  |
| Age squared                        | -0.004<br>(0.003)       | -0.003<br>(0.003)    | -0.003<br>(0.002)       | -0.004<br>(0.003)    |
| Female                             | 0.001<br>(0.012)        | 0.009<br>(0.01)      | 0.006<br>(0.017)        | 0.009<br>(0.016)     |
| One-person household               | 0.025<br>(0.018)        | 0.061 ***<br>(0.022) | 0.028<br>(0.021)        | 0.036<br>(0.019)     |
| Two-person household               | 0.023<br>(0.018)        | 0.034 **<br>(0.016)  | 0.017<br>(0.013)        | 0.016<br>(0.013)     |
| Children ≤6 years                  | 0.023 **<br>(0.01)      | 0.024 **<br>(0.011)  | 0.004<br>(0.009)        | 0<br>(0.014)         |
| Children ≤15 years                 | 0.030 ***<br>(0.008)    | 0.031 ***<br>(0.009) | -0.002<br>(0.008)       | -0.013<br>(0.009)    |
| Household head                     | 0.002<br>(0.011)        | 0.006<br>(0.01)      | 0.002<br>(0.006)        | 0<br>(0.008)         |
| High income                        | 0.090 ***<br>(0.032)    | 0.052 *<br>(0.03)    | 0.131 ***<br>(0.03)     | 0.152 ***<br>(0.027) |
| Medium income                      | 0.055 ***<br>(0.019)    | 0.039 **<br>(0.016)  | 0.069 ***<br>(0.014)    | 0.088 ***<br>(0.01)  |
| Don't know /no answer income       | 0.072 **<br>(0.036)     | 0.045<br>(0.035)     | 0.088 **<br>(0.036)     | 0.104 ***<br>(0.033) |
| Medium education                   | 0.082 ***<br>(0.023)    | 0.074 ***<br>(0.023) | 0.074 ***<br>(0.014)    | 0.068 ***<br>(0.014) |
| High education                     | 0.205 ***<br>(0.033)    | 0.171 ***<br>(0.03)  | 0.183 ***<br>(0.018)    | 0.181 ***<br>(0.028) |
| Employed                           | 0.070 ***<br>(0.013)    | 0.060 ***<br>(0.012) | 0.035 ***<br>(0.008)    | 0.031 ***<br>(0.01)  |
| Self-employed                      | 0.134 ***<br>(0.03)     | 0.104 ***<br>(0.031) | 0.099 ***<br>(0.023)    | 0.085 ***<br>(0.012) |
| Bank perceived as far              | -0.014 **<br>(0.006)    | -0.013 **<br>(0.006) | -0.009 *<br>(0.005)     |                      |
| Expected economic situation better | 0.068 **<br>(0.03)      | 0.059 **<br>(0.029)  | 0.015<br>(0.027)        |                      |
| Plan a loan                        | 0.043 *<br>(0.024)      | 0.060 **<br>(0.027)  | 0.046 **<br>(0.02)      |                      |
| Remittances                        | 0.079 *<br>(0.044)      | 0.049<br>(0.037)     | 0.093 ***<br>(0.028)    | 0.106 ***<br>(0.015) |
| Remembers inflation                | 0.007<br>(0.009)        | 0.011<br>(0.01)      | 0.025 ***<br>(0.007)    | 0.034 ***<br>(0.011) |
| Income in euro                     | 0.321 ***<br>(0.108)    | 0.311 ***<br>(0.102) | 0.249 ***<br>(0.049)    | 0.233 ***<br>(0.027) |
| Risk averse                        | 0.060 ***<br>(0.023)    | 0.054 **<br>(0.024)  | 0.036 ***<br>(0.014)    | 0.033 ***<br>(0.013) |
| Log-L                              | -3477.4                 | -3299.4              | -5725.3                 | -5402.1              |
| N                                  | 6633                    | 6431                 | 11421                   | 10955                |
| P(dependent variable=1)            | 0.3                     | 0.3                  | 0.24                    | 0.23                 |

Source: Authors' calculations.

Note: Marginal effects from probit model, standard errors (adjusted for clustering at the country level) in parentheses. \*: significant at the 10% level, \*\*: significant at the 5% level, \*\*\*: significant at the 1% level. See annex for a definition of the variables. All estimations include time-fixed and country-fixed effects. P(dependent variable=1) denotes the unconditional sample probability that a respondent has interest savings. All estimations are carried out for subsamples, which are indicated above the estimations.

Republic. For Bulgaria, results indicate a U-shape, which is in line with results from Denizer et al. (2002).

We also investigated further determinants which might influence households' decision to diversify their savings portfolios. However, we find that neither expectations regarding inflation and/or the exchange rate nor trust in institutions have a significant effect on households' saving decisions.<sup>20</sup>

## 7 Conclusions

Using data from the OeNB Euro Survey for ten CESEE countries in 2010 and 2011, we investigated CESEE household saving behavior and portfolio choices. More specifically, we analyzed whether the decision of a household to save and the subsequent decision which financial instruments to choose depended, in addition to other determinants, on the household's life cycle. Our findings suggest that the individual propensity to save has a flattening-out hump shape, i.e. young and old people are less likely to save than middle-aged people, but older respondents' propensity to dissave is smaller than the life-cycle hypothesis would predict. This is possibly due to a bequest motive or to memories of past economic turbulences. Age similarly plays a role in the diversification of households' portfolios and in the individual choice of financial instruments. In addition, education, income and employment status also shape the two stages of a saving decision.

Looking forward, these findings should be taken into account when formulating policies that are intended to affect savings. In practice, it is often assumed that pensioners and households with children belong to the most vulnerable groups in society, and policies are often set accordingly. Our results suggest that among those lacking insurance against income shocks due to a lack of (diversified) savings are the young people. By contrast, households with children seem to be able to build average buffers. In addition, older respondents up to a certain age are even broadly able to maintain their saving likelihood. However, our results also suggest that the flattening-out hump shape of households' propensity to save, i.e. the fact that for the old, only weak dissaving is recorded, might be due to memories of past economic turbulences related to transition. This pattern might change as generations without such an experience enter retirement age. Furthermore, population ageing itself will likely have an aggravating negative effect on savings.

Household savings should also be seen in the context of policies that target education. We find that higher education levels lead to a higher propensity to save and to more diversified savings; and this effect is not exclusively due to expectations of higher income. Policies that foster education will therefore not only affect growth via human capital formation but also by increasing the propensity to save, which in turn will affect gross fixed capital formation. In addition, previous research shows that education is correlated with financial literacy. Improving not only education levels in general but financial literacy in particular could therefore boost savings.

Policies targeted at financial literacy could furthermore affect not only savings as such but also households' portfolio diversification. We find that those who

<sup>20</sup> Previous research stressed the role of religion in making financial decisions (see e.g. Grosjean, 2011). We address this issue by repeating our estimations for a subsample of three countries (Macedonia, Romania, Serbia) for which information on religion is available.

perceive themselves as risk averse are more likely to underdiversify their portfolios, possibly because they stick to one familiar saving instrument they trust. At the moment, savings deposits seem to be the most popular saving instrument for the middle-aged and older people in CESEE, while pension funds are scarcely used. Life insurance is the most prevalent financial instrument among younger respondents, while pension funds are not so popular with this age group. One of the many possible explanations for this prevalence might be that taking out a life insurance policy is a requirement for taking out a loan. We suspect that it would be possible to find more diversified (optimal) portfolios for each of the respective life-cycle phases. By extension, our findings imply that improving the levels of education and financial literacy will lead not only to higher, but also to more diversified savings. Further research could also investigate whether the lack of diversified portfolios is driven by the demand or the supply of alternative financial products.

## References

- Alessie, R., A. Lusardi and A. Kapteyn. 1999.** Saving after retirement: evidence from three different surveys. In: *Labour Economics*. Vol. 99(6). 277–310.
- Ameriks, J. and S. P. Zeldes. 2004.** How Do Household Portfolio Shares Vary with Age? Working Paper. Columbia University.
- Attanasio, O. P. and G. Weber. 1995.** Is Consumption Growth Consistent with Intertemporal Optimization? Evidence from the Consumer Expenditure Survey. In: *Journal of Political Economy*. The University of Chicago. Vol. 103(6). 1121–1157.
- Beckmann, E. and T. Scheiber. 2012.** The Impact of Memories of High Inflation on Households' Trust in Currencies. In: *Focus on European Economic Integration Q4/12*. 80–94.
- Browning, M. and T. F. Crossley. 2001.** The Life-Cycle Model of Consumption and Saving. In: *The Journal of Economic Perspectives*. Vol. 15(3). 3–22.
- Campbell, J. Y. 2006.** Household Finance. In: *The Journal of Finance*. Vol. 61(4). 1553–1604.
- Carroll, C. D. 1994.** How Does Future Income Affect Current Consumption? In: *The Quarterly Journal of Economics*. Vol. 109(1). 111–147.
- Cocco, J. F., F. J. Gomes and P. J. Maenhout. 2005.** Consumption and Portfolio Choice over the Life Cycle. In: *The Review of Financial Studies*. Vol. 18(2). 491–553.
- Crossley, T. F. and C. O'Dea. 2010.** The wealth and saving of UK families on the eve of the crisis. Institute for Fiscal Studies Report No. R71.
- Denizer, C., H. Wolf and Y. Ying. 2002.** Household Savings in Transition. *Journal of Comparative Economics* 30. 463–475.
- European Commission. 2012.** Fiscal Sustainability Report.
- Flavin, M. and T. Yamashita. 2002.** Owner-Occupied Housing and the Composition of the Household Portfolio. In: *The American Economic Review*. Vol. 91(1). pp. 345–362.
- Friedman, M. 1957.** *A Theory of the Consumption Function*. Princeton. Princeton University Press.
- Grosjean, P. 2011.** The Institutional Legacy of the Ottoman Empire: Islamic Rule and Financial Development in South Eastern Europe. *Journal of Comparative Economics* Vol. 39. 1–16.
- Hanousek, J. and Z. Tuma. 2002.** A Test of the Permanent Income Hypothesis on Czech Voucher Privatization. *Economics of Transition* 10(2). 235–254.
- Heckman, J. 1979.** Sample Selection Bias as a Specification Error. *Econometrica* 47. 153–61.

- Household Finance and Consumption Network (HFCN). 2009.** Survey Data on Household Finance and Consumption. Research Summary and Policy Use. ECB Occasional Paper No. 100. January 2009.
- Household Finance and Consumption Network (HFCN). 2013.** The Eurosystem Household Finance and Consumption Survey. Results from the First Wave. ECB Statistics Paper No. 2. April 2013.
- Iorgova, S. and L. Lian Ong. 2008.** The Capital Markets of Emerging Europe: Institutions, Instruments and Investors. IMF Working Paper 08/103.
- Jappelli, T. and L. Pistaferri. 2010.** The Consumption Response to Income Changes. In: Annual Review of Economics. Annual Reviews Vol. 2(1). 479–506.
- Kapteyn, A., R. Alessie and A. Lussardi. 2005.** Explaining the Wealth Holdings of Different Cohorts: Productivity Growth and Social Security. In: European Economic Review. Vol. 49(5). 1361–1391.
- Leszkiwicz-Kedzior, K. and W. Welfe. 2012.** Consumption Function for Poland. Is the Life Cycle Hypothesis Legitimate? *Kredit i Bank* Vol. 48(6). 6–15.
- Lusardi, A. and O. S. Mitchell. 2011.** Financial literacy around the world: an overview. *Journal of Pension Economics and Finance*. Vol. 10(4). 497–508.
- Mankiw, N. G. and S. P. Zeldes. 1991.** The consumption of stockholders and nonstockholders. In: *Journal of Financial Economics*. Vol. 29 (1). 97–112.
- Modigliani, F. 1986.** Life Cycle, Individual Thrift and the Wealth of Nations. In: *The American Economic Review*. Vol. 76(3). 297–313.
- Modigliani, F. and R. Brumberg. 1954.** Utility Analysis and the Consumption Function: An Interpretation of Cross-Sectional Data. In: *The Collected Papers of Franco Modigliani*. Cambridge, Massachusetts. The MIT Press. 2005.
- OeNB. 2011.** Financial Stability Report 22. Oesterreichische Nationalbank.
- Pistaferri, L. 2001.** Superior Information, Income Shocks and the Permanent Income Hypothesis. In: *Review of Economics and Statistics*. Vol. 83(3). 465–476.
- Revoltella, D. and F. Mucci. 2004.** Household Wealth in New Europe: Towards the EU. Conference Proceedings from the 65th Anniversary Conference of the Institute of Economics, Zagreb.
- Roche, H., S. Tompaidis and C. Yang. 2013.** Why Does Junior Put All His Eggs In One Basket? A Potential Explanation for Holding Concentrated Portfolios. In: *Journal of Financial Economics*.
- Scoufias, E. 2003.** Consumption Smoothing in Russia. Evidence from RLMS. *Economics of Transition* 11(1). 67–91.
- Stix, H. 2011.** Euroization: what factors drive its persistence? Household data evidence for Croatia, Slovenia and Slovakia. *Applied Economics*. Vol. 43(21). 2689–2784.
- Stix, H. 2013.** Why Do People Save in Cash? Distrust, Memories of Banking Crises, Weak Institutions and Dollarization. *Journal of Banking and Finance*. Forthcoming.
- Thaler, R. H. 1990.** Anomalies: Saving, Fungibility, and Mental Accounts. In: *The Journal of Economic Perspectives*. Vol. 4(1). 193–205.
- Xiao, J. J. 1996.** Effects of Family Income and Life Cycle Stages On Financial Asset Ownership. In: *Journal of Financial Counseling and Planning*. Vol. 7(1). 21–30.
- Zeldes, S. P. 1989.** Consumption and Liquidity Constraints: An Empirical Investigation. In: *Journal of Political Economy*. University of Chicago Press. Vol. 97(2). 305–346.

## Annex

Table A.1

## Data and Variable Description – Dependent Variables

| Label  | Description   |
|--|---|
|  | All variables are derived from the question presented in section 3. For all variables, "Don't know" or "No answer" responses are coded as missing. The coding does not take the importance at which the respondent ranks the respective saving instrument into account. |
| All savings                                      | Dummy variable that takes the value one for respondents who cite one of the possible saving instruments, zero for those answering "I have no savings."  |
| Interest savings                                 | Dummy variable that takes the value one for respondents who cite one of the possible saving instruments, zero for those answering "I have no savings" or for those who only name cash and/or current accounts.  |
| Cash   | Dummy variable that takes the value one for respondents who cite cash as one of their saving instruments, zero for those who have savings but do not cite cash.   |
| Current accounts                                 | Dummy variable that takes the value one for respondents who cite current accounts as one of their saving instruments, zero for those who have savings but do not cite current accounts.   |
| N instruments                                    | Categorical variable ranging from 1 to 7 according to the number of saving instruments the respondent reports. This variable includes the category "other," but does not include cash or current accounts.  |
| N instruments $\geq 2/\geq 2$ saving instruments | Dummy variable based on categorical variable above, coded as one if the respondent has two or more interest-bearing savings instruments.  |
| Deposits   | Dummy variable that takes the value one for respondents who cite savings deposits as one of their saving instruments, zero for those who have savings but do not cite savings deposits.   |
| Life insurance                                   | Dummy variable that takes the value one for respondents who cite life insurance policies as one of their saving instruments, zero for those who have savings but do not cite life insurance policies.   |
| Pension funds                                    | Dummy variable that takes the value one for respondents who cite pension funds as one of their saving instruments, zero for those who have savings but do not cite pension funds.   |
| Stocks   | Dummy variable that takes the value one for respondents who cite stocks as one of their saving instruments, zero for those who have savings but do not cite stocks.   |
| Mutual funds                                     | Dummy variable that takes the value one for respondents who cite mutual funds as one of their saving instruments, zero for those who have savings but do not cite mutual funds.   |
| Bonds  | Dummy variable that takes the value one for respondents who cite bonds as one of their saving instruments, zero for those who have savings but do not cite bonds.   |

Source: OeNB Euro Survey.

**Data and Variable Description – Explanatory Variables (in the order of the regression results)**

| Label   | Description   |
|---|---|
| Age, age squared                              | Age of respondent divided by 10, age squared of respondent.   |
| Female  | Dummy variable that takes the value one if the respondent is female.  |
| Size of household (one person, two persons)   | Dummy variables that take the value one if the respondents live in a single household or in a household with two people. Omitted category: household with three or more people.   |
| Children                                      | Number of children aged 6 years and younger or 7 to 15 years.   |
| Head of household                             | Dummy variable that takes the value one if the respondent is the head of the household (the main earner in the household).  |
| Income (high, medium, don't know / no answer) | Dummy variables that take the value one for each net household income tercile (high, medium, low). Sample values are used to construct terciles. For those respondents who did not give an answer, an additional dummy variable is defined (dk / na income). Omitted category: income low.                |
| Education                                     | Dummy variables; degree of education (university level, medium level, and basic education). Omitted category: education low.  |
| Employment                                    | Dummy variable coded as one if respondent belongs to selected occupational category. Omitted category: not working (retired, unemployed, students).   |
| Remembers high inflation                      | Dummy variable coded as one if the respondent agrees with the statement "I remember periods of high inflation during which the value of the local currency dropped sharply."  |
| Income in euro                                | Dummy variable; one if the respondent regularly receives income in euro.  |
| Remittances                                   | Derived from answers to the question "Do you personally or your partner receive any money from abroad? E.g. from family members living or working abroad, pension payments, etc.?" Dummy variable coded as one if answer is "yes, regularly" or "yes, infrequently," zero otherwise.                      |
| Risk averse                                   | Derived from answers to the statement that "in financial matters, I prefer safe investments over risky investments." Categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree").   |
| Bank perceived as far                         | Derived from answers to the statement "for me, it takes quite a long time to reach the nearest bank branch." Answers are "strongly agree" "agree" "somewhat agree" "somewhat disagree" "disagree" "strongly disagree." Categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree"). |
| Expected economic situation better            | Dummy variable coded as one if the respondent agrees with the statement "Over the next five years, the economic situation in my country will improve."  |
| Plan a loan                                   | Dummy variable coded as one if the respondent replies "yes" to the question "Do you plan to take out a loan over the next year?"  |
| Own house / car / second residence            | Dummy variables that take the value one if the household owns the house or apartment they live in, owns a car or a second residence, zero otherwise.  |
| Married                                       | Dummy variable that takes the value one if the respondent is married, zero otherwise. Data available for Albania, Bosnia and Herzegovina, FYR Macedonia, Bulgaria, Croatia, and Romania only.   |

Source: OeNB Euro Survey.

Table A.3

## Descriptive Statistics

|                                    | Min/Max | CZ               | HU               | PL               | BG              | RO               | AL               | BA               | HR              | MK               | RS               | Total            |
|------------------------------------|---------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|
| All savings                        | 0/1     | 0.92<br>(0.27)   | 0.55<br>(0.50)   | 0.64<br>(0.48)   | 0.41<br>(0.49)  | 0.48<br>(0.50)   | 0.78<br>(0.42)   | 0.47<br>(0.50)   | 0.63<br>(0.48)  | 0.81<br>(0.40)   | 0.56<br>(0.50)   | 0.62<br>(0.49)   |
| Interest savings                   | 0/1     | 0.56<br>(0.50)   | 0.38<br>(0.49)   | 0.35<br>(0.48)   | 0.19<br>(0.39)  | 0.17<br>(0.37)   | 0.28<br>(0.45)   | 0.12<br>(0.33)   | 0.31<br>(0.46)  | 0.32<br>(0.47)   | 0.16<br>(0.37)   | 0.28<br>(0.45)   |
| N instruments                      | 0/1     | 1.79<br>(1.00)   | 1.56<br>(0.78)   | 1.88<br>(1.45)   | 1.24<br>(0.57)  | 1.28<br>(0.63)   | 1.14<br>(0.39)   | 1.22<br>(0.62)   | 1.42<br>(0.69)  | 1.37<br>(0.85)   | 1.47<br>(0.77)   | 1.49<br>(0.91)   |
| N instruments ≥2                   | 0/1     | 0.50<br>(0.50)   | 0.41<br>(0.49)   | 0.44<br>(0.50)   | 0.18<br>(0.39)  | 0.21<br>(0.41)   | 0.12<br>(0.33)   | 0.16<br>(0.37)   | 0.32<br>(0.47)  | 0.25<br>(0.43)   | 0.34<br>(0.48)   | 0.32<br>(0.47)   |
| Cash                               | 0/1     | 0.86<br>(0.34)   | 0.33<br>(0.47)   | 0.48<br>(0.50)   | 0.29<br>(0.45)  | 0.30<br>(0.46)   | 0.69<br>(0.46)   | 0.37<br>(0.48)   | 0.51<br>(0.50)  | 0.56<br>(0.50)   | 0.31<br>(0.46)   | 0.46<br>(0.50)   |
| Current accounts                   | 0/1     | 0.79<br>(0.41)   | 0.16<br>(0.36)   | 0.29<br>(0.45)   | 0.15<br>(0.36)  | 0.10<br>(0.31)   | 0.12<br>(0.33)   | 0.19<br>(0.39)   | 0.22<br>(0.41)  | 0.44<br>(0.50)   | 0.26<br>(0.44)   | 0.26<br>(0.44)   |
| Deposits                           | 0/1     | 0.60<br>(0.49)   | 0.48<br>(0.50)   | 0.55<br>(0.50)   | 0.81<br>(0.39)  | 0.65<br>(0.48)   | 0.85<br>(0.36)   | 0.38<br>(0.49)   | 0.59<br>(0.49)  | 0.66<br>(0.47)   | 0.57<br>(0.50)   | 0.62<br>(0.49)   |
| Life insurance policy              | 0/1     | 0.45<br>(0.50)   | 0.57<br>(0.50)   | 0.59<br>(0.49)   | 0.14<br>(0.35)  | 0.27<br>(0.44)   | 0.13<br>(0.34)   | 0.32<br>(0.47)   | 0.43<br>(0.50)  | 0.21<br>(0.40)   | 0.32<br>(0.47)   | 0.37<br>(0.48)   |
| Pension funds                      | 0/1     | 0.46<br>(0.50)   | 0.37<br>(0.48)   | 0.25<br>(0.43)   | 0.16<br>(0.37)  | 0.16<br>(0.36)   | 0.04<br>(0.20)   | 0.09<br>(0.29)   | 0.14<br>(0.34)  | 0.17<br>(0.38)   | 0.07<br>(0.25)   | 0.22<br>(0.42)   |
| Stocks                             | 0/1     | 0.05<br>(0.22)   | 0.02<br>(0.15)   | 0.14<br>(0.35)   | 0.02<br>(0.15)  | 0.07<br>(0.25)   | 0.03<br>(0.16)   | 0.14<br>(0.34)   | 0.15<br>(0.36)  | 0.14<br>(0.35)   | 0.37<br>(0.48)   | 0.10<br>(0.30)   |
| Mutual funds                       | 0/1     | 0.09<br>(0.28)   | 0.05<br>(0.22)   | 0.12<br>(0.32)   | 0.00<br>(0.06)  | 0.01<br>(0.11)   | 0.04<br>(0.21)   | 0.06<br>(0.24)   | 0.05<br>(0.22)  | 0.09<br>(0.28)   | 0.03<br>(0.16)   | 0.06<br>(0.24)   |
| Bonds                              | 0/1     | 0.04<br>(0.19)   | 0.03<br>(0.17)   | 0.13<br>(0.34)   | 0.01<br>(0.08)  | 0.02<br>(0.14)   | 0.03<br>(0.18)   | 0.05<br>(0.22)   | 0.01<br>(0.08)  | 0.04<br>(0.21)   | 0.04<br>(0.20)   | 0.04<br>(0.20)   |
| Age /10                            | 1.9/9.7 | 4.63<br>(1.72)   | 4.83<br>(1.69)   | 4.06<br>(1.32)   | 4.33<br>(1.44)  | 4.71<br>(1.60)   | 3.92<br>(1.46)   | 4.51<br>(1.63)   | 4.32<br>(1.58)  | 4.65<br>(1.66)   | 4.49<br>(1.49)   | 4.44<br>(1.58)   |
| Age squared                        | 4/94    | 24.38<br>(17.15) | 26.17<br>(17.02) | 18.21<br>(10.90) | 20.8<br>(12.74) | 24.72<br>(15.57) | 17.51<br>(12.36) | 23.01<br>(15.43) | 21.2<br>(14.99) | 24.43<br>(16.26) | 22.41<br>(14.18) | 22.26<br>(14.99) |
| Female                             | 0/1     | 0.49<br>(0.50)   | 0.52<br>(0.50)   | 0.53<br>(0.50)   | 0.51<br>(0.50)  | 0.55<br>(0.50)   | 0.49<br>(0.50)   | 0.55<br>(0.50)   | 0.56<br>(0.50)  | 0.57<br>(0.50)   | 0.51<br>(0.50)   | 0.53<br>(0.50)   |
| One-person household               | 0/1     | 0.11<br>(0.32)   | 0.24<br>(0.43)   | 0.1<br>(0.30)    | 0.11<br>(0.32)  | 0.19<br>(0.39)   | 0.02<br>(0.15)   | 0.11<br>(0.31)   | 0.13<br>(0.34)  | 0.06<br>(0.24)   | 0.07<br>(0.26)   | 0.12<br>(0.32)   |
| Two-person household               | 0/1     | 0.35<br>(0.48)   | 0.32<br>(0.47)   | 0.31<br>(0.46)   | 0.3<br>(0.46)   | 0.37<br>(0.48)   | 0.12<br>(0.32)   | 0.24<br>(0.42)   | 0.25<br>(0.44)  | 0.16<br>(0.36)   | 0.18<br>(0.39)   | 0.26<br>(0.44)   |
| Children ≤6 years                  | 0/5     | 0.19<br>(0.47)   | 0.15<br>(0.47)   | 0.15<br>(0.40)   | 0.17<br>(0.45)  | 0.14<br>(0.41)   | 0.2<br>(0.48)    | 0.18<br>(0.47)   | 0.19<br>(0.49)  | 0.24<br>(0.56)   | 0.21<br>(0.49)   | 0.18<br>(0.47)   |
| Children ≤15 years                 | 0/6     | 0.35<br>(0.66)   | 0.24<br>(0.60)   | 0.28<br>(0.57)   | 0.28<br>(0.56)  | 0.22<br>(0.54)   | 0.36<br>(0.69)   | 0.3<br>(0.62)    | 0.27<br>(0.60)  | 0.45<br>(0.79)   | 0.39<br>(0.70)   | 0.31<br>(0.64)   |
| Household head                     | 0/1     | 0.59<br>(0.49)   | 0.65<br>(0.48)   | 0.52<br>(0.50)   | 0.59<br>(0.49)  | 0.64<br>(0.48)   | 0.48<br>(0.50)   | 0.58<br>(0.49)   | 0.51<br>(0.50)  | 0.54<br>(0.50)   | 0.51<br>(0.50)   | 0.56<br>(0.50)   |
| High income                        | 0/1     | 0.3<br>(0.46)    | 0.23<br>(0.42)   | 0.23<br>(0.42)   | 0.19<br>(0.39)  | 0.23<br>(0.42)   | 0.32<br>(0.47)   | 0.28<br>(0.45)   | 0.28<br>(0.45)  | 0.26<br>(0.44)   | 0.17<br>(0.38)   | 0.25<br>(0.43)   |
| Medium income                      | 0/1     | 0.32<br>(0.47)   | 0.23<br>(0.42)   | 0.29<br>(0.46)   | 0.26<br>(0.44)  | 0.23<br>(0.42)   | 0.31<br>(0.46)   | 0.28<br>(0.45)   | 0.26<br>(0.44)  | 0.26<br>(0.44)   | 0.22<br>(0.42)   | 0.27<br>(0.44)   |
| Don't know / no answer income      | 0/1     | 0.02<br>(0.16)   | 0.18<br>(0.39)   | 0.07<br>(0.26)   | 0.28<br>(0.45)  | 0.29<br>(0.46)   | 0.1<br>(0.31)    | 0.19<br>(0.39)   | 0.22<br>(0.42)  | 0.08<br>(0.28)   | 0.25<br>(0.43)   | 0.17<br>(0.38)   |
| Medium education                   | 0/1     | 0.86<br>(0.35)   | 0.59<br>(0.49)   | 0.68<br>(0.47)   | 0.67<br>(0.47)  | 0.54<br>(0.50)   | 0.6<br>(0.49)    | 0.7<br>(0.46)    | 0.75<br>(0.43)  | 0.55<br>(0.50)   | 0.61<br>(0.49)   | 0.65<br>(0.48)   |
| High education                     | 0/1     | 0.11<br>(0.31)   | 0.17<br>(0.37)   | 0.23<br>(0.42)   | 0.24<br>(0.43)  | 0.23<br>(0.42)   | 0.21<br>(0.41)   | 0.11<br>(0.32)   | 0.13<br>(0.34)  | 0.17<br>(0.37)   | 0.19<br>(0.39)   | 0.18<br>(0.39)   |
| Employed                           | 0/1     | 0.77<br>(0.42)   | 0.49<br>(0.50)   | 0.74<br>(0.44)   | 0.63<br>(0.48)  | 0.47<br>(0.50)   | 0.61<br>(0.49)   | 0.43<br>(0.49)   | 0.56<br>(0.50)  | 0.38<br>(0.48)   | 0.5<br>(0.50)    | 0.55<br>(0.50)   |
| Self-employed                      | 0/1     | 0.1<br>(0.29)    | 0.03<br>(0.18)   | 0.07<br>(0.26)   | 0.04<br>(0.19)  | 0.03<br>(0.18)   | 0.12<br>(0.32)   | 0.04<br>(0.19)   | 0.06<br>(0.24)  | 0.06<br>(0.24)   | 0.05<br>(0.22)   | 0.06<br>(0.24)   |
| Risk averse                        | 0/1     | 0.55<br>(0.50)   | 0.59<br>(0.49)   | 0.52<br>(0.50)   | 0.73<br>(0.44)  | 0.59<br>(0.49)   | 0.6<br>(0.49)    | 0.48<br>(0.50)   | 0.66<br>(0.47)  | 0.83<br>(0.38)   | 0.69<br>(0.46)   | 0.63<br>(0.48)   |
| Income in euro                     | 0/1     | 0.01<br>(0.08)   | 0.01<br>(0.10)   | 0.01<br>(0.10)   | 0.02<br>(0.14)  | 0.01<br>(0.12)   | 0.05<br>(0.22)   | 0.03<br>(0.17)   | 0.02<br>(0.15)  | 0.05<br>(0.22)   | 0.03<br>(0.16)   | 0.02<br>(0.16)   |
| Remittances                        | 0/1     | 0.03<br>(0.17)   | 0.02<br>(0.14)   | 0.03<br>(0.18)   | 0.05<br>(0.22)  | 0.07<br>(0.25)   | 0.22<br>(0.41)   | 0.12<br>(0.32)   | 0.06<br>(0.24)  | 0.12<br>(0.32)   | 0.08<br>(0.27)   | 0.08<br>(0.28)   |
| Bank perceived as far              | 1/6     | 3<br>(1.26)      | 2.19<br>(1.31)   | 2.52<br>(1.32)   | 2.49<br>(1.60)  | 3.05<br>(1.50)   | 2.95<br>(1.43)   | 3.19<br>(1.50)   | 2.71<br>(1.52)  | 3.16<br>(1.76)   | 2.82<br>(1.63)   | 2.8<br>(1.53)    |
| Expected economic situation better | 0/1     | 0.33<br>(0.47)   | 0.42<br>(0.49)   | 0.46<br>(0.50)   | 0.32<br>(0.47)  | 0.23<br>(0.42)   | 0.44<br>(0.50)   | 0.31<br>(0.46)   | 0.36<br>(0.48)  | 0.52<br>(0.50)   | 0.27<br>(0.44)   | 0.37<br>(0.48)   |
| Plan a loan                        | 0/1     | 0.14<br>(0.35)   | 0.04<br>(0.19)   | 0.13<br>(0.33)   | 0.06<br>(0.23)  | 0.04<br>(0.20)   | 0.1<br>(0.30)    | 0.1<br>(0.30)    | 0.07<br>(0.25)  | 0.12<br>(0.32)   | 0.12<br>(0.32)   | 0.09<br>(0.28)   |
| Own house                          | 0/1     | 0.67<br>(0.47)   | 0.86<br>(0.35)   | 0.59<br>(0.49)   | 0.89<br>(0.31)  | 0.76<br>(0.43)   | 0.93<br>(0.26)   | 0.95<br>(0.23)   | 0.79<br>(0.41)  | 0.94<br>(0.23)   | 0.87<br>(0.34)   | 0.79<br>(0.41)   |
| Own car                            | 0/1     | 0.75<br>(0.43)   | 0.49<br>(0.50)   | 0.7<br>(0.46)    | 0.66<br>(0.47)  | 0.36<br>(0.48)   | 0.41<br>(0.49)   | 0.58<br>(0.49)   | 0.86<br>(0.35)  | 0.61<br>(0.49)   | 0.59<br>(0.49)   | 0.55<br>(0.50)   |
| Own second residence               | 0/1     | 0.17<br>(0.38)   | 0.07<br>(0.25)   | 0.07<br>(0.26)   | 0.16<br>(0.37)  | 0.06<br>(0.24)   | 0.08<br>(0.27)   | 0.09<br>(0.29)   | 0.14<br>(0.35)  | 0.12<br>(0.32)   | 0.13<br>(0.34)   | 0.11<br>(0.31)   |
| Married                            | 0/1     |                  |                  |                  | 0.45<br>(0.50)  | 0.47<br>(0.50)   | 0.66<br>(0.47)   | 0.48<br>(0.50)   | 0.41<br>(0.49)  | 0.54<br>(0.50)   |                  |                  |

Source: OeNB Euro Survey.

Note: Descriptive statistics are the average value for the surveys in spring 2010, fall 2010, spring 2011 and fall 2011, except for "Own house," "Own car" and "Own second residence," where the data are from fall 2011 only. "Total" is the average across countries that is not weighted by size.

# Private Sector Debt in CESEE EU Member States

Mathias  
Lahnsteiner<sup>1</sup>

*The crisis has recalled that private sector indebtedness may constitute a core macrofinancial vulnerability. In some countries of Central, Eastern and Southeastern Europe (CESEE), risks stemming from indebtedness materialized in the form of markedly rising nonperforming loans during the crisis, following years of high credit growth. The inclusion of sector debt variables in the macroeconomic imbalances procedure – a new component in the toolbox of European economic governance – also shows the high relevance of this issue. We present systematic cross-country information about the indebtedness of the household and nonfinancial corporate sector in CESEE EU Member States and also compare this information with euro area figures. We scrutinize the fast buildup of debt prior to the financial crisis as well as the gradual adjustment that has taken place in some countries more recently. We focus on the developments of the debt stock in relation to disposable income and profitability, leverage ratios as well as the interest burden. In doing so, we are able to explore sectoral balance sheet vulnerabilities and put them into perspective.*

*JEL classification: E21, E43, E44, F34, G01*

*Keywords: CESEE, private sector, households, NFCs, debt, indebtedness, debt overhang, deleveraging, interest burden, leverage ratios, crisis*

## 1 Introduction and Literature Overview

The financial crisis has been a stark reminder that private sector indebtedness may constitute a core macrofinancial vulnerability.

Most observers welcomed financial deepening in Central, Eastern and South-eastern Europe (CESEE), as many papers highlighted a positive relationship between credit-to-GDP levels and economic development (for a literature overview, see e.g. Terrones and Mendoza, 2004, or Rajan and Zingales, 2001). Yet, in the years before the crisis, the sustainability of persistently high private sector lending growth in many CESEE countries had become one of the key topics of the economic policy debate. Against this background, empirical research addressed the question whether credit expansion or credit levels had become excessive in the CESEE countries (including Backé et al., 2007; Cottarelli et al., 2005; Égert et al., 2006, as well as Kiss et al., 2006).

After the global economy was hit by the shock emanating from the collapse of Lehman Brothers, the general focus shifted to the question if and how the accumulation of debt can amplify the impact of shocks. In fact, many papers found that a high level of debt and rapid lending growth are associated with deeper and protracted downturns once the boom ends. See for example Leigh et al. (2012), which also contains useful literature references, and Drehmann and Juselius (2012), who construct a debt service ratio and find that its level is associated with the loss of output in economic downturns.

A paper by Brown and Lane (2011) aims to identify debt overhangs in emerging Europe. The authors come to the conclusion that, in the household sector, only Estonia faced the threat of a debt overhang. In the nonfinancial corporate sector, debt overhangs are considered likely to have had an impact on firm activity in

<sup>1</sup> Oesterreichische Nationalbank, Foreign Research Division, [mathias.lahnsteiner@oenb.at](mailto:mathias.lahnsteiner@oenb.at). The author would like to thank Michael Andreasch, Peter Backé, Martin Feldkircher, Thomas Reiningger and Doris Ritzberger-Grünwald (all OeNB) for helpful comments and suggestions.

Latvia, Lithuania, Estonia and Slovenia. These results are slightly in contrast to the assessment of Herzberg (2010), who argued that all three Baltic countries appeared to be at risk of a debt overhang and that this risk could be more acute in the household than in the corporate sector due to limited financial assets. Furthermore, Fáykiss and Szigel (2012) point out that income and consumption of Hungarian households was negatively affected by balance sheet changes and through the net interest income channel during the crisis.

The ongoing debate on economic adjustment and rebalancing in CESEE attests to the relevance and timeliness of this paper's topic.<sup>2</sup> Many CESEE countries have gone through adjustment processes since the onset of the crisis, with adjustment in flow variables, in particular the current account, happening relatively quickly. However, the adjustment in stock variables, such as private sector debt, naturally proceeds more gradually.

Stock variables have also been at the center of the IMF's balance sheet approach (BSA, see Allen et al., 2002), an analytical framework for understanding crises in emerging markets based on an examination of stock variables in the aggregate balance sheet of a country and the balance sheets of its main sectors (assets and liabilities). In particular, this approach aims to identify maturity, currency and capital structure mismatches in the balance sheet of an economy's key sectors, such as the government, the financial sector and the nonfinancial private sector. In general, this analytical framework helps to pin down how balance sheet problems in one sector can spill over to other sectors. In Bakker et al. (2007) the BSA was applied to Southeastern European countries, the largest balance sheet mismatches being identified in the corporate sector.

Given the high relevance of private sector debt for the overall macroeconomic and macrofinancial stability of a country it is not surprising that private sector debt also features in the European Commission's macroeconomic imbalances procedure (MIP), a new component in the toolbox of European economic governance. The analytical part of the MIP relies on an alert system that uses a scoreboard of indicators that are benchmarked against threshold values (see European Commission, 2012a) as well as in-depth country studies. The scoreboard consists of ten indicators, two of which represent developments of credit to the private sector, i.e. private sector debt in percent of GDP with a threshold of 160%, and private sector credit flow in percent of GDP with a threshold of 15%. As this study examines developments of private sector debt stock, the former threshold is more relevant in the context of this study. It is worth noting that in an empirical analysis based on industrial countries Cecchetti et al. (2011) derive a 90% of GDP threshold for corporate debt and a threshold of 85% for household debt. These two thresholds would sum up to 175%, which is relatively close to the European Commission's threshold of 160%.

Currently, many Western European countries exceed the threshold defined for the private sector debt stock, in contrast to most CESEE countries. This observation is not surprising, as Western European countries are more advanced than CESEE countries and the credit-to-GDP ratio tends to rise with the level of economic development. According to the latest version of the MIP scoreboard (see

<sup>2</sup> For a summary of an OeNB event on this issue see Lahnsteiner and Wörz (2013).

European Commission, 2013) Hungary is the only CESEE country, out of 15 EU Member States, that exceeds the threshold for private sector debt. Yet, the crisis developments in nonperforming loans (see Barisitz, 2011, and Klein, 2013) provide evidence that in many CESEE countries risks stemming from private sector indebtedness have materialized in recent years. Thus, it is important to keep an eye on private sector debt developments even below the threshold, in particular in the case of catching-up economies.

Focusing on CESEE EU Member States (CESEE EU MS), this paper aims to enrich the discussion on how to assess private sector debt developments based on aggregated data. As the risks stemming from debt crucially depend on the distribution of debt within the economy, we are aware that analysis of macro-data can only deliver part of the complete picture. Yet, cross-country and intertemporal comparisons can help put balance sheet vulnerabilities in perspective and provide indications for debt overhangs.

Therefore, we will systematically present several debt<sup>3</sup>-related indicators in a cross-country perspective disaggregating between households and nonfinancial corporates (NFCs). We also use the respective indicators for the euro area as reference values while bearing in mind that three CESEE countries already participate in the common currency area. Moreover, it should be noted that within the euro area individual countries saw quite divergent trends regarding private sector indebtedness. Furthermore, comparability is certainly limited precisely because of the correlation between credit-to-GDP ratio and the level of economic development. Therefore, we would like to point out that the euro area debt level does not constitute some kind of target or equilibrium level. However, if for instance the indebtedness of the household or the NFC sector in a CESEE country comes close to the euro area figure it might be regarded as an indication of over-indebtedness.

We will scrutinize the fast buildup of debt prior to the financial crisis and highlight the gradual adjustment or deleveraging process by households and NFCs after the onset of the crisis. As Fáykiss and Szigel (2011) stress, it is also a worthwhile exercise to look at developments of interest payable on debt, as consumption and investment might be affected by the interest income channel. We also present debt-to-financial assets ratios and figures on net financial wealth. As noted by Herzberg (2010) with regard to households in the Baltic states, risks associated with debt might be higher in CESEE than in wealthier euro area countries as financial assets are at lower levels.

The paper is structured as follows: Based on selected indicators derived from the financial and nonfinancial European sector accounts<sup>4</sup>, section 2 examines developments in household debt, while section 3 focuses on NFCs. Finally, section 4 summarizes and concludes.

<sup>3</sup> In this paper we define debt as the sum of loans and securities other than shares.

<sup>4</sup> European sector accounts group together institutional sectors, such as households, nonfinancial corporations, financial corporations and the government. These data are compiled in a close cooperation between Eurostat, the European Central Bank (ECB), the national statistical institutes and the national central banks in the European Union. For an introduction to the European sector accounts see [http://epp.eurostat.ec.europa.eu/portal/page/portal/sector\\_accounts/introduction](http://epp.eurostat.ec.europa.eu/portal/page/portal/sector_accounts/introduction). ECB and Eurostat (2007) provide an overview of quarterly euro area and European Union accounts for institutional sectors. Leythienne and Smokova (2009) and Leetmaa et al. (2009) compare various indicators derived from the national accounts between EU countries and the U.S.A. Furthermore, ECB (2011) examines developments of euro area accounts during the crisis.

## 2 Household Debt

A commonly used indicator for comparing household sector<sup>5</sup> debt across time and across countries is household debt as a percentage of gross disposable income (GDI, see for example DeBelle, 2004, Herzberg, 2010, and ECB, 2011). In all CESEE countries, the household debt-to-GDI ratio had risen quickly – albeit at heterogeneous pace – before the financial and economic crisis increasingly spilled over to CESEE in late 2008 (see chart 1). However, only in Estonia the household debt-to-GDI ratio reached levels that are close to the euro area figure. With a debt-to-GDI-ratio of 60% to 70%, Latvia and Hungary also show relatively high ratios.

The track record of CESEE countries in adopting macroprudential policy measures before and during the crisis has been fairly diverse, partly because of differences in the dynamics of credit growth and partly because of different perceptions about the effectiveness of such measures. For more detailed information on this issue see Vandenbussche et al. (2012), who construct a dataset on macroprudential policy measures in CESEE.

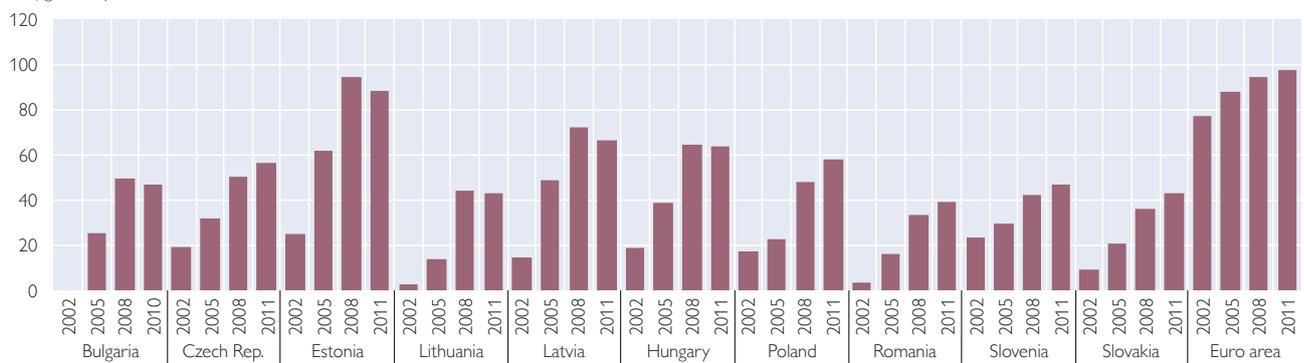
Though in some other CESEE countries household debt-to-GDI ratios do not appear particularly high when compared to the euro area, household indebtedness represents a vulnerability due to its structure in terms of income, currency and type of credit.

The high share of foreign currency-denominated loans in the household sector in some CESEE economies is an intensively discussed phenomenon. When the crisis hit CESEE, more than half of the total household sector loan volume was denominated in foreign currency in Latvia (87%, end-2008), Hungary (67%), Lithuania (62%) and Romania (59%). In other countries, foreign currency loans were also an important funding source, whereas in the Czech Republic this instrument was practically nonexistent in the household sector. For details on this

Chart 1

### Household Debt

% of gross disposable income



Source: Eurostat.

Note: Based on consolidated data.

<sup>5</sup> The household sector includes households and nonprofit institutions serving households.

issue we refer to Zettelmeyer et al. (2010), Steiner (2011) as well as to Beckman et al. (2011), who examine micro-data based on the OeNB's Euro Survey<sup>6</sup>.

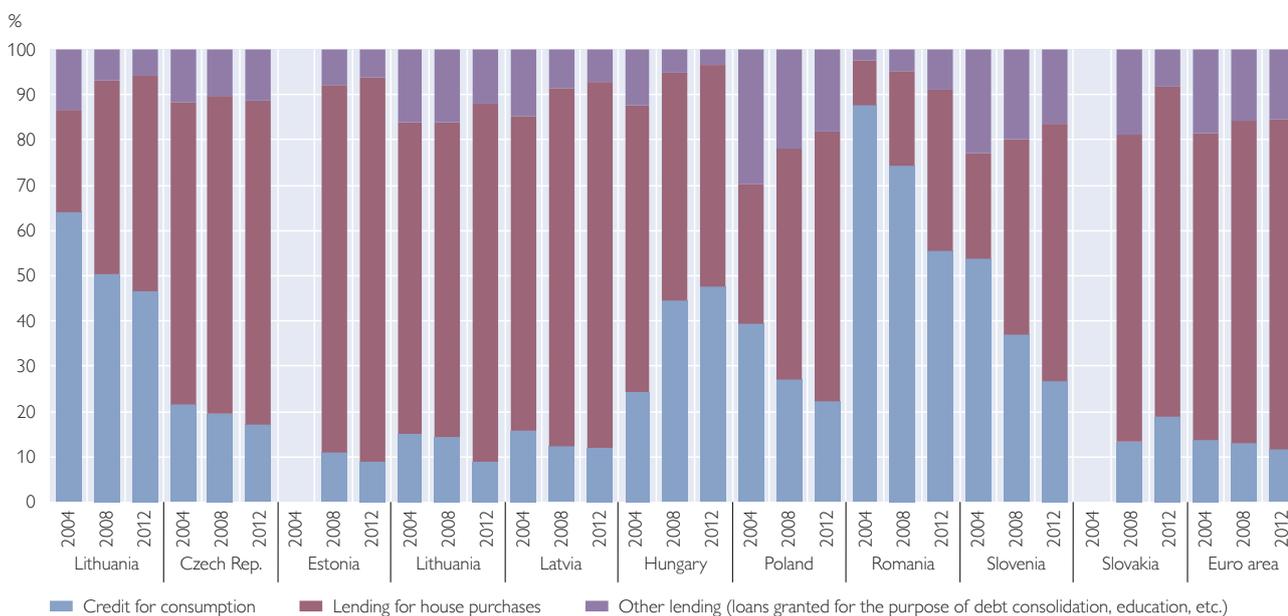
A less debated characteristic of the structure of loans in CESEE is the share of credit for consumption in total loans – which is considerable in some countries, also compared to the euro area (see chart 2). The share of credit for consumption has been particularly high in Romania and Bulgaria and to a lesser extent in Slovenia, though it has been steadily declining in these countries, as lending for house purchases became more and more widespread. In Hungary, credit for consumption grew at a faster speed than lending for house purchases before the crisis and also reached a comparatively high share.

A deeper analysis of the distribution of debt across individual households or household groups would require more disaggregated data. For a detailed discussion of household indebtedness and its structure by income groups in Romania see National Bank of Romania (2012).

It is worth noting that households in Bulgaria, Estonia, Lithuania, Latvia and Hungary reduced their debt-to-GDI ratio between 2008 and 2011. Yet, the decline in the ratio appears quite small compared to the steep increase in the three years preceding 2008.<sup>7</sup> Chart 3 visualizes the time dynamics in greater detail by making

Chart 2

### Composition by Type of Loan



Source: ECB.

<sup>6</sup> [http://www.oenb.at/en/geldp\\_volksw/zentral\\_osteuropa/Eurosurvey/the\\_euro\\_in\\_central\\_eastern\\_and\\_southeastern\\_europe.jsp](http://www.oenb.at/en/geldp_volksw/zentral_osteuropa/Eurosurvey/the_euro_in_central_eastern_and_southeastern_europe.jsp).

<sup>7</sup> De Haas et al. (2012) show that subsidiaries of parent banks that participated in the Vienna Initiative – and thus committed to keeping their exposure stable – were significantly more stable sources of credit than subsidiaries of banks that did not. Available disaggregated private and government sector data suggest that CESEE banks largely shifted their portfolios from the private to the government sector. Thus, the direct impact of the Vienna Initiative on the adjustment of private sector debt stock in the countries concerned (Latvia, Hungary, Romania) might have been limited.

use of quarterly data from the beginning of 2005 up to the third quarter of 2012, taking the third quarter of 2008 (collapse of Lehman Brothers) as the reference point in time. Unfortunately, gross disposable income is only available on a quarterly basis in three CESEE countries (Czech Republic, Poland and Romania), which is why we simply calculate the household debt-to-GDP ratio.

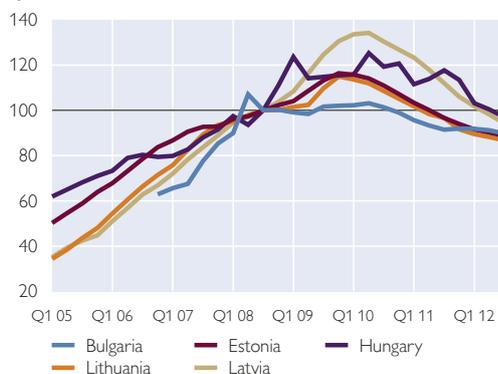
The left-hand panel in chart 3 shows the countries (5 out of 10 CESEE EU Member States) in which the household debt-to-GDP ratio has already fallen below the level seen in the third quarter of 2008 again. This correction may suggest some overshooting in indebtedness levels in the run-up to the crisis. While Brown and Lane (2011) detected signs of a debt overhang only in Estonia's household sector, data that have since become available seem to provide some evidence of household sector debt overhangs in some other countries as well. In fact, three out of these five countries, i.e. Estonia, Latvia and Hungary, recorded the highest household debt-to-GDI levels (above 60%, see chart 1) when the financial crisis hit. Tightening lending standards amid increasing economic uncertainty might also explain part of the development. After the shock emanating from the collapse of Lehman Brothers, the household debt-to-GDP ratio continued to rise in the five analyzed countries, with the exception of Bulgaria, and reached a turning point only in late 2009/early 2010. The time lag to the beginning of the adjustment is mainly attributable to falling GDP levels. Also Romania and Slovenia show a turning point in their household debt-to-GDP ratio, but the adjustment has not led back to 2008 Q3 levels so far. In contrast to the Baltic countries and Bulgaria, which have a fixed exchange rate regime, the adjustment in the debt level in Romania was postponed due to the effect of a weakening exchange rate on foreign currency-denominated debt. In Hungary, administrative measures (early repayment scheme for foreign currency mortgages at favorable exchange rates, see Magyar Nemzeti Bank, 2011, and Magyar Nemzeti Bank, 2012) pushed the household debt level down. In the Czech Republic, Slovakia and Poland, the household debt-to-

Chart 3

### Household Debt-to-GDP Ratio

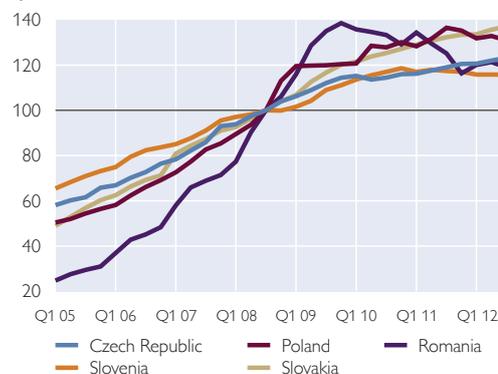
#### CESEE Countries Below the Q3 08 Level

Q3 08=100



#### CESEE Countries Above the Q3 08 Level

Q3 08=100



Source: ECB, Eurostat, NCBs, OeNB.

Note: Debt based on ECB nonconsolidated data. As the relevant data are not available for Latvia and Romania, domestic banking sector claims on households were used instead for these two countries.

GDP ratio continued its rising trend, partly reflecting a better overall macroeconomic performance after the collapse of Lehman.

Though only one country reached household debt-to-GDI ratios close to the euro area figure, CESEE EU MS feature relatively high debt-to-financial assets ratios (see table 1). In fact, only three countries stood below the euro area figure at end-2011. Moreover, CESEE household sectors hardly caught up in terms of financial wealth (see table 1). As regards the CESEE average, net financial assets as a percentage of GDP make up less than half of the corresponding euro area figure on average. However, the informative value of these indicators is limited when it comes to assessing vulnerabilities, as the ratio of financial assets to financial liabilities (or debt) might show a strong variation across individual households. Yet, for Slovakia and Slovenia results from the Eurosystem Household Finance and Consumption Survey<sup>8</sup> show that 26.8% and 44.9% of households, respectively, are indebted (euro area: 43.7%), while in both countries more than 90% hold financial assets. Moreover, nonfinancial assets are not available in the framework of integrated accounts and therefore cannot be taken into account in this study, which is a considerable shortcoming particularly in the light of a considerable share of mortgage loans and the fact that some CESEE economies experienced residential housing price booms in the run-up to the crisis (see Hildebrandt et al., 2012, and Huynh-Olesen et al., 2013). The Household Finance and Consumption Survey shows the following picture regarding the composition of assets for Slovakia and Slovenia: Real assets amount to 91.7% of total assets in Slovakia and 94.4% in Slovenia (euro area: 83.2%), while financial assets make up only 8.3% and 5.6%, respectively (euro area: 16.8%).

The extent to which debtors are strained by their indebtedness is also reflected by the interest burden. In this respect, attention has to be paid to the fact that within the framework of the European sector accounts, interest payments and

Table 1

### Debt-to-Financial Assets Ratio and Financial Wealth

|                | Debt-to-financial assets ratio |      |      |      | Net financial assets |       |       |       |
|----------------|--------------------------------|------|------|------|----------------------|-------|-------|-------|
|                | 2002                           | 2005 | 2008 | 2011 | 2002                 | 2005  | 2008  | 2011  |
|                | %                              |      |      |      | % of GDP             |       |       |       |
| Bulgaria       | 7.6                            | 22.5 | 30.4 | 23.8 | 49.5                 | 50.1  | 53.0  | 74.7  |
| Czech Republic | 12.8                           | 20.7 | 31.0 | 31.5 | 70.4                 | 62.3  | 56.3  | 64.7  |
| Estonia        | 21.6                           | 32.0 | 45.4 | 44.7 | 48.2                 | 56.1  | 53.4  | 49.6  |
| Hungary        | 14.8                           | 26.4 | 38.2 | 37.8 | 62.3                 | 62.2  | 56.2  | 59.0  |
| Latvia         | 20.3                           | 45.7 | 93.3 | 69.9 | 34.3                 | 35.5  | 1.0   | 14.9  |
| Lithuania      | 4.5                            | 15.8 | 41.9 | 37.1 | 38.9                 | 44.4  | 30.8  | 47.4  |
| Poland         | 22.4                           | 19.4 | 41.3 | 43.9 | 40.6                 | 62.2  | 42.2  | 45.6  |
| Slovakia       | 10.5                           | 26.0 | 39.0 | 40.3 | 40.0                 | 30.8  | 30.2  | 37.8  |
| Slovenia       | 17.9                           | 19.4 | 27.1 | 29.2 | 66.7                 | 74.5  | 65.5  | 70.0  |
| Romania        | 6.3                            | 17.6 | 25.8 | 32.9 | 32.9                 | 42.1  | 54.1  | 38.6  |
| Euro area      | 28.1                           | 28.8 | 33.3 | 32.6 | 126.8                | 139.4 | 120.0 | 127.7 |

Source: Eurostat.

Note: Based on consolidated data.

<sup>8</sup> [http://www.ecb.europa.eu/home/html/researcher\\_hfcn.en.html](http://www.ecb.europa.eu/home/html/researcher_hfcn.en.html).

receipts are reported after the allocation of financial intermediation services indirectly measured (FISIM).<sup>9</sup> The idea behind this concept is that financial intermediaries provide services for which they do not explicitly charge fees and commissions, but generate income through the interest rate margin. Hence, interest paid by borrowers to financial intermediaries is reduced by the estimated value of the charges payable, and interest receivable by depositors is similarly increased. In turn, part of households' interest payments is treated as consumption. In the context of this study, it is more relevant to look at total interest payments, i.e. interest payments and receipts before FISIM allocation, as these figures better reflect the actual interest burden of borrowers.

Therefore, we present gross interest payments before FISIM as a percentage of GDI (see table 2). The fact that for example Hungarian households are net interest payers before FISIM allocation and net interest receivers after FISIM allocation illustrates the relevance of this issue. The example of Bulgaria also shows that FISIM can be sizeable. In 2010, gross interest payments before FISIM allocation amounted to 4% of GDI, while gross interest payments after FISIM allocation only made up 0.7% of GDI. When looking at net interest payments the differences are even more pronounced, as not only interest payments are reduced, but also interest receivables are increased by the FISIM allocation procedure.

Looking at developments over time in greater detail, it can be observed that, along with rising debt levels, the interest burden increased until 2008 in most countries. From 2008 to 2011, the interest burden declined in some CESEE countries (Estonia, Latvia, Lithuania and Slovenia). However, in some other countries (Czech Republic, Hungary, Slovakia) the interest burden continued to increase despite slowing or even stalling credit growth. In general, the development of the interest burden is influenced by various factors: the level of debt, the structure of

Table 2

### Interest Burden of Households

|                       | Gross interest payments before FISIM |      |      |      | Net interest payments before FISIM |      |      |      |
|-----------------------|--------------------------------------|------|------|------|------------------------------------|------|------|------|
|                       | 2002                                 | 2005 | 2008 | 2011 | 2002                               | 2005 | 2008 | 2011 |
|                       | % of gross disposable income         |      |      |      |                                    |      |      |      |
| Bulgaria <sup>1</sup> | ..                                   | 2.5  | 4.3  | 4.7  | ..                                 | 1.8  | 2.9  | 1.7  |
| Czech Republic        | 2.1                                  | 1.9  | 2.3  | 3.2  | 0.5                                | 0.9  | 1.3  | 2.2  |
| Estonia               | 2.1                                  | 2.5  | 10.9 | 3.7  | 1.6                                | 2.1  | 5.0  | 2.5  |
| Hungary               | 2.4                                  | 3.8  | 4.9  | 5.3  | -1.0                               | 0.3  | 0.6  | 2.1  |
| Latvia                | 0.9                                  | 2.0  | 4.3  | 2.7  | 0.3                                | 1.3  | 3.1  | 2.2  |
| Lithuania             | 0.6                                  | 0.6  | 1.5  | 2.0  | -0.4                               | 0.2  | 1.1  | 0.9  |
| Poland                | 2.2                                  | 1.7  | 3.0  | 3.1  | -1.3                               | -0.3 | 2.1  | 1.5  |
| Slovakia              | 0.7                                  | 1.5  | 3.1  | 3.3  | -1.7                               | 0.9  | 2.1  | 2.5  |
| Slovenia              | ..                                   | ..   | ..   | ..   | ..                                 | ..   | ..   | ..   |
| Romania <sup>1</sup>  | 1.2                                  | 0.7  | 1.0  | ..   | -2.7                               | -1.5 | -2.9 | ..   |
| Euro area             | 4.4                                  | 4.2  | 5.1  | 4.0  | 0.2                                | 0.8  | 0.7  | 1.2  |

Source: Eurostat.

<sup>1</sup> 2010 instead of 2011 data.

Note: In this table the euro area values do not include Greece and Malta due to data unavailability.

<sup>9</sup> Thanks for fruitful discussions on this issue to Gabor Szigel, Magyar Nemzeti Bank (MNB).

debt (fixed versus floating interest rate), the development of domestic and foreign policy rates as well as by the exchange rate. Fáykiss and Szigel (2012) show that interest payable increased as a result of the strong growth of credit in the pre-crisis years, which was then further aggravated by the impact of the depreciation of the forint (via the increase in interest payable on foreign currency loans). In Bulgaria and Hungary, gross interest payments of households as a percentage of GDI exceeded the ratio in the euro area in recent years despite a considerably lower debt stock. In Estonia, gross interest payments as a percentage of GDI peaked at more than 10% in 2008 before declining to slightly below the euro area figure thereafter.

While gross interest payments remained below the euro area figure in most CESEE countries, net interest payments show a less favorable picture for most CESEE household sectors. Households in Lithuania, Hungary, Poland, Slovenia and Slovakia turned from net interest receivers to net interest payers over the observation period. The interest balance tended to deteriorate in CESEE as well as in the euro area, in particular from the early 2000s until 2008. Then, household sectors in several countries (Bulgaria, Estonia, Lithuania, Latvia and Poland) showed improvements in their position. In most countries the household sector's net interest burden relative to GDI was above the euro area figure in 2011. According to the data provided by Eurostat, Romanian households maintained a net receiver position. However, in this case data quality is questionable as the impact of the FISIM correction appears to go into the wrong direction (interest payments are higher or remain unchanged after FISIM correction, while interest receipts are lower after FISIM allocation)<sup>10</sup>.

### 3 Debt of Nonfinancial Corporates (NFCs)

When analyzing financial accounts data of NFCs, the consolidation issue has to be carefully considered. In contrast to the household sector there are non-negligible stocks of intra-sector assets and liabilities in the NFC sector. The scoreboard indicator within the framework of the MIP is based on nonconsolidated data. The European Commission argues that only nonconsolidated data are available for all EU Member States and at quarterly frequency and that nonconsolidated data give information on each sector's total debt (also including for example bonds that are held within the sector).

However, the major drawback is that nonconsolidated data also include intra-company loans. As the European Commission highlights, nonconsolidated data may be biased due to national and multinational accounting practices. In countries where each unit of a company group reports its credit/debit, the nonconsolidated data would probably show higher figures than in Member States where headquarters report on total group consolidated debt (see European Commission, 2012a). The inclusion of intra-company loans is also questionable from another angle: Within the framework of balance of payments and international investment position statistics, cross-border intra-company loans are recorded as FDI. Correspondingly, external debt figures are usually available including and excluding intra-company loans. This methodological separation is built on the argumentation line that intra-company lending has different implications for risk and vulnerability compared with debt between unrelated

<sup>10</sup> Eurostat is aware of this data problem and is working on a solution.

parties (see IMF, 2009). Moreover, the compilation of data on intra-sector asset and liability holdings is afflicted with inaccuracies, as these data are usually derived from balance sheet data and have to be extrapolated.

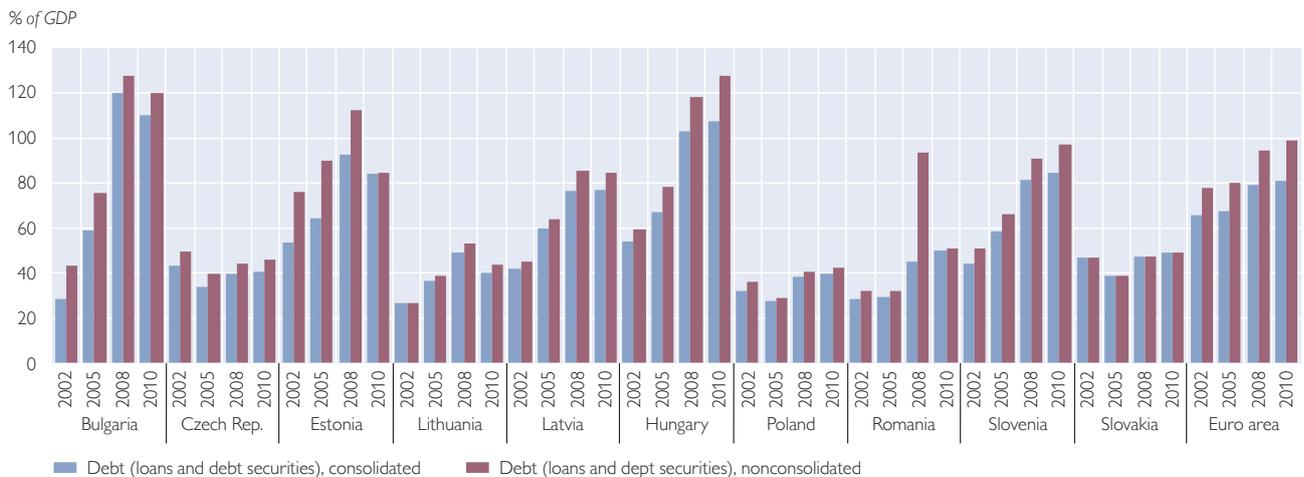
Data on CESEE countries show considerable variation in the differences between consolidated and nonconsolidated debt of NFCs, both across countries and over time (see chart 4). While for Slovakia Eurostat reports identical data on consolidated and nonconsolidated debt,<sup>11</sup> the difference is sizeable in other countries. From 2002 to 2011, the difference between the consolidated and nonconsolidated figure averaged 20% of GDP in Estonia and Romania. In Romania, the largest variation over time can be observed. The difference between these two statistics increased from 3% of GDP in 2005 to 49% of GDP in 2007 and stayed at this level for three years before dropping to 1% in 2010. According to information received from the National Bank of Romania (NBR) this development was due to certain items within short-term liabilities that had been treated as intra-sector debt from 2007 to 2009. With more detailed information on NFCs' balance sheets becoming available at the request of the NBR these items were reclassified as trade credits and advances. In Estonia, the difference also declined rapidly from 2008 until 2011. Such sharp fluctuations hamper the interpretability of nonconsolidated data over time and across countries.

As, all in all, consolidated data appear to be more meaningful and are available for all CESEE EU Member States, we prefer to show them (where available), i.e. yearly data, and additionally present quarterly unconsolidated data.

While there are considerable differences regarding the domestic intra-sector holding of debt, there is also a large variation with respect to the importance of the domestic banking sector as a financing source. In fact, financing provided by entities other than domestic banks (including domestic nonbank financial institutions, direct cross-border credit provided by foreign banks and cross-border

Chart 4

### NFCs' Debt Financing: Consolidated and Nonconsolidated Data



Source: Eurostat

<sup>11</sup> Eurostat is aware of this data problem and is working on a solution.

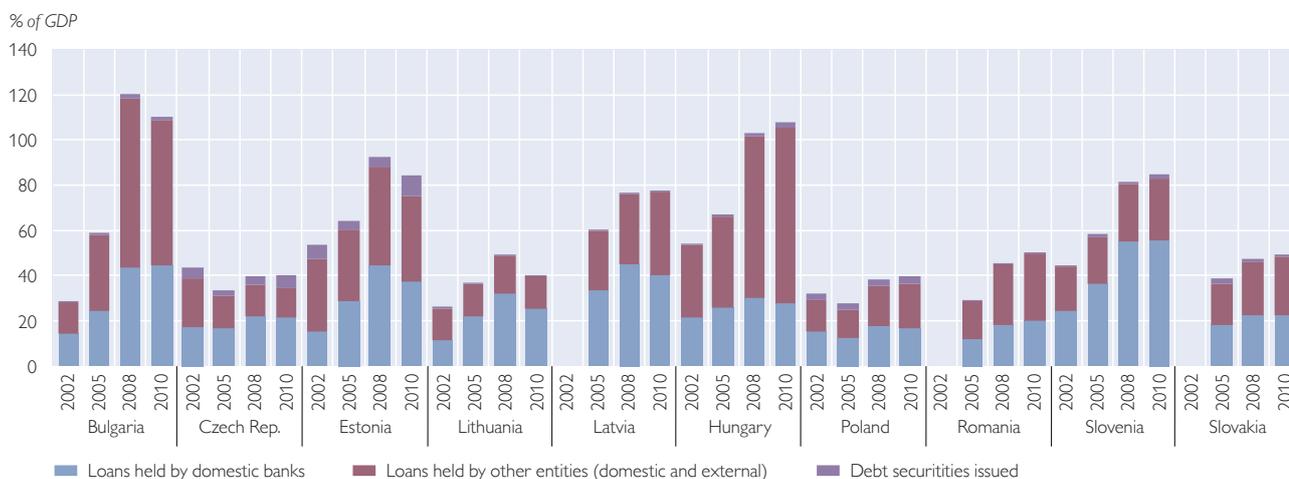
intercompany loans) plays an important role in a number of countries (see chart 5). While it is possible to match financial accounts data with aggregated balance sheet data of domestic banks at the level of NFCs, external debt data only provide information at the level other sectors, which includes NFCs, nonbank financial institutions and households. Therefore, data availability does not allow us to split up “loans held by other entities” in chart 5 into loans held by domestic nonbank financial institutions and external creditors.

Still, it is noteworthy that in the period of strong domestic bank credit growth (up to 2008), loans granted by domestic nonbank and external borrowers increased at a similar speed as domestic bank credit (Latvia, Romania, Slovakia) or even faster (Bulgaria, Hungary, Poland). The high share of loans that are not held by the domestic banking sector is certainly relevant for empirical studies that align private sector debt levels – usually based on domestic bank credit data – with macro-economic fundamentals. As chart 5 shows the share of loans held by other entities even exceeded the share of domestic bank loans in some countries at the end of our observation period (Bulgaria, Estonia, Hungary, Poland, Romania and Slovakia). A large part of NFC loans held by other entities takes the form of cross-border intercompany loans, which belong to FDI. While we cannot provide exact figures for NFCs due to data limitations already mentioned in the previous paragraph, external debt statistics at the level of other sectors (NFCs, households and nonbank financial institutions) give an impression of the relevance of this component. Cross-border intercompany loans have been a particularly important financing source in Bulgaria (56% of other sectors’ external debt at end-2012), Lithuania (54%), Hungary (62%) and Slovakia (60%). Corporate bond markets do not play a very important role in CESEE, as debt securities have been a relatively scarcely used financing instrument in this region.

In contrast to household debt, NFCs’ debt stock rose above the euro area figure in a number of countries (Bulgaria, Estonia, Hungary and Slovenia) when

Chart 5

### NFCs’ Debt by Instrument and Loans by Creditor



Source: Eurostat.

Note: Based on consolidated data.

Chart 6

## NFC Debt-to-GDP Ratio

### CESEE Countries Below the Q3 08 Level



### CESEE Countries Above the Q3 08 Level



Source: ECB, Eurostat, OeNB.

Note: Debt based on nonconsolidated ECB data. Data not available for Romania.

measured against the economies' GDP. At the same time, debt remained well below the euro area figure in the Czech Republic, Lithuania, Poland, Romania and Slovakia. It is noteworthy that over a longer time horizon debt dynamics differ strongly across CESEE countries (e.g. in the Czech Republic the NFC debt-to-GDP ratio fell from 60% in 1996 to 40% in 2011, while in Latvia it increased from 10% to 77%). Looking in more detail at the developments over recent years, it turns out that the debt-to-GDP ratio fell below the level seen in the third quarter of 2008 only in the three Baltic countries (see chart 6). In most other countries the rising trend in the NFC debt-to-GDP ratio came to a halt.

While in the case of households, disposable income is a widely used denominator for comparing debt levels across countries, the nonfinancial accounts offer several indicators which can serve as a measure of profitability or, in a broader sense, debt-servicing capacity of the NFC sector. In a typical economy, the largest share of gross value added originates in the NFC sector. However, most value added created by NFCs is passed on to households in the form of wages, salaries and employers' social contributions. Hence, gross value added does not reflect profitability. For NFCs, disposable income broadly equals their gross saving, which is broadly equivalent to retained earnings plus depreciation allowances in business accounting. This indicator appears too narrow, as corporates distribute dividends – money that could also be spent on debt servicing – and pay profit taxes. For our purpose, the entrepreneurial income account – which is a sub-account of the primary income account – seems most suitable. It corresponds to operating surplus and mixed income plus property income received, minus interest and (land) rents paid. Corporate taxes and dividends distributed to other sectors and retained earnings on foreign direct investment of nonresidents are included in this item.

Table 3 shows that the picture changes markedly depending on which denominator is chosen. If we consider debt as a percentage of gross value added and rank countries accordingly, Slovenia is on the third place after Bulgaria and Hungary, only slightly above the debt level in the euro area. However, if debt is measured against gross entrepreneurial income, Slovenia's NFC sector appears highly indebted in a cross-country comparison. In Bulgaria and Hungary this ratio is higher than in the euro area as well. For an in-depth analysis of the indebtedness of NFCs in Slovenia see European Commission (2012b).

Leverage indicators also provide important information on NFCs' indebtedness (see table 4). If debt is measured against NFCs' financial assets, it turns out that

Table 3

### NFCs' Debt Level

|                       | Debt                   |       |       |       |                                   |       |       |       |
|-----------------------|------------------------|-------|-------|-------|-----------------------------------|-------|-------|-------|
|                       | 2002                   | 2005  | 2008  | 2011  | 2002                              | 2005  | 2008  | 2011  |
|                       | % of gross value added |       |       |       | % of gross entrepreneurial income |       |       |       |
| Bulgaria <sup>1</sup> | ..                     | 129.4 | 234.2 | 239.9 | ..                                | 252.5 | 476.9 | 480.0 |
| Czech Republic        | 78.7                   | 60.0  | 68.3  | 71.8  | 174.7                             | 123.6 | 132.7 | 157.3 |
| Estonia               | 89.2                   | 102.2 | 147.4 | 136.4 | 192.8                             | 209.8 | 365.0 | 311.1 |
| Hungary               | 113.3                  | 138.3 | 202.6 | 206.2 | 280.6                             | 335.4 | 394.4 | 386.5 |
| Latvia                | 70.9                   | 100.7 | 128.2 | 126.8 | 124.1                             | 190.2 | 304.4 | 247.7 |
| Lithuania             | 48.4                   | 60.4  | 80.7  | 62.7  | 89.2                              | 113.5 | 162.4 | 107.0 |
| Poland                | 83.5                   | 67.5  | 91.0  | 90.3  | 253.2                             | 153.9 | 215.3 | 188.7 |
| Slovakia              | 102.1                  | 85.1  | 98.2  | 103.9 | 228.9                             | 166.5 | 173.8 | 191.4 |
| Slovenia              | 90.4                   | 115.8 | 156.3 | 171.0 | 316.0                             | 387.8 | 490.2 | 576.1 |
| Romania               | 56.7                   | 58.4  | 84.7  | 91.3  | 124.1                             | 123.8 | 187.0 | 174.0 |
| Euro area             | 127.6                  | 132.5 | 153.3 | 157.7 | 309.7                             | 296.6 | 351.8 | 357.5 |

Source: Eurostat.

<sup>1</sup> 2010 instead of 2011 data.

Note: Based on consolidated data.

Table 4

### NFCs' Leverage Ratios

|                | Debt-to-financial assets ratio |       |       |       | Debt-to-equity ratio |       |       |       |
|----------------|--------------------------------|-------|-------|-------|----------------------|-------|-------|-------|
|                | 2002                           | 2005  | 2008  | 2011  | 2002                 | 2005  | 2008  | 2011  |
|                | %                              |       |       |       |                      |       |       |       |
| Bulgaria       | 109.7                          | 146.5 | 190.9 | 158.4 | 53.4                 | 75.9  | 136.2 | 92.4  |
| Czech Republic | 86.3                           | 78.4  | 86.8  | 83.1  | 48.4                 | 39.7  | 52.6  | 50.7  |
| Estonia        | 123.5                          | 124.3 | 121.7 | 108.9 | 63.3                 | 50.9  | 72.9  | 65.1  |
| Hungary        | 53.6                           | 54.4  | 50.7  | 48.2  | 40.0                 | 42.8  | 51.9  | 50.1  |
| Latvia         | 171.9                          | 168.4 | 150.2 | 188.8 | 84.4                 | 116.3 | 191.7 | 158.8 |
| Lithuania      | 151.0                          | 120.2 | 147.8 | 102.1 | 43.9                 | 51.2  | 71.4  | 65.2  |
| Poland         | 127.5                          | 102.9 | 115.7 | 107.5 | 87.5                 | 41.4  | 61.0  | 65.4  |
| Slovakia       | 45.5                           | 41.4  | 57.5  | 52.7  | 62.6                 | 45.9  | 67.6  | 63.6  |
| Slovenia       | 102.2                          | 115.4 | 159.6 | 157.0 | 62.7                 | 83.2  | 137.0 | 131.9 |
| Romania        | 159.4                          | 118.9 | 190.1 | 162.0 | 51.2                 | 44.4  | 76.8  | 69.1  |
| Euro area      | 81.5                           | 70.8  | 81.5  | 76.6  | 83.0                 | 65.9  | 88.1  | 84.7  |

Source: Eurostat.

Note: Based on consolidated data.

this ratio is higher than in the euro area in every CESEE country except Hungary and Slovakia. Bulgaria, Latvia, Romania and Slovenia are the countries that show the highest debt-to-financial assets ratio in the NFC sector.

An alternative leverage indicator consists of taking debt in relation to equity. As regards debt-to-equity ratio, Bulgaria and Slovenia again are among the countries with relatively unfavorable levels of indebtedness in the NFC sector. Latvia records the worst debt-to-equity ratio in CESEE. The developments of the debt-to-equity ratio in these three countries may point to a possible buildup of capital structure mismatches. In the other countries the debt-to-equity ratio remained below the euro area average.

Transaction data show that equity was heavily affected by crisis-related valuation effects in 2008 in a few countries (in particular in Bulgaria and Romania), while these effects were much smaller in the case of financial assets, which mainly consist of deposits. As debt was still on the rise and negative valuation effects were only partially compensated by capital injections, the debt-to-equity ratio worsened from 2007 to 2008 in all countries except Lithuania. The deterioration was most pronounced in Bulgaria (from 74.6% in 2007 to 136.2% in 2008) and Romania (from 88% to 137%) and was also remarkable in Latvia (from 162.9% to 191.7%).

Finally, we take a closer look at dynamics in NFCs' interest payment obligations (see table 5). In many countries, gross interest payment as a percentage of gross entrepreneurial income (GEI) rose markedly from the early 2000s until 2008 and has declined since then. In contrast, the NFC sectors in Poland and the Czech Republic saw their gross interest payments-to-GEI ratio decline during the period of relatively strong credit growth before 2008. In recent years, this interest payable-to-GEI ratio has surpassed the euro area figure in Bulgaria, Estonia, Hungary and Slovenia, and in certain years it also did so in Latvia.

If we deduct interest receipts, the picture does not change markedly. Nevertheless, the picture looks slightly less challenging in the case of Hungary and Slovenia.

Table 5

### NFCs' Interest Burden

|                       | Gross interest payments before FISIM |      |      |      | Net interest payments before FISIM |      |      |      |
|-----------------------|--------------------------------------|------|------|------|------------------------------------|------|------|------|
|                       | 2002                                 | 2005 | 2008 | 2011 | 2002                               | 2005 | 2008 | 2011 |
|                       | % of gross entrepreneurial income    |      |      |      |                                    |      |      |      |
| Bulgaria <sup>1</sup> | ..                                   | 13.2 | 27.8 | 25.6 | ..                                 | 11.2 | 22.7 | 19.0 |
| Czech Republic        | 13.3                                 | 11.3 | 10.3 | 11.2 | 10.6                               | 6.7  | 5.8  | 7.7  |
| Estonia               | 11.5                                 | 9.4  | 23.2 | 20.1 | 8.7                                | 7.9  | 10.3 | 15.6 |
| Hungary               | 15.6                                 | 16.5 | 25.4 | 19.4 | 8.1                                | 9.3  | 10.8 | 8.7  |
| Latvia                | 7.0                                  | 8.9  | 22.6 | 11.6 | 5.0                                | 5.3  | 15.0 | 7.0  |
| Lithuania             | 5.5                                  | 4.3  | 9.8  | 3.5  | 5.4                                | 4.1  | 8.1  | 2.4  |
| Poland                | 23.9                                 | 13.2 | 12.0 | 10.3 | 18.2                               | 9.1  | 7.7  | 5.8  |
| Slovakia              | 13.5                                 | 6.2  | 11.3 | 7.3  | 10.0                               | 4.6  | 7.7  | 5.4  |
| Slovenia              | ..                                   | ..   | ..   | ..   | ..                                 | ..   | ..   | ..   |
| Romania               | 5.4                                  | 2.3  | 13.0 | ..   | 7.5                                | 4.4  | 4.8  | ..   |
| Euro area             | 19.6                                 | 15.9 | 22.5 | 15.6 | 10.6                               | 8.5  | 12.0 | 8.8  |

Source: Eurostat.

<sup>1</sup> 2010 instead of 2011 data.

Note: In this table the euro area values do not include Greece and Malta due to data unavailability.

To sum up, there are several countries (Bulgaria, Estonia, Latvia, Hungary and Slovenia) that show relatively elevated aggregate debt dynamics in the NFC sector, both with regard to the rapid buildup of debt and interest payment obligations as well as in comparison to the euro area.

#### 4 Concluding Remarks

The purpose of this paper was to analyze trends in private sector indebtedness in CESEE EU MS from a cross-country perspective. Eurostat and ECB financial and nonfinancial sector accounts served as our main data source. We focused on developments of the debt stock in relation to disposable income and profitability, leverage ratios as well as the interest burden.

A natural starting point is the European Commission's scoreboard indicator on the private sector debt stock, which refers to total nonconsolidated private sector indebtedness (households and NFCs) as a percentage of the total economy's GDP. Though many CESEE economies have experienced sharp increases in nonperforming loans in recent years, private sector debt slightly exceeds the threshold value of 160% of GDP only in Hungary.

This paper compared debt levels to sector-specific indicators that better reflect the sector's debt servicing capacity than GDP of the total economy. For the household sector a widely used indicator is gross (or net) disposable income. For NFCs, we argue that gross entrepreneurial income is the most suitable reference point in this respect. While the financial and nonfinancial accounts offer a lot of valuable information, attention has to be paid to some specifics. First, we present gross and net interest payments before FISIM (financial intermediation services indirectly measured) allocation because these figures represent the actual interest burden the household and NFC sectors have to carry. Second, as regards the NFC sector, the paper discussed advantages and disadvantages of consolidated and nonconsolidated data and we perceive consolidated data to be more meaningful than non-consolidated data.

Looking in greater detail at developments over time, we highlighted that the household debt-to-GDI ratio rose quickly before 2008 and has only retreated slightly since then in most CESEE countries. In Estonia, household debt has reached levels close to the euro area figure, while in some other countries the difference to the euro area is still considerable. In half of the CESEE economies covered in this study a notable adjustment has taken place during the last few years, with household debt in relation to GDP falling again below the level recorded in the third quarter of 2008. While generally low in comparison to the euro area, household debt in CESEE is accompanied by a much smaller volume of financial assets than in the euro area. As regards real assets, information is only available from the Eurosystem Household Finance and Consumption Survey for Slovakia and Slovenia. In these two countries, real assets of households make up more than 90% of total assets. A more detailed analysis of debt-to-assets ratios based on micro-data could certainly deliver important insights.

Moreover, despite a lower debt stock, interest payments (in gross and in net terms) reached levels that are close to or even above the euro area figure. When taking into account debt-to-GDI and (gross and net) interest payments-to-GDI ratios, household sectors in Estonia and Hungary appear more exposed than households in the other CESEE EU MS. Moreover, the high share of foreign

currency loans represents a source of vulnerability in many CESEE EU MS. As regards the structure of debt broken down by type of loan, it is noteworthy that the share of credit for consumption is comparatively high in Bulgaria, Romania, Hungary and Slovenia. A more detailed assessment would, of course, also have to take into account the distribution of debt broken down by income groups, which would require more disaggregated data.

Similar to the household sector, NFCs' debt stock also witnessed a strong increase up to 2008. In contrast to the household sector, however, debt of the NFC sector has already reached or exceeded the euro area figure in several CESEE EU MS (Bulgaria, Estonia, Hungary and Slovenia). A large part of NFC debt is held by domestic nonbanks and external creditors, which testifies to the close real and financial integration of NFC sectors in CESEE EU MS with those in other EU Member States. When measured as a percentage of gross entrepreneurial income, indebtedness of the Slovenian NFC sector stands out as elevated, both in comparison to other CESEE countries as well as compared to the euro area. Debt-to-financial assets ratios are higher in most CESEE EU MS than in the euro area. The debt-to-equity ratio has worsened in most CESEE countries' NFC sectors. In Latvia, Slovenia and Bulgaria this ratio markedly exceeds the euro area figure. In the other countries the debt-to-equity ratio has remained below the ratio for the euro area. Moreover, interest payments (in gross and net terms) surpassed the euro area figure in several countries.

In sum, available data provide valuable insights into private sector debt dynamics and related vulnerabilities. We showed that it is worth looking at indebtedness at the sector level (households and NFCs separately), as some countries are characterized by comparatively high indebtedness in only one sector (see for example Estonia's household sector and Slovenia's NFC sector). While some adjustment has been seen in recent years, fragilities remain in a number of countries. Thus, it is important to monitor and analyze private sector debt dynamics on a regular basis.

Looking forward, a more preemptive stance on a renewed buildup of debt levels in the household and the NFC sector than practiced in the years before the financial crisis is warranted. For that purpose, it will be important for policymakers to foster sound lending policies (including the avoidance of foreign currency lending to unhedged borrowers) and, relatedly, to avoid overly fast credit growth. Measures by home-country supervisors, for instance aligning credit growth of subsidiaries that have relatively high loan-to-deposit ratios with their deposit growth (local stable funding), as set out for instance in the Austrian sustainability package<sup>12</sup>, can contribute to this latter end along with macroprudential measures by host countries that aim at keeping a lid on overly fast (and potentially unsustainable) increases in sectoral leverage. In this respect, good communication and coordination between both home and host authorities is key to providing sufficient financing to the nonbank private sector in order to promote the catching-up process while at the same time avoiding boom-bust developments in the future.

<sup>12</sup> For details please refer to: [http://www.oenb.at/en/presse\\_pub/aussendungen/2012/2012q1/pa\\_aufsicht\\_nachhaltigkeitspaket\\_fuer\\_oesterreichs\\_banken\\_246091\\_page.jsp](http://www.oenb.at/en/presse_pub/aussendungen/2012/2012q1/pa_aufsicht_nachhaltigkeitspaket_fuer_oesterreichs_banken_246091_page.jsp).

## References

- Allen, M., C. Keller, C. Rosenberg, N. Roubini and B. Setser. 2002.** A Balance Sheet Approach to Financial Crisis. IMF Working Paper WP/02/210.
- Bawcké, P., B. Égert and Z. Walko. 2007.** Credit Growth in Central and Eastern Europe Revisited. In: Focus on European Economic Integration Q2/07. 69–77.
- Bakker, B., C. Duenwald, A. M. Maechler, P. Sorsa and A. Tiffin. 2007.** Vulnerabilities in Emerging Southeastern Europe – How Much Cause for a Concern? IMF Working Paper WP/07/236.
- Barisitz, S. 2011.** Nonperforming Loans in CESEE – What Do They Comprise? In: Focus on European Economic Integration Q4/11. 46–68.
- Beckmann, E., T. Scheiber and H. Stix. 2011.** How the Crisis Affected Foreign Currency Borrowing in CESEE: Microeconomic Evidence and Policy Implications. In: Focus on European Economic Integration Q1/11. 25–43.
- Cecchetti, S. G., M. S. Mohanty and F. Zampoli. 2011.** The Real Effects of Debt. BIS Working Paper No. 352.
- Cottarelli, C., G. Dell’Ariccia and I. Vladkova-Hollar. 2005.** Early Birds, Late Risers and Sleeping Beauties: Bank Credit Growth to the Private Sector in Central and Eastern Europe and in the Balkans. In: Journal of Banking & Finance 29(1). 83–104.
- Debelle, G. 2004.** Macroeconomic Implications of Rising Household Debt. BIS Working Paper No. 153.
- Drehmann, M. and M. Juselius. 2012.** Do Debt Service Costs Affect Macroeconomic and Financial Stability? In: BIS Quarterly Review, September 2012. Basel: BIS. 21–35.
- ECB. 2011.** The Financial Crisis in the Light of the Euro Area Accounts: A Flow-Of-Funds Perspective. In: ECB Monthly Bulletin October 2011. Frankfurt: ECB. 99–120.
- ECB and Eurostat. 2007.** Quarterly Euro Area and European Union Accounts For Institutional Sectors (European Sector Accounts).
- Égert, B., P. Backé and T. Zumer. 2006.** Private Credit in Central and Eastern Europe: New (Over)Shooting Stars? ECB Working Paper 687.
- European Commission. 2012a.** Scoreboard for the surveillance of macroeconomic imbalances: technical explanations on the scoreboard. Occasional Paper 92.
- European Commission. 2012b.** Macroeconomic Imbalances – Slovenia. European Economy. Occasional Paper 109.
- European Commission. 2013.** Alert Mechanism Report 2013. Brussels: European Commission.
- Fáykiss, P. and G. Szigel. 2012.** The Effect of Indebtedness on the Financial and Income Position of Hungarian Households. In: MNB Bulletin February 2012. Budapest: MNB. 27–42.
- Leigh, D., D. Ignaz, J. Simon and P. Topalova. 2012.** Dealing With Household Debt. In: International Monetary Fund. World Economic Outlook, Chapter 3. Washington D.C. April. 89–124.
- Kiss, G., M. Nagy and B. Vonnák. 2006.** Credit Growth in Central and Eastern Europe: Trend, Cycle or Boom? MNB Working Paper Series 2006/10. Budapest: MNB.
- Herzberg, V. 2010.** Assessing the Risk of Private Sector Debt Overhang in the Baltic Countries. IMF Working Paper WP/10/250.
- Hildebrandt, A., R. Martin, K. Steiner and K. Wagner. 2012.** Residential Property Markets in CESEE EU Member States. In: Focus on European Economic Integration Q1/12. 8–30.
- Huynh-Olesen, Duy T., K. Steiner, A. Hildebrandt and K. Wagner. 2013.** Residential Property Prices in Central, Eastern and Southeastern European Countries: The Role of Fundamentals and Transition-Specific Factors. In: Focus on European Economic Integration Q2/13. 52–76.

- IMF. 2009.** Balance of Payments and International Investment Position Manual. Sixth Edition (BPM6). Washington.
- Klein, N. 2013.** Non-Performing Loans in CESEE: Determinants and Impact on Macroeconomic Performance. IMF Working Paper WP/13/72.
- Lahnsteiner, M. and J. Wörz. 2013.** 72nd East Jour Fixe: External Imbalances and Adjustment to the Crisis in CESEE. In: Focus on European Economic Integration Q1/13. 97–101.
- Leetma, P., H. Rennie and B. Thiry. 2009.** Household Saving Rate Higher in the EU than in the USA Despite Lower Income. Statistics in Focus 29/2009. Eurostat.
- Leythienne, D. and T. Smokova. 2009.** Business Profit Share and Investment Rate Higher in the EU than in the USA. Statistics in Focus 28/2009. Eurostat.
- Magyar Nemzeti Bank. 2011.** Report on Financial Stability. November 2011. Budapest.
- Magyar Nemzeti Bank. 2012.** Report on Financial Stability. November 2012. Budapest.
- National Bank of Romania. 2012.** Financial Stability Report 2012. Bucharest.
- Rajan, R. G. and L. Zingales. 2001.** Financial Systems, Industrial Structures, and Growth. In: Oxford Review of Economic Policy 17(4). 467–482.
- Steiner, K. 2011.** Foreign Currency Loan Exposure of Households in CESEE EU Member States and Croatia. In: Focus on European Economic Integration Q 1/11. 6–24.
- Terrones, M. and E. Mendoza. 2004.** Are Credit Booms in Emerging Markets a Concern? In: International Monetary Fund. World Economic Outlook, Chapter IV. Washington D.C. April. 147–166.
- Zettelmeyer, J., P. Nagy and S. Jeffrey. 2010.** Addressing private sector currency mismatches in emerging Europe. In: EBRD Working Paper No. 115.

# Determinants of Nonperforming Loans in Central, Eastern and Southeastern Europe

Petr Jakubík,  
Thomas Reininger<sup>1</sup>

*Credit risk assessment is a crucial part of macroprudential analysis, with the aggregate nonperforming loan (NPL) ratio serving as a proxy for the economy-wide probability of default of the banking sector's overall loan exposure. Therefore, the factors driving the NPL ratio deserve a lot of interest. This study provides a macroeconomic model for nonperforming loans (NPLs) for the Central, Eastern and Southeastern European (CESEE) countries. It is based on panel data for Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Russia, Slovakia and Ukraine. In line with current literature, our empirical analysis confirms that economic growth is the main driver that is negatively correlated with NPL development. This inverse relation is also indicated by the stock index as a leading indicator for economic developments. However, there are also other important determinants that can help explain the change in NPL ratios in the CESEE countries: past credit growth as well as exchange rate changes coupled with the share of foreign currency loans in total loans. This study confirms and quantifies risks of excessive credit growth as well as foreign exchange lending.*

*JEL classification: G28, G32, G33, G38*

*Keywords: Nonperforming loans, credit risk, financial stability, macroprudential framework, Central, Eastern and Southeastern Europe (CESEE), emerging Europe*

Credit risk assessment and, in particular, nonperforming loan (NPL) projection are a crucial part of macro-stress tests. These tests are based on macroeconomic assumptions in order to provide common scenarios for all financial institutions participating in such an exercise. However, due to limited data availability, short time series and structural breaks, especially in emerging markets, it is challenging to estimate a robust model for any single country. It is therefore useful to provide an estimate based on panel data from emerging Europe to be used as a benchmark for countries in this region.

Credit risk is one key risk for financial stability in Central, Eastern and Southeastern Europe (CESEE), where banks apply the traditional business model based on accepting deposits and granting loans. Although the recent financial crisis had its origin in advanced economies, average bank asset quality in CESEE deteriorated sharply when the subsequent economic crisis hit the global economy. Many research studies empirically confirm that credit quality is tightly linked to the economic cycle. However, there is some disagreement as to the importance of other factors driving credit quality.

In this study, we focus on some specifics of the CESEE region that could determine the key drivers of NPL development. This study follows research conducted by Beck, Jakubík and PiloIU (2013), who empirically investigated the key drivers of NPL development for a global panel covering 75 countries by using annual NPL data. Unlike the above study, we employ quarterly data and a more detailed dataset covering some aspects that were not available to Beck et al. (2013).

<sup>1</sup> *European Insurance and Occupational Pensions Authority (EIOPA) and Institute of Economic Studies of Charles University in Prague, petr.jakubik@eiopa.europa.eu; Oesterreichische Nationalbank (OeNB), Foreign Research Division, thomas.reininger@oenb.at. The views expressed in this paper are exclusively those of the authors and do not necessarily reflect those of the EIOPA, the OeNB or the Eurosystem. The authors would like to thank Peter Backé, Jarka Urvova, Tomáš Slačik and Zoltan Walko (all OeNB) for helpful comments and valuable support and Susanne Steinacher and Jennifer Gredler (both OeNB) for concise language advice. Moreover, we would like to thank two anonymous referees for their insightful comments and much appreciated suggestions.*

This paper is structured as follows: Section 1 provides a review of related studies on determinants of bank asset quality and credit risk. Section 2 presents a comprehensive description of the employed dataset and discusses NPL development in CESEE. Section 3 focuses on the econometric methodology which is applied for quantifying the relationship between nonperforming loans (NPLs) and macroeconomic and financial indicators. On this basis, we present the estimation results of an econometric model which quantifies this relationship. Section 4 summarizes the obtained results by drawing some conclusions with regard to policy implications. The last section concludes.

## 1 Related Studies

The literature on determinants of bank asset quality or credit risk comprises various approaches. Here, we focus on literature directly relevant for the present paper, following three main criteria.

First, we cover papers that have the same regional focus, namely CESEE. Second, our coverage extends to papers that follow a macro-approach by using macroeconomic variables as determinants for economy-wide aggregate NPLs. Third, our focus is on papers that apply a similar econometric framework as our paper, at least in as far as they apply panel techniques as well.

To our best knowledge, no study has been published so far that meets all three criteria. So, we see the present study as the first to use a macro-based approach to estimate economy-wide aggregate NPL ratios for a set of CESEE countries by applying a panel technique. There are, however, many CESEE-related studies on bank asset quality and credit risk. For a large set of CESEE countries, Barisitz (2011, 2013) compares the national definitions and concepts of NPLs in detail and provides suggestions for aligning the statistical methodologies that measure NPLs.

Available CESEE-related studies on the macro-determinants of changes in the economy-wide aggregate NPL ratio of the banking sector are country-specific. For Croatia, Erjavec, Cota and Jakšić (2012) set up a vector-autoregressive (VAR) model with macro-variables (real economic activity in Croatia and in the EU, inflation and short-term interest rates) and variables of the aggregate banking sector (return on equity (RoE), NPL ratio) and employ Uhlig's sign restriction approach. The VAR model is based on quarterly data for the period from Q2 2000 to Q2 2010. The above-mentioned authors find a strong sensitivity of the Croatian banking sector to contractionary monetary policy shocks and to negative demand shocks. For the Baltic countries, Fainstein and Novikov (2011) published a comparative analysis of credit risk determinants in the banking sector, applying a separate vector-error-correction model (VECM) for each of these three countries, based on quarterly data for the period from (depending on the country) Q3 1997/Q1 2002/Q1 2004 to Q4 2009. In addition to the unemployment rate, real GDP growth and banks' aggregated loan growth, the authors introduce the growth rate of the real estate market as explanatory variable. Their results show real GDP growth as the most significant determinant of NPL growth in all three countries and that real estate market growth plays an important role in two of these countries (Latvia and Lithuania). For Albania, Mancka (2012) estimates the impact of the exchange rate (in relation to the euro and to the U.S. dollar) and of a dummy variable for the world financial crisis on aggregate credit risk (measured by the NPL ratio) for the period from 2002 to 2010 on the basis of quarterly data. Both

the exchange rates of the national currency and the dummy variable proved to have significant influence on NPLs.

Beyond the CESEE region, several studies estimate aggregate NPL ratios under a macro-based approach for a large set of countries (that may or may not include CESEE countries) by application of panel techniques.

In their paper on macroprudential stress testing of credit risk, Buncic and Melecky (2012) incorporate estimates of NPL elasticities by dynamic panel data regression (unbalanced panel, Arellano-Bond GMM estimator) on the basis of annual data for 54 high- and middle-income countries in the period from 1994 to 2004. Explanatory variables are the NPL ratio, real GDP growth, CPI inflation, the (ex post) real interest rate and the change in the nominal U.S. dollar exchange rate for each country, while a vector of control variables comprises the log of GDP per capita, the credit-to-GDP ratio and the share of foreign currency loans in total loans. Buncic and Melecky find the exchange rate changes and the control variables to be not statistically significant.

For 26 advanced economies in the period from 1998 to 2009, Nkusu (2011) investigates the macroeconomic determinants of the NPL ratio and of the first difference of the NPL ratio in various panel regressions on the basis of annual data that include the lagged dependent variable. The results confirm that adverse macroeconomic developments, in particular a contraction of real GDP, a higher unemployment rate, higher interest rates, a fall in house prices and a fall in equity prices, are associated with rising NPLs. In a second step, the feedback between NPLs and macroeconomic variables is estimated in a panel vector autoregressive (PVAR) model.

For 25 emerging market economies in the period from 1996 to 2010, De Bock and Demyanets (2012) estimate various panel regressions on the basis of annual data that include the lagged dependent variable and unobserved country effects. Real GDP contraction, currency depreciation against the U.S. dollar, weaker terms of trade and outflows of debt-creating capital (portfolio debt and bank loans) lead to a higher aggregate NPL ratio of the banking sector. The sharp deterioration of loan quality following a reversal of portfolio inflows is particularly noteworthy. The (first lagged) increase in the private credit-to-GDP ratio has no significant impact in the whole sample but is significant with a negative sign in the 2004 to 2010 subsample. In a second step, feedback effects from the financial sector on the wider economy are found to be significant according to a PVAR model with fixed effects, in which GDP growth falls in the wake of shocks that drive NPLs higher or generate a contraction in credit.

For 75 advanced and emerging economies in the period from 2000 to 2010, Beck, Jakubík and Piloiu (2013) estimate fixed-effects and dynamic panel regressions on the basis of annual data for the change in the aggregate NPL ratio. Real GDP growth, share prices, the nominal effective exchange rate of the local currency and the bank lending interest rate are found to significantly affect changes in the NPL ratio. In the case of exchange rates, the direction of the effect depends on the extent of foreign exchange lending to unhedged borrowers. In the case of share prices, the impact is found to be larger in countries which have a large stock market relative to GDP.

## 2 Data, Stylized Facts and Hypotheses

In contrast to the study by Beck et al. (2013), we focus only on CESEE and have a richer data sample with quarterly frequency. Hence, we are able to better capture some specific effects for emerging Europe that cannot be fully revealed with a global data sample at annual frequency.

Our study covers the following nine CESEE countries: Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Russia, Slovakia and Ukraine. We include these countries for two main reasons: First, for these countries we can rely upon studies that investigate the applicability of the corresponding national data on NPLs and credit classifications (Barisitz, 2011 and 2013, see below). However, we could not include all the ten countries covered by Barisitz, as we had to exclude Serbia due to problems with data availability related to the explanatory variables. Second, these nine countries together account for a very large part of Austrian banks' credit exposure to the CESEE region.

For NPLs, i.e. the *dependent variable* to be explained, there is, so far, no internationally harmonized definition that has been applied in all or most countries of the world for a considerable period of time. Rather, efforts toward harmonizing NPL definitions have been getting steam only in recent years in the wake of the financial and economic crisis. For the time being, one can resort only to national NPL data established by the national supervisory authorities on the basis of their respective national definitions. However, we use the results of the detailed investigations performed by Barisitz (2011 and 2013) in an effort to minimize the methodological differences reflected in the data. Barisitz looked at both primary elements ("90days+" and/or "well-defined weaknesses") and secondary elements (treatment of replacement loans, impact of collateral and/or guarantees, share of loans classified as NPLs, downgrade requirement) in the CESEE countries' NPL definitions in order to derive NPL ratios that are based on roughly internationally comparable definitions in a transparent and replicable manner. Hence, we use the time series of NPL ratios as suggested by Barisitz (2011 and 2013), built as the country-specific sums of various components of the credit volume classified according to the respective national definitions. From our point of view, this enhances the added value of this empirical study.

Moreover, these level data that were derived by Barisitz on a best-effort basis, form the starting point of the ensuing transformation, as we aim at explaining the relative change in the share of NPLs in total loans, i.e. the percentage change (as opposed to the change in percentage points). Therefore, any remaining methodological differences inherent in the level data are of lesser importance, as we follow the development of each national NPL time series in its own right.

Turning to *possible explanatory variables*, we take into account both the stylized facts of NPL developments in CESEE sketched out above and the body of literature in which econometrical models typically explain NPL ratios by including variables for economic activity, aggregate credit and some additional variables.

As regards real economic activity, we look at real GDP as well as at the two main components of final demand, namely real exports and real domestic demand. Obviously, we hypothesize a negative relation between real GDP growth and a change in the NPL ratio. Moreover, we expect this to be true also for both main demand components.

As real economic activity in each CESEE country is heavily influenced by the international environment, we include the Chicago Board Options Exchange (CBOE) Market Volatility Index (VIX), a popular measure of the implied volatility of Standard and Poor's (S&P) 500 index options, the emerging market bond index global (EMBIG) and the national stock indices as proxies for the risk attitude among international financial investors and for the international environment and thus as leading indicators for the financial and economic developments in the CESEE countries.

Regarding the credit aggregate, we look at domestic bank credit to the private sector, including both households and nonfinancial corporations. We highlight, however, that this credit aggregate includes loans denominated in foreign currency or indexed to the exchange rate. Therefore, as we would like to avoid having the development of this credit aggregate blurred by purely statistical effects of exchange rate changes, we used this credit aggregate after adjustment for valuation changes resulting from exchange rate changes. The drawback of this approach was the fact that we had to shorten our sample to the period from 2004 to 2012. At the same time, however, this had the advantages that we avoided the statistical breaks in the NPL series at the end of the 1990s and early 2000s and that we ended up with a nearly balanced panel. We use the credit aggregate relative to GDP as explanatory variable in the model. An increase in the credit-to-GDP ratio via higher credit growth than GDP growth may indicate a sound, sustainable process of financial deepening on the one hand, but it may also result from excessive loan growth as part of a boom-bust cycle on the other hand.

We hypothesize a two-fold relation between developments in the credit-to-GDP ratio and the NPL ratio. First, in the short run, we expect a denominator effect that has a negative sign. Second, in the medium to long run, we expect a credit cycle effect with the opposite sign. We expect episodes of high credit growth, which are often coupled with low lending standards, to raise the share of NPLs only with a considerable time lag, as the distinction between borrowers evolves over time and the probability of default in the course of a credit's entire life cycle is higher than the probability of default just in the first payment period.

In several CESEE countries the share of foreign currency loans (loans denominated in foreign currency or linked to the exchange rate) in total loans is sizeable; there is an indirect credit risk as borrowers are exposed to higher debt servicing costs if their national currency depreciates against the loan currency and only a part of these borrowers may be adequately hedged. We use the exchange rate against the euro for most CESEE countries and the one against the U.S. dollar for Ukraine and Russia, where foreign currency loans are mostly U.S. dollar denominated. As we assume that a (substantial) part of the foreign currency-denominated loans is extended to unhedged borrowers, our hypothesis is that a depreciation of the national currency leads to a higher NPL ratio, depending on the size of the share of foreign currency-denominated loans in total loans. Therefore, we use the multiplicative term exchange rate change multiplied by the share of foreign currency loans (weighted exchange rate change) as an additional explanatory variable. Clearly, if one of the two components is very small or even zero – like in the case of the Czech Republic, where foreign currency loans play a very limited role, or in the case of Bulgaria, where the currency does not change against the euro

given its currency board arrangement – this variable will hardly have any impact on the development of the NPL ratio.

However, obviously, this explanatory variable does not cover all types of risks potentially attached to foreign currency loans. Apart from possible risks related to the corresponding foreign currency funding of banks, “the interest rate risk profile of foreign currency loans differs from the risk profile of domestic currency loans. This can be detrimental to the quality of foreign currency loans if the interest rate cycles of the foreign currency diverge from that of the domestic economy.” (ESRB, 2011). In addition, also the size of the amplitude of the cycles may be quite different. As foreign interest rates are generally less linked to domestic inflation than domestic interest rates, the volatility of implicit real interest rates will be higher. In as far as the share of foreign currency loans is positive, this interest rate risk is relevant also for countries where the respective exchange rate has not changed in the period of observation. Both the exchange rate-related credit risk of foreign currency loans and the interest rate-related one are two-sided risks. As these risks are not necessarily synchronized, the materialization of foreign interest rate risk may mitigate or exacerbate the impact of exchange rate changes, depending on the specific periods under observation. Moreover, the extent of foreign interest rate risk depends on (i) the dominant type of interest rate-setting regime for foreign currency loans in an individual country<sup>2</sup> and (ii) the country-risk premium (thus, in particular, on the anticipated fiscal position of the public sector) and how this premium is taken into account in the interest rate-setting regime of foreign currency loans to the private sector. However, investigating which type of pricing regime is followed to which extent in which country and for which type of foreign currency loan and inserting this information into an NPL model would be a task of its own that we leave for further research. For the moment, we would like to stress that the materialization of foreign interest rate risk, which depends inter alia on the interest rate-setting regime, may blur the measured impact of exchange rate changes on the NPL ratio.

It is conceivable that banks’ profitability is somehow related to the NPL ratio in later periods. Thus, we look at the return on assets (RoA) as a measure for banks’ profitability that we consider superior to the RoE, as the latter is heavily influenced by the degree of capital adequacy and leverage. One may follow the traditional management quality hypothesis, stipulating that more profitable banking sectors are better managed and more prudent in their granting of credit so that higher profitability in the past leads to a lower NPL ratio. For the sake of clarity, we would like to mention that, in addition, there may well be an impact of the NPL ratio on banks’ profitability in later periods, in particular via net creation of loan loss provisions, with the calculation of impairment charges usually taking more time. However, we do not investigate this feedback loop in the present study, but limit our focus on the factors determining the NPL ratio.

Taking all these explanatory variables together, we aim at explaining the development of NPL ratios to a large extent.

<sup>2</sup> As exemplified by the ESRB (2011), the pricing regime followed by Hungarian banks allowed them to set the retail borrowers’ interest rate unilaterally and to disregard changes in foreign interest rates, while in other countries, like for example Poland and Romania, (at least) the interest rates on foreign currency mortgages are explicitly linked to market interest rates.

For each of the explanatory variables, we tried to get time series ranging from Q1 1993 to Q4 2012. However, due to the aforementioned structural breaks and the limited availability of data that conform to the quality requirements sketched out above for the years up to the first years of the new millennium, we finally ended up with a nearly balanced panel that we could estimate for the time span ranging from 2004 to 2012.

### 3 Empirical Analysis

In this section, we distinguish between the analysis and treatment of the time series used for the models, the econometric framework, the model specification, the estimation results and, finally, the robustness checks on the selected model.

#### 3.1 Analysis and Treatment of Time Series

As our time series have quarterly frequency, they incorporate a degree of seasonality that may distort the relations between the variables. However, for the variables stemming from the national accounts framework, seasonally adjusted data have been published for most countries for all or most of the time period under investigation. For EU countries (including Croatia), in particular, these data have the advantage of including not only a seasonal adjustment but rather a seasonal and working-day adjustment. For the remainder of the time series employed we apply seasonal adjustment<sup>3</sup>.

Then we test for panel stationarity, using a unit root test for unbalanced panels. Maddala and Wu (1999) argue that the Fisher unit root test for panel data performs best when compared with other panel data unit root tests, e.g. the Lin, Levin and Chu (2002) and Im, Pesaran and Shin (2003) tests. Moreover, it does not require a balanced panel dataset. We therefore apply the Fisher test for a panel unit root, using an augmented Dickey-Fuller (ADF) test.

We find that the null hypothesis of a common unit root process for all countries as well as the hypothesis of unit root processes for individual countries can be rejected at the 1% significance level for all our variables when taken in logarithmic differences. Thus, we apply logarithm transformation and take first differences of such transformed variables.

#### 3.2 Econometric Framework

We estimate a linear model for panel data explaining changes in the NPL ratio, using all variables in logarithmic differences.

The use of panel data techniques to analyze and quantify the impact of the macroeconomic and financial variables described above on asset quality during the last decade allows us to capture the country-specific effects and the unobservable differences between countries. Using a panel data approach, one can control for the biases generated by potential heterogeneity and omitted variable problems.

In line with the literature, we expect the NPL growth rate to exhibit some degree of persistence. Hence, we include the lagged NPL ratio as an explanatory variable in the model, constructing a dynamic panel. In order to evade problems of correlation between the explanatory variables and the error term and to obtain additional efficiency gains, we apply the generalized method of moments (GMM)

<sup>3</sup> For this purpose, we use TRAMO-SEATS provided by Eurostat via the Demetra software.

with the corresponding GMM type of instrumental variables (IVs) for predetermined and endogenous variables (including the lagged dependent variable) and standard IVs for variables reasonably assumed to be strictly exogenous, like the stock index or the exchange rate.

Following the GMM approach, in order to eliminate the fixed effects (and their correlations), we take the model in first differences. First, we use the GMM-type instruments for this first-difference equation only, thus applying the “difference GMM” proposed by Arellano and Bond (1991) by using past lagged levels as instruments. Then, we use the GMM-type instruments for both the first-difference equation and the level equation, thus applying the “system GMM” elaborated by Arellano and Bover (1995) and Blundell and Bond (1998) by using lagged first-differences as instruments for the level equation. For both GMM estimators we derive the (one-step) robust covariance matrix that is robust to heteroskedasticity in the errors. Regarding the validity of instruments, we first perform the post-estimation check to see whether the null of no second-order autocorrelation has to be rejected. Second, we follow Arellano and Bond (1991) and checked whether the null of the Sargan test, namely the joint validity of all moment conditions (including the overidentifying restrictions), has to be rejected in the nonrobust case as the small sample size prevents the use of the robust Hansen J statistic.

Moreover, given the special features of our sample, namely the number of countries being much smaller than the effective length of the time series in the unbalanced panel, combined with a relatively small effective sample size, we take the following safeguard measures: First, we apply t-statistics and an F-test instead of a Wald chi-squared test of overall model fit. Second, we reduce the size of the instrument matrix by implementing the collapsing method designed by Roodman (2009).

### 3.3 Model Specification

We start by considering all explanatory variables up to six lags (1.5 years). We do not assume contemporaneous explanatory variables as we look for leading indicators of NPL development – see equation:

$$d(\log npl)_{i,t} = \sum_{l=1}^6 d(\log npl)_{i,t-l} + \sum_{j=1}^k \sum_{l=1}^6 b_j X_{j,i,t-l} + f_i + u_{i,t}$$

where  $X_{j,i,t-l}$  is the  $j^{\text{th}}$  indicator for country  $i$  and time  $t-l$ ,  $f_i$  is the fixed effect for country  $i$  and  $u_{i,t}$  is the stochastic error term, with errors assumed as i.i.d.

On the one hand, we consider economically meaningful combinations of our potential regressors (see section 2), while on the other hand, we follow the principle of parsimony, aiming at reducing the number of lagged explanatory variables, considering also the relatively small sample size.

### 3.4 Estimation Results

Adequate statistical performance is obtained for the following model, which explains the development of the NPL ratio by the changes in the following variables: the lagged NPL ratio, real GDP, the stock index, credit to private sector relative to GDP and the nominal exchange rate combined with the share of foreign currency loans in total loans (see table 1). The number in parenthesis indicates, for each indicator, the respective number of lags in quarters.

Table 1

**Estimated Main Model**

|  | Difference GMM model | System GMM model | System GMM model with constant |
|--|----------------------|------------------|--------------------------------|
| <b>Explanatory variables: coefficients</b>                                 |                      |                  |                                |
| NPL ratio (first lag)  | 0.21                 | 0.22             | 0.21                           |
| <i>t</i> -statistic  | 1.76                 | 1.84             | 1.78                           |
| <i>p</i> -value  | 0.11                 | 0.10             | 0.11                           |
| Real GDP (first lag)   | -1.65                | -1.58            | -1.64                          |
| <i>t</i> -statistic  | -3.92                | -3.86            | -3.86                          |
| <i>p</i> -value  | 0.00                 | 0.00             | 0.00                           |
| Private sector credit-to-GDP ratio (sixth lag)                             | 0.47                 | 0.48             | 0.46                           |
| <i>t</i> -statistic  | 4.46                 | 4.54             | 4.33                           |
| <i>p</i> -value  | 0.00                 | 0.00             | 0.00                           |
| National stock index (fifth lag)   | -0.10                | -0.10            | -0.10                          |
| <i>t</i> -statistic  | -2.92                | -2.87            | -2.91                          |
| <i>p</i> -value  | 0.02                 | 0.02             | 0.02                           |
| Exchange rate, weighted by foreign currency share (first lag) <sup>1</sup> | 0.36                 | 0.37             | 0.37                           |
| <i>t</i> -statistic  | 2.37                 | 2.38             | 2.37                           |
| <i>p</i> -value  | 0.04                 | 0.04             | 0.05                           |
| Constant   |                      |                  | 0.02                           |
| <i>t</i> -statistic  |                      |                  | 1.88                           |
| <i>p</i> -value  |                      |                  | 0.10                           |
| Number of observations   | 285                  | 294              | 294                            |
| F-test (p-value)   | 0.00                 | 0.00             | 0.00                           |
| AR-1 test (p-value)  | 0.04                 | 0.04             | 0.04                           |
| AR-2 test (p-value)  | 0.20                 | 0.17             | 0.19                           |
| Sargan test (p-value)  | 0.12                 | 0.12             | 0.13                           |

Source: Authors' estimations.

<sup>1</sup> A positive sign denotes a depreciation of the national currency.

Note: All variables in logarithmic differences. Dependent variable: NPL ratio.

Among the leading indicators for the financial and economic developments in the CESEE countries, the national stock indices clearly outperformed the EMBI Global and the VIX. This is quite plausible. While the EMBI Global and the VIX reflect the risk attitude among international financial investors and, in the case of the EMBI Global, the global market sentiment toward emerging markets in general, the national stock index more precisely represents (national and international) investors' perception of the international environment and of its future impact on the financial and economic development in the relevant CESEE country. Given the relatively limited role of stock exchange markets in CESEE countries compared to advanced economies, we do not claim that the stock market constitutes an import source of direct financing (through new equity issues) for economic growth in CESEE and hence would have an impact on the NPL ratio via a financing channel. Nor do we argue that the transmission mechanism consists in direct wealth effects among borrowers. However, we would like to stress the role of the national stock index as leading variable for financial and economic developments that directly influence the NPL ratio; it effectively captures part of future effects of GDP and currency developments. In addition, one may hypothesize that the stock index plays a role as early proxy indicator for the value of loan collateral,

at least with respect to the direction of collateral value (and property price) development in several countries, although this would warrant a separate investigation. Finally, stock indices might capture some other effects not included in our model.

We could not confirm a significant impact of profitability on the NPL ratio. Neither the level nor the change of RoA proved to play a significant role.

Apart from profitability, the estimation results strongly confirm the initial hypotheses. The chosen explanatory variables proved to be significant and their coefficients have the expected signs (compare section 2).

Comparing our results with those of other studies, in particular those mentioned in section 1, the income variable plays a significant and important role in our model as well as in most models of macro-studies on NPLs<sup>4</sup> and in the survey data-based study by Beckmann et al. (2012). In these models, the income variable enters in different forms, as (simultaneous and/or lagged) unemployment rate and/or GDP growth and/or foreign demand growth (proxied by main trading partners' GDP growth). Here, our result is pretty much standard.

With respect to the impact of credit growth, the situation is less clear cut. For advanced economies, the macro-models applied by Nkusu (2011) use the simultaneous change in house prices (as explanatory variable that corresponds to credit growth) and yield a statistically significant negative coefficient. For emerging market economies, the macro-models applied by De Bock and Demyanets (2012) use two variables that are related to credit growth, namely the ratio of portfolio and bank flows to GDP (as a proxy for foreign funding of credit growth) and the first lag of the private credit-to-GDP ratio. The former is highly significant with a negative sign, and the latter is insignificant in the sample as a whole, but significant with a negative sign in the 2004 to 2010 subsample. By contrast, Klein (2013) and Espinoza and Prasad (2010) apply a mixed macro-micro approach, using (inter alia) the second lag of loan growth to explain bank-level data of impaired loans in CESEE and Gulf Cooperative Council countries, respectively, and find a significant effect in the majority of their models, albeit relatively small and only at the 5% or 10% significance level. Our main model uses an even higher lag of credit growth (here, the sixth lag) and yields a statistically significant and relatively strong positive impact for this explanatory variable, which is measured more precisely in terms of exchange rate-adjusted change in the private sector credit-to-GDP ratio. Moreover, as will be shown in the next subsection, if we incorporate the first lag of credit growth into our model, this new variable is significant as well, but with a negative sign, in line with the results of De Bock and Demyanets (2012) and Nkusu (2011) and conforms to our initial hypotheses.

With respect to the impact of the exchange rate, our results are in line with the results of other macro-studies on NPLs<sup>5</sup> and with the results of Klein (2013). Moreover, our results confirm the following observation by the ESRB (2011): "In some countries, foreign currency loans have higher non-performing loan (NPL) ratios and higher levels of loan restructuring (for example Hungary and Romania)."

<sup>4</sup> In particular, in most models of the panel studies by Nkusu (2011), Buncic and Melecky (2012), De Bock and Demyanets (2012) and Beck, Jakubík and Piloiu (2013).

<sup>5</sup> In particular, most models in the panel studies by De Bock and Demyanets (2012) and Beck, Jakubík and Piloiu (2013) as well as the country-specific study by Mancka (2012) on a country with a flexible exchange rate regime.

However, the ESRB (2011) also remarks: “In other countries, such as Poland, data shows that foreign currency loans tend to perform better than the domestic currency ones.” In a similar vein, some micro-level evidence shows mixed results on the performance of foreign currency mortgage loans<sup>6</sup>. Apart from methodological issues, there are economic explanations why foreign currency loans may not show higher NPL ratios than local currency loans: (1) As described in section 2, the materialization of foreign interest rate risk can have an influence on the non-performance of foreign currency loans. In countries with a floating exchange rate, such risk materialization can substantially mitigate the impact of exchange rate changes. Indeed, as the ESRB (2011) mentions, in some countries (for example Poland and Romania), the negative effects of local currency depreciation were partly offset by declining interest rates in euro and Swiss francs. This beneficial form of risk materialization was a result of both the prevalent interest rate-setting regime and the specific situation in advanced economies and global financial markets during the crisis years of the time period examined in our study. In some countries with fixed/pegged regimes, borrowers in foreign currency did not suffer from currency devaluation but rather benefited from foreign interest rate cuts during the crisis years. For our sample countries, this was true for Bulgaria, but not Ukraine. (2) Another explanation may be borrower selection as a result of prudent behavior on banks’ own initiative and/or of early measures by authorities (like the “Recommendation S” in Poland) that guided the extension of foreign currency loans above all to higher income borrowers. (3) A third economic reason may be the bank practice of converting foreign currency loans into domestic currency when they are close to becoming delinquent or being restructured, as the ESRB (2011) highlights in the annex to its recommendation. Especially the latter point suggests that it may be misleading to compare (only partially available) bank-level or supervisory data on NPL ratios disaggregated by currency. Rather, estimating the impact of exchange rate changes on the aggregated NPL ratio (comprising both foreign and domestic currency loans) may provide more reliable insights. Referring to the corresponding results of such estimates in our study, we highlight that we found a significant and sizeable adverse impact of currency depreciation on the NPL ratio, *although* borrower selection had been at work to a varying degree in the countries of our sample (probably most notably so in Poland).<sup>7</sup>

### 3.5 Robustness Checks

We performed several robustness checks. First, we introduced an additional lag for the credit variable, corresponding to our hypothesis on the relation between developments in the credit-to-GDP ratio and the NPL ratio that in the short run we expect a denominator effect that has a negative sign (see above). While the es-

<sup>6</sup> For instance, micro-studies cited in EBRD (2011): *Foreign currency mortgage loans tend to be of better quality than local currency loans, but foreign currency borrowers had to adjust their consumption more than local currency borrowers in countries with large depreciation (and could afford to do so).*

<sup>7</sup> While we could not control explicitly for foreign interest rate risk of foreign currency loans (see section 2), we stress that potentially blurring impacts of the materialization of this risk partly offset each other, as they went into opposite directions (given differences in the interest rate-setting regimes) during the crisis years, exerting a mitigating impact in some countries (like Poland and Romania), but an amplifying impact in others (in particular Hungary) – see ESRB (2011). Hence, we found a significant and sizeable adverse impact of currency depreciation on the NPL ratio, *although* such mitigating impacts and partly because such amplifying impacts were at play.

timation result indeed shows the expected sign (see table A1 in the annex), the main outcome does not change substantially. However, from a statistical point of view, the autocorrelation structure of the residuals is somewhat negatively affected, as the null hypothesis of zero second-order autocorrelation could be rejected at the 10% significance level, so that this specification is definitely inferior to the main model presented above in statistical terms.

In a next step, we replaced real GDP as the explanatory variable reflecting real economic activity by the two main components of final demand, i.e. real exports and real domestic demand (see table A2 in the annex). Both demand components proved to be significant, having the right sign and being roughly equally important with respect to the development of the NPL ratio. Indeed, in this model specification the presence of the lagged dependent variable becomes even more justified, given the rising significance level.

In view of the difficulties of combining the special features of our sample (in particular the relatively small sample size) with the GMM estimator and given the partly low significance of the lagged dependent variable, we additionally provided the following complementary static panel models with fixed effects (see table A3 in the annex). Post-estimation tests support the fixed-effects approach, as running a pooled ordinary least squares (OLS) regression is rejected, as indicated by the  $F_f$  statistic of the F-test on the joint significance of the fixed effects. These static models confirm the explanatory power of the variables found to be significant in the dynamic model, including the signs of the coefficients. Interestingly, this also applies to the additional lag (first lag) of the credit variable.

#### 4 Policy Implications

Our empirical research renders a quite plausible macro-model for explaining the development of the aggregate NPL ratio during the boom-bust cycle the CESEE countries experienced in the past decade.

In boom times, the national economy is characterized by high, possibly overheating GDP growth amid a benign international environment in which financial investors have a positive perception of future financial and economic developments in the country concerned, leading to higher national stock index levels and (depending on the exchange rate regime) a nominal appreciation of the national currency (moving down the exchange rate variable in the model). These factors exert downward pressure on the NPL ratio. Once this downward movement sets in, it exhibits features of self-reinforcing persistence as described by the autoregressive (AR) component. Coupled with the factors mentioned above, credit to the private sector tends to outpace GDP growth, often by far, and the rise in the private credit-to-GDP ratio has a lagged increasing effect on the NPL ratio that is held in check by the short-term decreasing effect for as long as the boom goes on. Excessively high credit growth in boom times can also be seen as a proxy for loosening bank lending standards and underwriting criteria, often implemented in the quest for market shares.

When the boom comes to an end, a fall in the stock index often foreshadows the bust. GDP growth slows down sharply or even turns negative. Depending on the exchange rate regime, a depreciation of the national currency helps absorb part of the shock to the real variables, which in turn dampens the NPL-raising impact of the slowdown. However, in as far as the share of foreign currency loans

is positive, the currency depreciation leads to an additional rise in the NPL ratio that may well outpace the mentioned dampening effect (and would be smaller if the share of foreign currency loans were lower). At the same time, the credit-to-GDP ratio stops increasing strongly, withdrawing the short-term decreasing effect on the NPL ratio. (How quickly the credit-to-GDP ratio stops increasing or even starts declining depends not only on credit supply and demand reactions but also on the size of the recession and the inflationary impact of any possible currency depreciation.) By contrast, the lagged effect of strong increases of the credit-to-GDP ratio in previous quarters persists for quite a while, raising the NPL ratio. In this context, the feature of self-reinforcing persistence consists in an adverse development of the NPL ratio that may be given the economic interpretation that payment difficulties of one agent or one part of the economy quickly affect other agents or other parts of the economy, driving up the aggregate NPL ratio.

There are at least two main aspects in relation to which the findings of this study support the adoption of a cautious macroprudential stance.

The first is foreign currency lending (prevalent in most of the nine CESEE countries under study), as a high share of foreign currency loans in total loans combined with a depreciation of the national currency significantly contributes to a rise in the NPL ratio. Therefore, ongoing macroprudential efforts to curtail foreign currency lending with respect to unhedged borrowers may well contribute to make bank asset quality and credit risk less volatile.

The second aspect relates to periods when credit growth is high relative to GDP growth, as high credit growth rates tend to lower the NPL ratio initially, but to increase it later on, with the latter effect still persisting after the period of high credit growth has come to an end. Therefore, ongoing efforts to establish and make active use of macroprudential tools to address excessive credit growth should mitigate negative consequences of excessive credit expansion on bank asset quality. Among the currently discussed tools are e.g. countercyclical capital buffers, changes in sectoral risk weights, a time-varying leverage ratio or limits to loan-to-value (LTV) and loan-to-income (LTI) ratios, which may help reduce credit risk as well as address different types of credit booms (e.g. housing loan boom). There is a non-negligible twofold challenge: First, macroprudential authorities have to strengthen their forward-looking attitude, i.e. ignore benign developments in the NPL ratio today while anticipating adverse developments in the NPL ratio tomorrow. In the context of catching-up countries like the nine CESEE countries under observation, the second challenge may prove to be even more difficult in practice: Like real currency appreciation, financial deepening (defined as an increase in the credit-to-GDP ratio) forms part of any long-term catching-up process, which in turn requires a positive real growth differential. Therefore, the decision-makers in macroprudential policy have to assess whether any increase in the private credit-to-GDP ratio exceeds the fundamentally justified, sustainable speed of financial deepening.

## 5 Conclusions

This study presents a macro-model that explains the development of the economy-wide aggregate nonperforming loan ratio in the CESEE countries. We aimed to reveal the key macroeconomic drivers determining the quality of banks' assets and compared our results with the recent empirical research based on global samples

(Beck et al., 2013) or national models (e.g. Erjavec, Cota and Jakšić, 2012; Jakubík, 2007).

In line with other studies, our research suggests that domestic economic activity plays a key role for nonperforming loans. Going beyond the scope of current literature, however, we show how the development of both main aggregate demand components, i.e. domestic demand and foreign demand, can affect NPL growth. Our empirical results further show a lagged effect of stock prices on NPLs. Stock indices work as leading variables for financial and economic developments that directly influence the NPL ratio, and they might also capture other effects that are not included in our model. Stock indices might also signal a direct effect that works through the value of loan collateral. Due to the relatively limited role of stock exchange markets in CESEE compared with advanced economies, the transmission mechanism might not work via wealth effects among borrowers or via the reduced potential of financing through new equity issues. Moreover, our results confirm the conclusion by Beck et al. (2013) that the depreciation of a local currency can have a sizeable negative impact on the quality of banks' assets. The size of this impact depends on the share of foreign currency loans in total loans; data on this share were directly available for the countries covered in the present study and could thus be combined with the exchange rate changes to form an explanatory variable that turned out to be significant and relevant. Finally, we empirically assessed the impact of the private credit-to-GDP ratio. This indicator seems to be crucial for explaining the development of banks' asset quality as has been repeatedly mentioned in some recent studies and policy discussions (see e.g. Borio, 2012).

Apart from the above-mentioned conclusions, the model presented in this study can be used by policymakers or supervisors as a benchmark for verifying comparable models developed by commercial banks for the CESEE countries. Moreover, it could serve the purpose of high-level cross-checks of country-specific models, which on the one hand can better capture country-specific effects, but on the other hand often have drawbacks from a statistical and econometric point of view, especially given the shortness of available time series in most of these countries. As a matter of fact, the countries included in our panel, despite their geographic proximity, show a number of differences, including, for instance, the quality of institutions, repayment culture and market standards. These differences are largely captured by country-specific fixed effects, but probably not entirely so. Therefore, these factors may still influence the country-specific strength of response to shocks of the same variable. It follows that our model, while useful for identifying economic processes that are relevant for all the countries in the sample, can be considered less reliable for forecasting for each individual country.

Further topical research related to the CESEE region could focus on the question whether it might be possible to extract thresholds below which the credit growth rate or the pace of financial deepening observed in the past have no significant impact on the development of the NPL ratio and thus could be considered to constitute a sustainable or equilibrium growth rate. Moreover, further research could focus on the feedback loop between rising NPL ratios on the one hand and the real economy, including the development of credit aggregates, on the other.

## References

- Arellano, M. and S. Bond. 1991.** Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58. In: Verbeek, M. 2008. *A Guide to Modern Econometrics*. John Wiley and Sons. 277–294.
- Arellano, M. and O. Bover. 1995.** Another Look at the Instrumental Variable Estimation of Error-Components Models. *Journal of Econometrics*, 68. In: Verbeek, M. 2008. *A Guide to Modern Econometrics*. John Wiley and Sons. 29–51.
- Barisitz, S. 2011.** Nonperforming Loans in CESEE – What Do They Comprise? In: *Focus on European Economic Integration Q4/11*. 46–68.
- Barisitz, S. 2013.** Nonperforming Loans in CESEE – An Even Deeper Definitional Comparison. In: *Focus on European Economic Integration Q3/13*.
- Beck, R., P. Jakubik and A. Piloju. 2013.** Non-performing loans: What matters in addition to the economic cycle? European Central Bank. Working Paper No. 1515.
- Beckmann, E., J. Fidrmuc and H. Stix. 2012.** Foreign Currency Loans and Loan Arrears of Households in Central and Eastern Europe. OeNB Working Paper 181.
- Blundell, R. and S. Bond. 1998.** Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87. In: Verbeek, M. 2008. *A Guide to Modern Econometrics*. John Wiley and Sons. 115–143.
- Bond, S. R. 2002.** Dynamic panel data models: a guide to micro data methods and practice. *Portuguese Economic Journal*. (2002) 1. 141–162.
- Borio, C. 2012.** The financial cycle and macroeconomics: What have we learnt? BIS Working Papers No 395.
- Buncic, D. and M. Melecky. 2012.** Macroprudential Stress Testing of Credit Risk – A Practical Approach for Policy Makers. World Bank Policy Research Working Paper No. 5936.
- De Bock, R. and A. Demyanets. 2012.** Bank Asset Quality in Emerging Markets: Determinants and Spillovers. IMF. Working Paper 12/71.
- Erjavec, N., B. Cota and S. Jakšić. 2012.** Sign restriction approach to macro stress-testing of the Croatian banking system. *Financial Theory and Practice* 36 (4). 395–412.
- Espinoza, R. and A. Prasad. 2010.** Nonperforming Loans in the GCC Banking System and their Macroeconomic Effects. IMF. Working Paper 10/224.
- European Bank for Reconstruction and Development (EBRD). 2011.** Transition Report. Box 2.1.
- European Systemic Risk Board (ESRB). 2011.** Recommendation of the European Systemic Risk Board of 21 September 2011 on lending in foreign currencies (ESRB/2011/1). In: *Official Journal of the European Union (2011/C 342/01)*, Annex, II.1.
- Fainstein G. and I. Novikov. 2011.** The Comparative Analysis of Credit Risk Determinants in the Banking Sector of the Baltic States. *Review of Economics & Finance*. No. 3. Online version. <http://www.bapress.ca/journal-3.html>.
- Jakubik P. 2007.** Macroeconomic Environment and Credit Risk. *Czech Journal of Economics and Finance*. 57(1-2). 41–59.
- Jakubik P. and Ch. Schmieder. 2008.** Stress Testing Credit Risk: Is the Czech Republic Different from Germany? Czech National Bank. Working Paper Series 9/2008.
- Klein, N. 2013.** Non-Performing Loans in CESEE: Determinants and Impact on Macroeconomic Performance. IMF. Working Paper 13/72.
- Mancka, A. 2012.** The Impact of National Currency Instability and the World Financial Crisis in the Credit Risk. The Case of Albania. *Journal of Knowledge Management, Economics and Information Technology*. Issue 8. February 2012.

- Moinescu, B. and A. Codirlaşu. 2012.** Assessing the Sectoral Dynamics of Non-performing Loans: Signs from Financial and Real Economy. *Theoretical and Applied Economics*. Volume XIX (2012). No. 2(567). 69–80.
- Nkusu, M. 2011.** Nonperforming Loans and Macrofinancial Vulnerabilities in Advanced Economies. IMF. Working Paper 11/161.
- Roodman, D. 2009.** How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal* 9(1). 86–136.
- Valentinyi-Endrész, M. and Z. Vásáry. 2008.** Macro stress testing with sector specific bankruptcy models. Magyar Nemzeti Bank. MNB Working Papers. 2008/2.
- Vogiazas, S. D. and E. Nikolaidu. 2011.** Investigating the Determinants of Nonperforming Loans in the Romanian Banking System: An Empirical Study with Reference to the Greek Crisis. Hindawi Publishing Corporation. *Economics Research International*. Volume 2011, Article ID 214689. 13 pages. doi:10.1155/2011/214689.

## Annex

Table A1

**Model with an Additional Lag for the Credit Variable**

|  | Difference<br>GMM model | System GMM<br>model | System GMM<br>model with<br>constant |
|--|-------------------------|---------------------|--------------------------------------|
| <b>Explanatory variables: coefficients</b>                                 |                         |                     |                                      |
| NPL ratio (first lag)  | 0.18                    | 0.20                | 0.18                                 |
| <i>t</i> -statistic  | 1.65                    | 1.72                | 1.66                                 |
| <i>p</i> -value  | 0.13                    | 0.12                | 0.14                                 |
| Real GDP (first lag)   | -1.50                   | -1.42               | -1.48                                |
| <i>t</i> -statistic  | -3.81                   | -3.65               | -3.74                                |
| <i>p</i> -value  | 0.00                    | 0.01                | 0.01                                 |
| Private sector credit-to-GDP ratio (first lag)                             | -0.42                   | -0.34               | -0.39                                |
| <i>t</i> -statistic  | -2.17                   | -2.16               | -2.18                                |
| <i>p</i> -value  | 0.06                    | 0.06                | 0.06                                 |
| Private sector credit-to-GDP ratio (sixth lag)                             | 0.53                    | 0.53                | 0.52                                 |
| <i>t</i> -statistic  | 3.77                    | 3.97                | 3.80                                 |
| <i>p</i> -value  | 0.00                    | 0.00                | 0.01                                 |
| National stock index (fifth lag)   | -0.10                   | -0.10               | -0.10                                |
| <i>t</i> -statistic  | -3.12                   | -3.06               | -3.14                                |
| <i>p</i> -value  | 0.01                    | 0.01                | 0.01                                 |
| Exchange rate, weighted by foreign currency share (first lag) <sup>1</sup> | 0.39                    | 0.40                | 0.39                                 |
| <i>t</i> -statistic  | 2.54                    | 2.58                | 2.55                                 |
| <i>p</i> -value  | 0.03                    | 0.03                | 0.03                                 |
| Constant   |                         |                     | 0.02                                 |
| <i>t</i> -statistic  |                         |                     | 2.37                                 |
| <i>p</i> -value  |                         |                     | 0.05                                 |
| Number of observations   | 285                     | 294                 | 294                                  |
| F-test (p-value)   | 0.00                    | 0.00                | 0.00                                 |
| AR-1 test (p-value)  | 0.05                    | 0.04                | 0.04                                 |
| AR-2 test (p-value)  | 0.07                    | 0.07                | 0.07                                 |
| Sargan test (p-value)  | 0.17                    | 0.15                | 0.17                                 |

Source: Authors' estimations.

<sup>1</sup> A positive sign denotes a depreciation of the national currency.

Note: All variables in logarithmic differences. Dependent variable: NPL ratio.

Table A2

**Model with Main Final Demand Components Replacing GDP**

|  | Difference<br>GMM model | System GMM<br>model | System GMM<br>model with<br>constant |
|--|-------------------------|---------------------|--------------------------------------|
| <b>Explanatory variables: coefficients</b>                                 |                         |                     |                                      |
| NPL ratio (first lag)  | 0.26                    | 0.27                | 0.26                                 |
| <i>t</i> -statistic  | 2.35                    | 2.33                | 2.35                                 |
| <i>p</i> -value  | 0.04                    | 0.04                | 0.05                                 |
| Real exports (first lag)   | -0.27                   | -0.26               | -0.27                                |
| <i>t</i> -statistic  | -3.05                   | -3.26               | -3.06                                |
| <i>p</i> -value  | 0.01                    | 0.01                | 0.02                                 |
| Real domestic demand (first lag)   | -0.62                   | -0.61               | -0.62                                |
| <i>t</i> -statistic  | -2.24                   | -2.09               | -2.26                                |
| <i>p</i> -value  | 0.05                    | 0.07                | 0.05                                 |
| Private sector credit-to-GDP ratio (sixth lag)                             | 0.40                    | 0.43                | 0.40                                 |
| <i>t</i> -statistic  | 4.02                    | 3.83                | 3.92                                 |
| <i>p</i> -value  | 0.00                    | 0.00                | 0.00                                 |
| National stock index (fifth lag)   | -0.09                   | -0.09               | -0.09                                |
| <i>t</i> -statistic  | -2.16                   | -2.18               | -2.20                                |
| <i>p</i> -value  | 0.06                    | 0.06                | 0.06                                 |
| Exchange rate, weighted by foreign currency share (first lag) <sup>1</sup> | 0.51                    | 0.51                | 0.50                                 |
| <i>t</i> -statistic  | 2.41                    | 2.46                | 2.52                                 |
| <i>p</i> -value  | 0.04                    | 0.04                | 0.04                                 |
| Constant   |                         |                     | 0.01                                 |
| <i>t</i> -statistic  |                         |                     | 2.00                                 |
| <i>p</i> -value  |                         |                     | 0.08                                 |
| Number of observations   | 285                     | 294                 | 294                                  |
| F-test (p-value)   | 0.00                    | 0.00                | 0.00                                 |
| AR-1 test (p-value)  | 0.03                    | 0.03                | 0.03                                 |
| AR-2 test (p-value)  | 0.12                    | 0.10                | 0.12                                 |
| Sargan test (p-value)  | 0.66                    | 0.67                | 0.68                                 |

Source: Authors' estimations.

<sup>1</sup> A positive sign denotes a depreciation of the national currency.

Note: All variables in logarithmic differences. Dependent variable: NPL ratio.

**Static Panel Model with Fixed Effects (FE)**

|  | FE model, main version      |       | FE model, including additional lag |       | FE model, with demand components |       |
|--|-----------------------------|-------|------------------------------------|-------|----------------------------------|-------|
|  | with robust standard errors |       | with robust standard errors        |       | with robust standard errors      |       |
| <b>Explanatory variables: coefficients</b>                                 |                             |       |                                    |       |                                  |       |
| Real GDP (first lag)   | -1.87                       | -1.87 | -1.59                              | -1.59 |                                  |       |
| <i>t</i> -statistic  | -6.32                       | -6.87 | -5.30                              | -6.27 |                                  |       |
| <i>p</i> -value  | 0.00                        | 0.00  | 0.00                               | 0.00  |                                  |       |
| Private sector credit-to-GDP ratio (sixth lag)                             | 0.45                        | 0.45  | 0.60                               | 0.60  | 0.42                             | 0.42  |
| <i>t</i> -statistic  | 3.22                        | 3.44  | 4.15                               | 3.32  | 2.99                             | 3.56  |
| <i>p</i> -value  | 0.00                        | 0.01  | 0.00                               | 0.01  | 0.00                             | 0.01  |
| Private sector credit-to-GDP ratio (first lag)                             |                             |       | -0.55                              | -0.55 |                                  |       |
| <i>t</i> -statistic  |                             |       | -3.55                              | -3.08 |                                  |       |
| <i>p</i> -value  |                             |       | 0.00                               | 0.02  |                                  |       |
| National stock index (fifth lag)   | -0.13                       | -0.13 | -0.12                              | -0.12 | -0.12                            | -0.12 |
| <i>t</i> -statistic  | -4.48                       | -6.04 | -4.23                              | -5.61 | -4.30                            | -4.52 |
| <i>p</i> -value  | 0.00                        | 0.00  | 0.00                               | 0.00  | 0.00                             | 0.00  |
| Exchange rate, weighted by foreign currency share (first lag) <sup>1</sup> | 0.51                        | 0.51  | 0.48                               | 0.48  | 0.61                             | 0.61  |
| <i>t</i> -statistic  | 2.07                        | 2.71  | 1.99                               | 2.62  | 2.55                             | 2.42  |
| <i>p</i> -value  | 0.04                        | 0.03  | 0.05                               | 0.03  | 0.01                             | 0.04  |
| Real exports (first lag)   |                             |       |                                    |       | -0.29                            | -0.29 |
| <i>t</i> -statistic  |                             |       |                                    |       | -2.82                            | -2.36 |
| <i>p</i> -value  |                             |       |                                    |       | 0.01                             | 0.05  |
| Real domestic demand (first lag)   |                             |       |                                    |       | -0.84                            | -0.84 |
| <i>t</i> -statistic  |                             |       |                                    |       | -5.11                            | -2.90 |
| <i>p</i> -value  |                             |       |                                    |       | 0.00                             | 0.02  |
| Constant   | 0.02                        | 0.02  | 0.03                               | 0.03  | 0.02                             | 0.02  |
| <i>t</i> -statistic  | 3.81                        | 6.94  | 4.65                               | 8.96  | 3.38                             | 5.33  |
| <i>p</i> -value  | 0.00                        | 0.00  | 0.00                               | 0.00  | 0.00                             | 0.00  |
| Number of observations   | 295                         | 295   | 295                                | 295   | 295                              | 295   |
| F-test (p-value)   | 27.69                       | 30.27 | 25.58                              | 38.93 | 21.67                            | 40.46 |
| F-test on fixed effects (p-value)  | 3.80                        |       | 3.74                               |       | 4.54                             |       |
| Correlation between error term and explanatory variables                   | 0.15                        | 0.15  | 0.15                               | 0.15  | 0.10                             | 0.10  |
| Sigma_u  | 0.03                        | 0.03  | 0.03                               | 0.03  | 0.03                             | 0.03  |
| Sigma_e  | 0.08                        | 0.08  | 0.08                               | 0.08  | 0.08                             | 0.08  |
| Rho  | 0.13                        | 0.13  | 0.12                               | 0.12  | 0.15                             | 0.15  |
| R2_within  | 0.28                        | 0.28  | 0.31                               | 0.31  | 0.28                             | 0.28  |
| R2_between   | 0.89                        | 0.89  | 0.86                               | 0.86  | 0.94                             | 0.94  |
| R2_overall   | 0.30                        | 0.30  | 0.33                               | 0.33  | 0.28                             | 0.28  |

Source: Authors' estimations.

<sup>1</sup> A positive sign denotes a depreciation of the national currency.

Note: All variables in logarithmic differences. Dependent variable: NPL ratio.

# Nonperforming Loans in CESEE – An Even Deeper Definitional Comparison<sup>1</sup>

Stephan Barisitz<sup>2</sup>

*This study builds on two previous studies the author contributed to Focus on European Economic Integration (FEEI), namely “Nonperforming Loans in CESEE – What Do They Comprise?” (Barisitz, 2011) and “Nonperforming Loans in Western Europe – A Selective Comparison of National Definitions” (Barisitz, 2013). It draws the following conclusions from Barisitz (2013) for the analysis of nonperforming loans (NPLs) in Central, Eastern and South-eastern Europe (CESEE): The slightly revised and simplified NPL definition (primary elements: principal or interest 90 days or more overdue and/or existence of well-defined weaknesses of loan or borrower) proposed in Barisitz (2013) facilitates cross-country comparison and is fully applicable to CESEE countries. Secondary elements (treatment of replacement loans, impact of collateral and/or guarantees, recording of total loan or only part of a loan as NPL, treatment of multiple loans to one borrower) may result in upward or downward biases of individual countries’ (suggested) NPL definitions. Overall, we derive NPL ratios that are roughly internationally comparable in a transparent and replicable manner. By providing a comparative overview of what NPLs constitute, this study (together with its two predecessors) hopes to make a contribution to the currently widely debated issues of uncertainty about banks’ balance sheets and (lack of) comparability across banks and countries.*

JEL classification: G12, G21, G33

Keywords: Bank lending, CESEE, credit quality, credit risk, financial soundness indicators, nonperforming loans

## 1 Introduction

This study builds on a previous contribution dealing with national definitions of nonperforming loans (NPLs) in ten Central, Eastern and Southeastern European (CESEE) countries (Barisitz, 2011) and on another study focusing on national NPL definitions and related matters in nine Western European countries (Barisitz, 2013). The novelty of this (third) study is that the additional findings of Barisitz (2013) are now applied to some of the largest countries in CESEE. Both Barisitz (2011) and the present study deal with Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Russia, Serbia, Slovakia and Ukraine. The overall quest is to find an analytical NPL definition that is as comparable as possible across countries in order to help make NPLs more meaningful indicators of credit quality for banking supervisors and policymakers. Moreover, this study aims to contribute to “heightened data transparency,” a goal put forward by the European Banking Coordination “Vienna” Initiative of March 2012 (EBCI, 2012, p. 7), and to add to respective findings. In this sense, it aims to support efforts to ensure that banks’ assets are valued correctly – a key objective highlighted by the European Banking Authority as well as the European Systemic Risk Board (EBA, 2013; ESRB, 2013).

<sup>1</sup> This is a follow-up study to Barisitz, S. 2011. *Nonperforming Loans in CESEE – What Do They Comprise?* In: *Focus on European Economic Integration Q4/11*, 46–68, and to Barisitz, S. 2013. *Nonperforming Loans in Western Europe – A Selective Comparison of Countries and National Definitions*. In: *Focus on European Economic Integration Q1/13*, 28–47.

<sup>2</sup> Oesterreichische Nationalbank, Foreign Research Division, [stephan.barisitz@oenb.at](mailto:stephan.barisitz@oenb.at). This article has benefited from a large number of disaggregated CESEE NPL data compiled and presented by Zoltan Walko (OeNB). The author is grateful to Mikhail Kovrigin (Bank of Russia) and Vlad Pentilie (NBG Securities Romania) for providing precious information. Moreover, the author is indebted to the two referees Katia D’Hulster (World Bank) and David Liebeg (OeNB) for their valuable comments and expertise. Thanks also go to Markus Eller, Thomas Reiningger and Doris Ritzberger-Grünwald (all OeNB) for their helpful remarks and proposals.

The structure of this paper is straightforward. Section 2 focuses on the implications of the results of Barisitz (2013) on Western European countries for comparable NPL concepts in CESEE. On this basis, section 3 provides country-specific summaries of NPL definitions and characteristics in a comparative regional overview. Section 4 provides a quick empirical glance at recent NPL developments (end-2010 through mid-2012) and comparable NPL levels (at mid-2012), based on the above explanations, for the CESEE countries mentioned. Section 5 summarizes and provides an overall assessment.

## 2 How Findings on Western Europe May Help Establish Comparable NPL Concepts in CESEE

### 2.1 General Aspects: Refocus on the Primary Elements of NPL Definition

In Barisitz (2011), three elements were found to be of major importance for identifying loans as nonperforming<sup>3</sup>: first, “principal or interest 90 days or more overdue” (or “90 days+”, based on the IMF Financial Soundness Indicators Compilation Guide, IMF, 2006); second, the presence of underlying “well-defined weaknesses” of loans or borrowers (commonly used, e.g. in the loan classification scheme of the IIF, see table 1); and third, certain credit quality categories (often applied, also proposed by the IIF), the weakest three of which (“substandard – doubtful – loss”) typically denote NPLs. While the majority of the ten CESEE countries analyzed in Barisitz (2011) apply the credit quality categories “substandard – doubtful – loss,” most of the nine Western European countries<sup>4</sup> dealt with in Barisitz (2013) do not provide prescriptive classification categories for NPLs.

While the above credit quality categories can frequently be found and tend to be related to national NPL definitions, they are far from universally present. Where they exist, the actual meaning behind them may differ perceptibly from country to country (see Barisitz, 2011, p. 52–54). Moreover, the definition of default applied by the Basel Committee on Banking Supervision (2004) does not refer to credit quality categories (see also Barisitz, 2013). Consequently, the “substandard – doubtful – loss” criterion may be regarded as less important for identifying NPLs than the elements “90 days+” and “well-defined weaknesses,” which may therefore be referred to as “primary” elements of NPL definition.

Findings for Western Europe and further research lead us to recommend following supervisors’ – or at least general – practice in the majority<sup>5</sup> of European countries, which appear to endorse the rule that for a loan to be nonperforming,

<sup>3</sup> While in this paper the terms “nonperforming,” “impaired” and “defaulted” are essentially taken to bear similar meanings, one should not overlook the fact that e.g. “impairment” originates from, and refers to, accounting concepts. According to IAS 36, an asset is impaired when its carrying amount exceeds its recoverable amount. (In somewhat simplified terms: The carrying amount is the amount at which an asset is recognized in the balance sheet after deducting past accumulated depreciation. The recoverable amount is the higher of two amounts: the asset’s value obtainable from its market sale less sale costs and the asset’s value obtainable from its continued use.) In contrast, the term “nonperforming loan” is predominantly, but not exclusively, used by regulators and supervisors. The definitions of “default of an obligor” applied by the Basel Committee on Banking Supervision (2004) and by the European Commission (2011) both correspond to a widespread common view of which basic elements make up NPLs (see Barisitz 2013, p. 31, 46-47; and see below). Generally, “overdue” or “past due” payments are understood to be those that have not been paid on time (e.g. “principal or interest payments 90 days overdue”). “Exposure” goes beyond impairment and typically corresponds to the amount of risk the holder of an asset or security is faced with as a consequence of holding the security or asset.

<sup>4</sup> Austria, Finland, France, Germany, Ireland, Italy, Portugal, Spain, United Kingdom.

<sup>5</sup> Namely in all the above-mentioned countries except Finland, Italy, the U.K. and Russia.

at least one of these two primary elements (90 days+, well-defined weaknesses) has to be present. This implies that each of the two elements is given equal weight. Finally, as mentioned in Barisitz (2013), this understanding not only corresponds to the definition of default of the Basel Committee on Banking Supervision (2004) but also to the NPL definition (Article 174) contained in the draft of the EU Capital Requirements Regulation, which will probably enter into force in 2014.<sup>6</sup>

## 2.2 Specific Conclusions for Some CESEE Countries: No More Bands Necessary

This adjusted NPL definition, which is slightly refocused and simplified<sup>7</sup> compared to the original three-pronged approach put forward in Barisitz (2011), has consequences for the assessment of comparability of NPL concepts in some CESEE countries. While the adjustment leaves the findings for six CESEE countries essentially unchanged against Barisitz (2011), some slight modifications or simplifications follow for the findings on Hungary, Romania, Serbia and Ukraine.

In *Hungary's* case, the 90 days+ rule starts with the credit quality category “doubtful” loans, not “substandard” loans; “substandard” loans, however, already embody “elevated risks.” Since the criterion “well-defined weaknesses” – which can be assumed to qualitatively correspond to “elevated risks” – is given equal weight to the 90 days+ criterion and a loan is deemed to be an NPL if at least one of these two elements is present, we now suggest to fully include substandard loans when calculating a comparable Hungarian NPL ratio instead of proposing, as in Barisitz (2011), an NPL band that spreads the breadth of the substandard category. The definition “substandard – doubtful – bad” corresponds to Magyar Nemzeti Bank’s definition of NPLs (Hungary Metadata Questionnaire 2006, subsection E3.1).

Given that in *Romania*, the 90 days+ rule corresponds to the weakest credit quality category (“loss”) and the well-defined weakness criterion probably also includes the second-weakest category (“doubtful”), one can assume that NPLs comprise these last two categories. Therefore, it no longer appears necessary to add the “substandard” category as an NPL band, as in Barisitz (2011). The NPL definition “doubtful – loss” is consistent with the Romanian authorities’ NPL definition (Romania Metadata Questionnaire 2007, subsection E3.1).

In *Serbia*, the loan quality categories D and E correspond to loans that are more than three months overdue. Category C comprises loans that are less than three months overdue but for which the respective bank has estimated that the debtor’s ability to pay has deteriorated or is not satisfactory – which can be assumed to constitute a well-defined weakness. We therefore suggest defining Serbian NPLs in a comparable way by assigning categories C, D and E to impaired loans – and

<sup>6</sup> While these two primary elements indicate when a loan enters into the domain of NPLs, its exit is just as important for the compilation of NPL ratios. A loan can cease to be an NPL through restructuring or replacement (see below), through writing off or even through maturity. Regulations may determine when and how quickly a loan can be written off; write-off timing can also be linked to the legal realization of collateral and to court proceedings. Divergence across jurisdictions with regard to these NPL exit criteria can play a nonnegligible role for NPL ratios (information provided by D’Hulster).

<sup>7</sup> Particularly by omitting the substandard – doubtful – loss criterion and attributing equal status to the criteria “90 days+” and “well-defined weakness.”

not only D and E (with C functioning as an NPL band), as in Barisitz (2011). This approach seems to be in line with Narodna banka Srbije's NPL definition.

In *Ukraine*, NPLs are identified as being 90 days or more overdue, while the well-defined weakness criterion already seems to apply to the substandard category.<sup>8</sup> Therefore, we now opt for suggesting a comparable NPL definition that refers to the sum of the three categories “substandard – doubtful – bad” and no longer propose an NPL band encompassing the breadth of the substandard category.

### **3 Primary and Secondary Elements of NPL Definition in CESEE: Possible Biases across Countries**

#### **3.1 Primary Elements**

The overwhelming majority of CESEE countries' NPL definitions appear to endorse the two primary elements found essential in identifying loans as nonperforming (90 days+ and/or well-defined weaknesses). Therefore, these definitions seem comparable. Russia is the only partial exception: While the Russian definitions follow the underlying logic of the two criteria and the regulations laid down by the Bank of Russia (Central Bank of the Russian Federation – CBR) correspond quite well to the well-defined weakness criterion, there is no clearly spelt-out debt-servicing deadline that indicates from when on a loan becomes delinquent (see table 1, columns 2 and 3). Therefore, in case of doubt, the CBR's NPL regulations relating to the two primary elements may, on balance, be presumed to be somewhat less strict than the common definition. Accordingly, Russia's NPL definition may have a slight downward bias with regard to the primary elements (see table 2).

<sup>8</sup> See *Ukraine Metadata Questionnaire 2009*, subsection C4.1.b and E3.1, “(...) credit exposure is substantial and can further increase; there is a probability of late payment of the full amount (...).”

Table 1

### Outline of Features of National NPL Definitions

| Country and source  | Essential features of NPLs (at least one of the following two features should be present): |  | Categories of credit quality classification (customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL)                   | Classification of restructured/ replacement loans  | Existence of collateral/ guarantees considered in determining classification of loan   | Full outstanding value of loan recorded as NPL (or only overdue installments or amount estimated as non-recoverable) | Downgrade requirement (a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired)  |
|---|--|--|--|--|--|--|---|
|   | Principal or interest payments 90 days overdue (90 days+)                                  | Well-defined weaknesses of borrower or loan  |  |  |  |  |   |
| <b>Bulgaria</b><br>Source:<br><b>Bulgarian National Bank:</b><br>Ordinance No. 9 of 3 April 2008 on the Evaluation and Classification of Risk Exposures of Banks and the Allocation of Specific Provisions for Credit Risk (amended on March 31, 2009);<br><b>Coordinated Compilation Exercise (CCE) for Financial Soundness Indicators (FSIs):</b><br>Answers to Bulgaria's Metadata Questionnaire (February 2007)         | Yes  | Yes (exposures for which available information points to debtors' unstable or substantially deteriorated financial state or current and anticipated proceeds are insufficient for full repayment of their obligations) | Risk exposures: standard – watch – nonperforming – loss (the last two categories should define NPLs)   | Classified as nonperforming  | –  | Yes  | Yes   |
| <b>Croatia</b><br>Source:<br><b>Hrvatska narodna banka:</b><br>Decision on the classification of placements and off-balance sheet liabilities of credit institutions (published in the Official Gazette, entry into force March 2010);<br><b>CCE FSIs:</b> Answers to Croatia's Metadata Questionnaire (January 2007);<br><b>IMF Financial Soundness Indicators (IMF FSIs):</b><br>Croatia Metadata Tables (2010 Quarterly) | Yes  | Yes (evidence of partial or total impairment)  | Risk categories: A/fully recoverable claims – B/partly recoverable claims (B1 – B2 – B3) – C/irrecoverable claims (categories B and C should define NPLs)                    | If a credit institution carries out loan restructuring owing to debtors' deteriorated financial position, debtors are deemed not to be meeting their obligations in a timely manner. Possible impairment losses should be determined by estimating future cash flows and discounting them by the terms of the initial contract | Yes (collateral can impact loan classification if debtors start to settle their obligations irregularly and banks take appropriate and effective legal action in order to collect their claims by activating the available collateral instruments; however, if the value of collateral falls, this can negatively affect the classification of the loan) | Yes (however, specific provisions are deducted from full value of loan)  | No (amount of loss is calculated for each claim that is individually significant, i.e. whose carrying value is greater than the amount set for the portfolio of small loans; exceptionally, all claims to a single debtor against whom bankruptcy proceedings have been initiated may be measured on a group basis) |
| <b>Czech Republic</b><br>Source:<br><b>Česká národní banka:</b><br>Decree No. 123 (2007), as amended by Decree No. 282 (2008), Part Six: Rules for the Acquisition, Financing and Assessment of Assets;<br><b>CCE FSIs:</b> Answers to the Czech Republic's Metadata Questionnaire (November 2006)  | Yes  | Yes (weakness of financial and economic situation of debtor)   | Receivables: standard – watch – substandard – doubtful – loss (according to Česká národní banka, the last three categories define NPLs – this corresponds to our suggestion) | Restructured loans must initially be classified as nonperforming, i.e. at least as substandard. After six months they may be reclassified in other categories according to the related risk  | Yes (if a receivable is supported in full by a high-quality security)  | Yes  | Yes   |

Source: Author's compilation from various sources.

Note: With the exception of footnotes and source, text in italics indicates author's suggestions or comments. "–" indicates that no information could be found on this particular issue.

### Outline of Features of National NPL Definitions

| Country and source  | Essential features of NPLs (at least one of the following two features should be present): |  | Categories of credit quality classification (customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL)                                      | Classification of restructured/ replacement loans   | Existence of collateral/ guarantees considered in determining classification of loan  | Full outstanding value of loan recorded as NPL (or only overdue installments or amount estimated as non-recoverable) | Downgrade requirement (a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired) |
|---|--|--|---|---|---|--|--|
|   | Principal or interest payments 90 days overdue (90 days+)                                  | Well-defined weaknesses of borrower or loan  |   |   |   |  |  |
| <b>Hungary</b><br>Source: Government Decree on Special Provisions Regarding the Annual Reporting and Bookkeeping Obligations of Credit Institutions and Financial Enterprises (No. 250/2000), Annex 7;<br><b>CCE FSIs:</b> Answers to Hungary's Metadata Questionnaire (December 2006)  | Yes  | Yes (risks are elevated or high, loss of more than 10% of amount due can be expected and is not covered by collateral)       | Categories: problem-free – special watch – substandard – doubtful – bad ( <i>according to Magyar Nemzeti Bank, the last three categories define NPLs – this corresponds to our suggestion</i> ) | Restructured troubled loans are not allowed to be treated as problem-free. At least quarterly reviews are required.   | Yes (guarantees and collateral, including the liquidity and enforceability of claims on collateral, are taken into consideration in determining whether exposure is impaired)   | Yes  | Yes  |
| <b>Poland</b><br>Source: Regulation of the Minister of Finance No. 1589 (December 16, 2008), published in Dziennik Ustaw (Official Gazette) 2008, No. 235;<br><b>CCE FSIs:</b> Answers to Poland's Metadata Questionnaire (January 2007)  | Yes  | Yes (economic and financial situation of debtor may jeopardize timely repayment)   | Credit exposures: normal – under observation – below standard – doubtful – lost ( <i>the last three categories should define NPLs</i> )   | Restructured credits (replacement loans or exposures whose repayment terms have been adjusted as a result of the signing of new contracts) may be moved to another exposure category with lower risk, but only after full recovery of debtors' creditworthiness and not earlier than after three months of timely debt service) | Yes (highest-quality security, i.e. cash, government and central bank securities, may be taken into account in loan classification)   | Yes  | Yes  |
| <b>Romania</b><br>Source: <b>Banca Națională a României (BNR):</b> Regulation No. 3/2009 on the Classification of Loans and Investments, and the Establishment, Regularization and Use of Specific Credit Risk Provisions (as amended and complemented by BNR Regulations Nos. 7/2009 and 18/2009);<br><b>CCE FSIs:</b> Answers to Romania's Metadata Questionnaire (January 2007);<br><b>IMF FSIs:</b> Romania Metadata Tables (2008 Annual) | Yes  | Yes (financial performance of debtor has deteriorated or legal proceedings have been initiated in view of recovering claims) | Categories: standard – watch – substandard – doubtful – loss ( <i>according to Romanian authorities, the last two categories should define NPLs – this corresponds to our suggestion</i> )      | Classified as nonperforming (moreover, credit institutions shall classify replacement loans by evaluating the financial performance of debtors using more stringent standards than those used prior to the replacement operation and by adequately reviewing factors based on updated information)                              | Guarantees or collateral securing the principal of loans classified as "loss" and in respect of which legal proceedings have been started and/or in respect of which 90 days or more have elapsed since the loan became due are eligible to be taken into account (up to 25%) as credit risk mitigation factors | Yes  | Yes  |

Source: Author's compilation from various sources.

Note: With the exception of footnotes and source, text in italics indicates author's suggestions or comments. "–" indicates that no information could be found on this particular issue.

Table 1 continued

### Outline of Features of National NPL Definitions

| Country and source   | Essential features of NPLs (at least one of the following two features should be present):                     |  | Categories of credit quality classification (customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL)  | Classification of restructured/ replacement loans   | Existence of collateral/ guarantees considered in determining classification of loan | Full outstanding value of loan recorded as NPL (or only overdue installments or amount estimated as non-recoverable) | Downgrade requirement (a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired) |
|--|--|--|---|---|--|--|--|
|  | Principal or interest payments 90 days overdue (90 days+)  | Well-defined weaknesses of borrower or loan  |   |   |  |  |  |
| <b>Russia</b><br>Source:<br>CBR: Regulation No. 254-P on the Procedure for Making Loan-Loss Provisions and Provisions for Loan Debts and Similar Liabilities by Credit Institutions (March 26, 2004);<br>CBR: Summary Methodology to “Review of the Banking Sector of the Russian Federation” (17th Issue, 2010);<br>CCE FSIs: Answers to the Russian Federation’s Metadata Questionnaire (January 2007);<br>IMF FSIs: Russia Metadata Tables (2011 Quarterly) | No (not explicitly, but quality of debt service dependent on length of payment overdue is important criterion) | Yes (weakness of economic or financial situation of debtor)  | Loan quality categories: standard – substandard – doubtful – problem – bad ( <i>the last three categories should define NPLs</i> )  | Replacement loans are not classified as NPLs unless the debtor’s financial conditions are weak and there are (renewed) overdue payments. After three months the loan is reclassified on the basis of up-to-date information | –  | Yes  | Yes  |
| <b>Serbia</b><br>Source:<br>Narodna banka Srbije: Decision No. 106 on the Classification of Bank Balance Sheet Assets and Off-Balance Sheet Items (December 28, 2007, as amended)  | Yes  | Yes (debtor’s financial position is not satisfactory or indicates serious problems, bank assesses that debtor’s ability to repay has deteriorated) | Categories: A – B – C – D – E ( <i>the last three categories should define NPLs</i> )   | Restructured receivables shall not be regarded as being in default if borrowers settle their obligations pursuant to the new repayment schedule with a delay of no more than 30 days  | Classification of receivables is also based on assessment of collateral quality      | Yes  | Yes  |
| <b>Slovakia</b><br>Source:<br>Národná banka Slovenska: Decree No. 4/2007 on Banks’ Own Funds of Financing and Banks’ Capital Requirements and on Securities Dealers’ Own Funds of Financing and Securities Dealers’ Capital Requirements (March 13, 2007);<br>CCE FSIs: Answers to Slovakia’s Metadata Questionnaire (January 2007);<br>IMF FSIs: Slovakia Metadata Tables (2008 Annual)   | Yes  | Yes (significant perceived decline in credit quality or obligor files for bankruptcy or seeks restructuring proceedings)                           | Loan categories: standard – special mention – substandard – doubtful – loss ( <i>according to Národná banka Slovenska, the last three categories define NPLs – this corresponds to our suggestion</i> ) | Restructured loans have to be classified according to the loss expected from these loans  | –  | Yes  | Yes  |

Source: Author’s compilation from various sources.

Note: With the exception of footnotes and source, text in italics indicates author’s suggestions or comments. “–” indicates that no information could be found on this particular issue.

### Outline of Features of National NPL Definitions

| Country and source   | Essential features of NPLs (at least one of the following two features should be present): |  | Categories of credit quality classification (customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL)   | Classification of restructured/replacement loans  | Existence of collateral/guarantees considered in determining classification of loan   | Full outstanding value of loan recorded as NPL (or only overdue installments or amount estimated as non-recoverable) | Downgrade requirement (a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired) |
|--|--|--|--|---|---|--|--|
|  | Principal or interest payments 90 days overdue (90 days+)                                  | Well-defined weaknesses of borrower or loan  |  |   |   |  |  |
| <b>Ukraine</b><br>Source:<br><b>National Bank of Ukraine:</b> Regulation on Reserve Formation and Usage to Recover Possible Losses on Banks' Credit Transactions (No. 279 of July 6, 2000, as amended);<br><b>CCE FSIs:</b> Ukraine's Metadata Questionnaire (December 2009) | Yes  | Yes (weak financial condition of borrower or low level of loan collateral)   | Categories: standard – watch/under control – substandard – doubtful – bad/nonperforming ( <i>according to the National Bank of Ukraine, the last two categories should define NPLs; for purposes of international comparability it is suggested to regard loans in the last three categories as NPLs</i> ) | Replacement loans have to be classified as substandard, doubtful or bad   | Yes   | Yes  | Yes  |
| Memorandum item<br><br><b>Institute for International Finance (IIF)</b><br>Source:<br><b>IMF:</b> Financial Soundness Indicators Compilation Guide (March 2006), Appendix VI   | Yes  | Yes (loan shows well-defined weaknesses that could lead to loss if not corrected; collection or liquidation of loan in full is determined by bank management to be improbable due to current conditions) | Standard – watch/special mention – substandard – doubtful – loss/write-off (last three: NPL)   | Replacement loans/restructured loans are those for which the lender grants concessions that would not otherwise be granted because of the debtor's financial difficulty. Restructured loans are often treated identically with impaired assets until a record of payment is established, after which they can be upgraded | Overall international practice: Most jurisdictions do not consider condition of collateral or guarantees in classifying loans; moreover, declines in the value of collateral or guarantees are predominantly not taken into account as a basis for classifying a loan as impaired | Yes  | –  |

Source: Author's compilation from various sources.

Note: With the exception of footnotes and source, text in italics indicates author's suggestions or comments. "–" indicates that no information could be found on this particular issue.

### 3.2 Secondary Elements

In this subsection we focus on the so-called secondary elements, which do not constitute immediate defining components of NPLs (see Barisitz, 2013) but which may have an upward or downward impact on individual countries' NPL definitions and data.<sup>9</sup> These secondary elements are:

- (a) the question whether restructured loans or replacement loans are classified as NPLs or performing loans<sup>10</sup> (see in table 1, column 5);

<sup>9</sup> This may cause individual countries' NPL definitions to be stricter or less strict than a benchmark (see below).

<sup>10</sup> Actually, there is a broad range of national definitions of restructuring and refinancing. These may e.g. include postponement of interest, renegotiation of interest, deferral of principal and/or of fees, additional grace periods, interest-only periods, repossession of part of collateral and partial write-offs. These differences also impinge on the level of NPLs (information provided by D'Hulster).

- (b) the question whether the existence of a collateral or guarantee is taken into account in grading loans in the sense that the quality of a loan deemed to suffer serious weaknesses is upgraded to “performing” thanks to the presence of a high-value collateral (table 1, column 6);
- (c) the question of what is actually recorded as nonperforming: the full outstanding value of the loan in question or just the sum of overdue installments or an amount gauged by the credit institution to be irrecoverable (which might only be a fraction of the full amount) (table 1, column 7); and
- (d) the question whether a bank is required to downgrade all loans to a given debtor if any of these loans is/are classified as impaired (downgrade requirement for multiple loans, or NPL customer view) – or not (NPL product view) (table 1, column 8).

Considering international approaches as well as average European or common practices, Barisitz (2013) proposed the following comparability benchmarks for the above-mentioned secondary elements:

- (a) restructured and/or replacement loans are classified as NPLs (at least for an initial period of a couple of months until a record of payment is established);
- (b) the quality of a loan is judged in its own right independent of collateral or guarantees;
- (c) the total gross value of a loan is recorded as nonperforming (not just the amount overdue or an amount deemed by the bank to be irrecoverable);
- (d) a bank is not required to downgrade all loans to a given debtor if any of these loans is/are classified as impaired (NPL product view).<sup>11</sup>

The specific rules and practices prevailing in the CESEE countries with regard to the secondary elements can now be assessed against these benchmarks (for a systematic overview, see tables 1 and 2).

*Bulgaria* applies the downgrade requirement for multiple loans (or practices the NPL customer view), which generates an upward bias vis-à-vis the above benchmark. Regarding other secondary elements, Bulgaria either does not have a specific position (collateral or guarantees) or hits the benchmark (restructured and/or replacement loans, total value). We therefore assign Bulgaria an upward bias with regard to the secondary elements which, combined with the fact that the country does not display a bias with respect to the primary elements, may produce an overall slight upward bias. To be internationally comparable, therefore, Bulgaria’s NPL data may need a slight downward adjustment.

In *Croatia*, while debtors of a restructured loan are “deemed not to be meeting their obligations in a timely manner” (see table 1), this does not necessarily mean that the respective restructured loan is classified as nonperforming. Croatian collateral and/or guarantees do have a possible impact on loan classification – in both ways.<sup>12</sup> Given that deviation from the benchmark in this case can explicitly go

<sup>11</sup> This last benchmark is chosen for reasons of consistency with the respective comparability benchmark explained in Barisitz (2013), although the majority of CESEE countries (but not the majority of European countries) apply the downgrade requirement and although from a general supervisory viewpoint (notwithstanding lack of guidance from the FSI Compilation Guide or the IIF) it would be preferable to adopt the stricter NPL customer view (downgrade requirement) as a benchmark.

<sup>12</sup> More precisely, if a bank takes appropriate and effective legal action to collect its claims by activating available instruments of collateral, the respective loan that has become impaired can be reclassified. Inversely, the grading of a loan can also be negatively affected if the value of collateral falls (see table 1).

both upward and downward, impacts might be mutually exclusive. However, the principle of prudence, like in the case of primary elements with respect to Russia above, would suggest a minor downward bias for the Croatian rule on collateral. According to Croatian regulations, it is not exactly the full gross value of a loan that is recorded as nonperforming, but the net value (after deduction of specific provisions). Together with the lack of a downgrade requirement, this combination of somewhat weaker rules than our benchmarks results in a clear downward bias with respect to the secondary elements. Combined with the fact that Croatia does not display a bias in terms of the primary elements, this results in an overall slight downward bias in Croatia's NPL definition, implying that the country's NPL data would need to be corrected somewhat upward to be internationally comparable. An attempt to quantify the respective Bulgarian and Croatian biases would require a detailed investigation into the country-specific practices relating to the secondary elements, which unfortunately cannot be undertaken here.

The *Czech Republic's* rules also allow collateral and/or guarantees to have an impact on the classification of a loan “if a receivable is supported in full by a high-quality security” (table 1). This corresponds to a slight negative bias, given that the opposite option of downgrading a loan through loss of collateral value is not mentioned. This stance on the one hand and the country's NPL customer view on the other appear to largely offset each other. Together with the fact that no bias can be detected with regard to the other secondary elements and the primary elements, this would suggest that overall the Czech Republic's NPL definition is unbiased (see table 2).

As regards the treatment of restructured loans, *Hungary* is comparable to Croatia in stating that “restructured troubled loans are not allowed to be treated as problem-free.” This does not necessarily imply that such loans are graded as impaired. Hungary's rule on the consideration of collateral does not essentially differ from the Czech Republic's approach and is more lenient than the benchmark. Hungary's somewhat weaker stances in the above two respects on the one hand and its stricter approach to the downgrade requirement for multiple loans on the other may possibly have offsetting effects, which means that no biases can be found with respect to the secondary and primary elements and, overall, Hungary's NPL definition does not display a bias, either.

*Poland's* very small downward bias with regard to collateral (i.e. only highest-quality collateral may be recognized in loan classification) combined with its adherence to the NPL customer view can be interpreted as producing a slight upward bias with regard to the secondary elements. Applying the principle of caution and given Poland's unbiased stance on the primary elements, overall, the country's NPL definition does not appear to be biased.

*Romania's* approach to restructured and/or replacement loans is even marginally more restrictive than our benchmark (which identifies them as NPLs) since “the financial performance of debtors [is to be evaluated] using more stringent standards than those used prior to the replacement operation” (table 1). Then again, similar to the practice in other CESEE countries, if with differing particular stipulations, Romania takes into account guarantees or collateral as credit risk mitigation factors. Combined with these unequal opposing influences, Romania's downgrade requirement for multiple loans yields a slight upward bias with respect to the secondary elements. The principle of caution and the fact that no bias can be

found with respect to the primary elements suggest that overall, the Romanian NPL definition is not biased.

Russia's treatment of replacement loans appears slightly less rigorous than our benchmark in the sense that replacement loans are not regarded as nonperforming automatically, but only if overdue payments are renewed. This minor downward distortion is contrasted by Russia's NPL customer view, which produces a slight upward bias with respect to the secondary elements. This, in turn, contrasts with Russia's slight downward bias with respect to the primary elements. Thus, both movements might (possibly) cancel each other out, which suggests that overall, Russia's NPL definition does not appear to display a bias (table 2).<sup>13</sup>

Serbia is a bit more lenient than the benchmark with respect to replacement loans and the consideration of collateral, while it is stricter than the benchmark on the downgrade requirement. Taken together, these two possibly offsetting approaches may confirm the country's unbiased position with respect to the primary elements.

Finally, Slovakia's and Ukraine's leniency regarding the treatment of restructured loans, respectively collateral, combined with their rigorous positions (NPL customer view) on the downgrade requirement do not suggest a perceptible bias with regard to the secondary elements. In combination with both countries' balanced stances on the primary elements, this yields NPL definitions that do not display a bias vis-à-vis the benchmark and are therefore internationally comparable.

Table 2

### Qualitative Assessment of the International Comparability of National NPL Definitions

| Country        | Primary elements of NPL definition and ratio (90 days+, well-defined weakness) | Secondary elements that influence NPL ratio (classification of replacement loans, role of collateral in grading credit quality, part of loan recorded as NPL, existence of downgrade requirement) | Resulting overall assessment of NPL definition and ratio in light of international comparability <sup>1</sup> |
|----------------|--|---|---|
| Bulgaria       | No bias (comparable)   | Upward bias   | Slight upward bias  |
| Croatia        | No bias (comparable)   | Downward bias   | Slight downward bias  |
| Czech Republic | No bias (comparable)   | No bias (comparable)  | No bias (comparable)  |
| Hungary        | No bias (comparable)   | No bias (comparable)  | No bias (comparable)  |
| Poland         | No bias (comparable)   | Slight upward bias  | No bias (comparable)  |
| Romania        | No bias (comparable)   | Slight upward bias  | No bias (comparable)  |
| Russia         | Slight downward bias   | Slight upward bias  | No bias (comparable)  |
| Serbia         | No bias (comparable)   | No bias (comparable)  | No bias (comparable)  |
| Slovakia       | No bias (comparable)   | No bias (comparable)  | No bias (comparable)  |
| Ukraine        | No bias (comparable)   | No bias (comparable)  | No bias (comparable)  |

Source: Author's assessment and compilation.

<sup>1</sup> A downward (upward) bias of the NPL definition and ratio compared to widespread practice would imply the need for an upward (downward) correction of data to enhance their international comparability.

Note: Shades of blue indicate degree of bias (ranging from white = upward to dark blue = downward).

<sup>13</sup> This recalls some similarities with the case of Finland as described in Barisitz (2013).

#### 4 Snapshot of NPL Development in CESEE from End-2010 through End-2012

We now take a comparative look at NPL development in the ten analyzed CESEE countries in the period from end-2010 to end-2012. This links up to the statistical observations in section 3 of Barisitz (2011, pp. 54–57), which had covered the period from end-2005 to end-2010. As regards the conclusions of these observations, not much has changed. As chart 1 shows, overall NPL levels have not decreased in the countries analyzed. Serbia and Ukraine remain saddled with very high NPL risks, followed by Bulgaria, Croatia, Hungary, Romania and Russia with medium-level to elevated risks. Finally, the Czech Republic, Poland and Slovakia continue to record the relatively lowest risks. Given the large relative size of Croatia's credit volume, which substantially exceeds 100% of GDP,<sup>14</sup> the chart depicting Croatia's credit quality is scaled somewhat larger than all other charts and is presented separately as chart 2.

The only country whose credit volume rose substantially (by a total of more than 5 percentage points of GDP) over the course of 2011 and 2012 was Russia. Bulgaria, the Czech Republic, Poland, Serbia and Slovakia recorded more modest credit growth (by less than 5 percentage points of GDP). Croatia, Hungary, Romania and Ukraine had to contend with obviously crisis-linked contractions of their credit volume-to-GDP ratios. These contractions were most pronounced in Hungary and Ukraine.

The share of NPLs in total loans<sup>15</sup> and/or the ratio of NPLs to GDP increased during the observation period in Bulgaria, Croatia, Hungary and Romania. It remained more or less steady in the Czech Republic, Poland, and Serbia, while it declined in Russia and went down slightly in Slovakia and Ukraine.

Whereas up to end-2008 (largely in the pre-crisis period), NPLs in most CESEE countries had not exceeded 5% of total loans and/or GDP (exceptions: Russia, Serbia, Ukraine), as of end-2012, the exceptions in a way became the rule, with only the Czech Republic, Poland and Slovakia still recording NPL levels that were below the 5% threshold. As of end-2012, ratios of NPLs to total loans and/or GDP of around 10% or more were commonplace in the majority of CESEE countries analyzed (i.e. in Bulgaria, Croatia, Hungary, Romania, Russia, Serbia and Ukraine). High levels of 20% or above were more widespread than before (end-2012: Romania, Serbia, Ukraine), as shown in charts 1 and 2.

Based on the above definitions, conclusions and the available data, Serbia's and Ukraine's NPL ratios may give rise to particular concern. Serbia's share of NPLs in total loans remains above 30% and has hardly budged despite a spurt of loan growth in the first half of 2012. The Ukrainian NPL level is even higher (end-March 2012: 39% of total loans), while the country's overall credit volume has contracted. Chart 1 illustrates that in both cases, the NPL-to-GDP ratio is very high at about 25%.

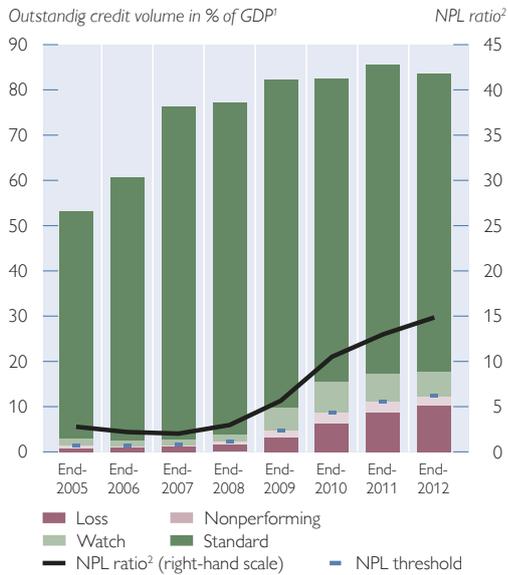
<sup>14</sup> Croatia's credit-to-GDP ratio is, however, substantially lower than the euro area average, and Croatia's GDP per capita is higher than that of most of its regional peers.

<sup>15</sup> One should bear in mind that comparisons of NPL ratios, i.e. the ratio of NPLs to total loans, do not only depend on the numerator but also on the denominator – the volume of total loans – which can diverge. This is likely for the countries analyzed here. Therefore, notwithstanding the quest to make the content of NPL definitions as comparable as possible, the comparison of NPL ratios has to be assessed with caution. This problem can be partly circumvented by looking at the ratios of NPLs to GDP (see above), although this indicator is, of course, somewhat different in nature. See also the note at the bottom of chart 1.

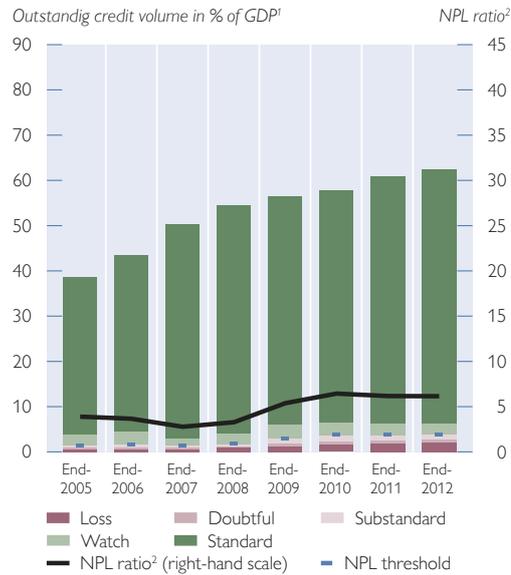
Chart 1

## Development of Credit Volume and Credit Quality in Nine CESEE Countries (2005–12)

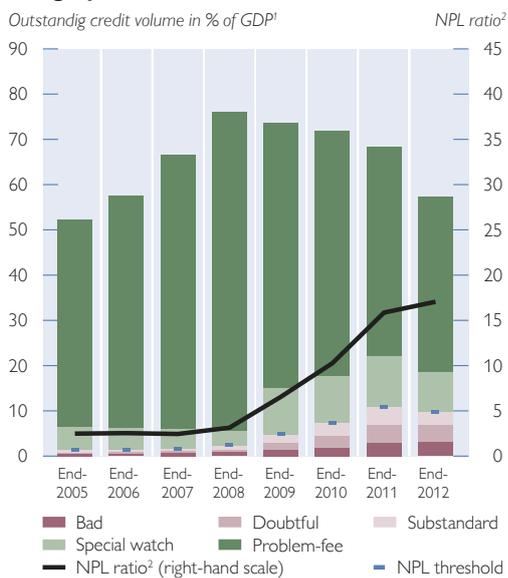
### Bulgaria



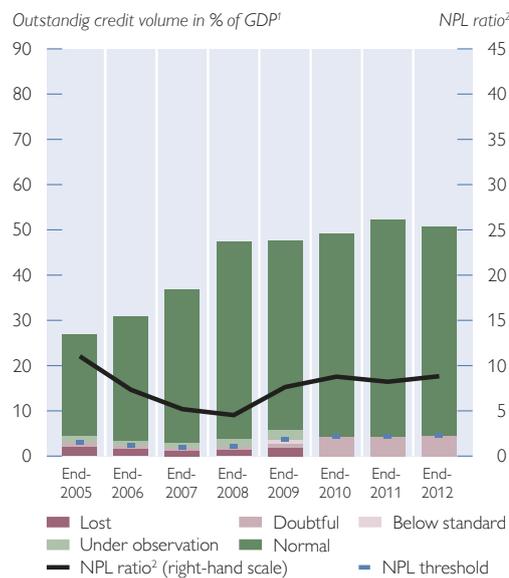
### Czech Republic



### Hungary



### Poland<sup>3</sup>



Source: National central banks, Eurostat. For Hungary: Hungarian Financial Supervisory Authority (PSZAF), Eurostat. For Russia and Ukraine: National central banks, national statistical offices.

<sup>1</sup> Broken down by credit quality categories.

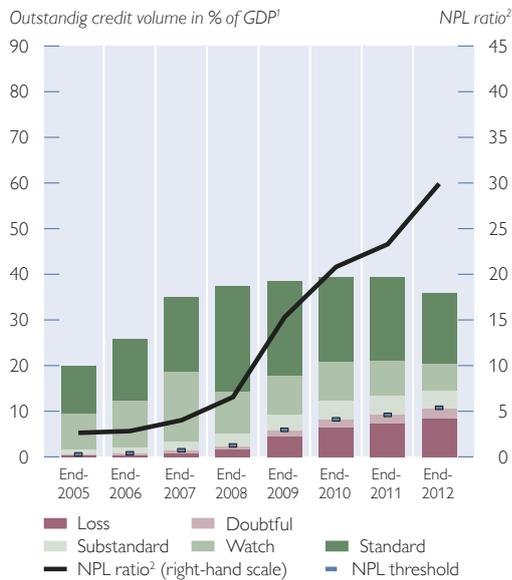
<sup>2</sup> Ratio of NPLs to total loans.

<sup>3</sup> For end-2010 to end-2012, doubtful loans represent all NPLs (impaired loans) and normal loans also include loans under observation.

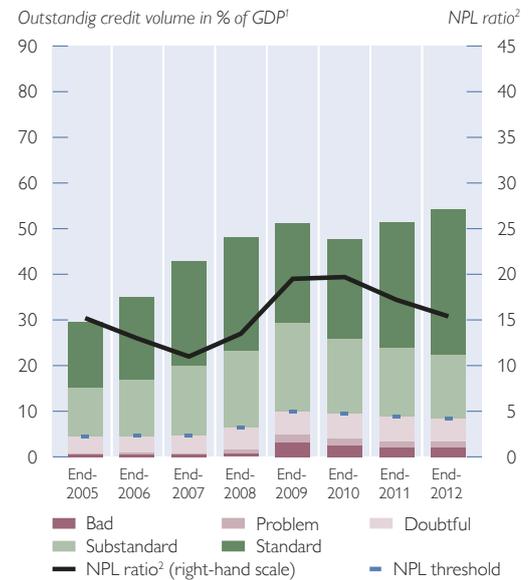
Note: Total credit aggregates correspond to national definition.

## Development of Credit Volume and Credit Quality in Nine CESEE Countries (2005–12)

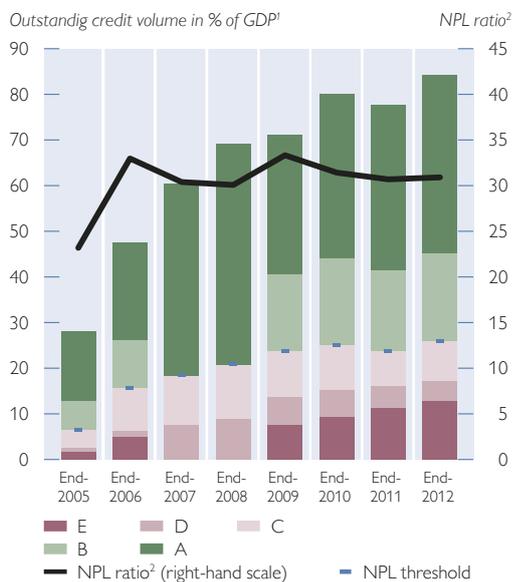
### Romania



### Russia



### Serbia<sup>3</sup>



### Slovakia<sup>4</sup>



Source: National central banks, Eurostat. For Hungary: Hungarian Financial Supervisory Authority (PSZAF), Eurostat. For Russia and Ukraine: National central banks, national statistical offices.

<sup>1</sup> Broken down by credit quality categories.

<sup>2</sup> Ratio of NPLs to total loans.

<sup>3</sup> Asset classification rules were substantially changed in the fourth quarter of 2006 and the third quarter of 2008. For end-2007 and end-2008, category A loans include those of category B and category D loans include those of category E. For end-2007 the breakdown of NPLs into categories D and C, and for end-2008 the level of C loans, had to be estimated.

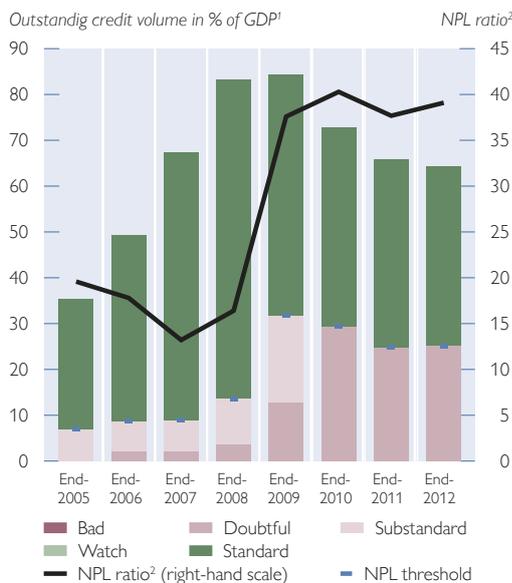
<sup>4</sup> Standard loans here include special mention loans; doubtful loans represent all default category loans or NPLs (i.e. including loss and substandard).

Note: Total credit aggregates correspond to national definition.

Chart 1 continued

### Development of Credit Volume and Credit Quality in Nine CESEE Countries (2005–12)

#### Ukraine<sup>3</sup>



Source: National central banks, Eurostat. For Hungary: Hungarian Financial Supervisory Authority (PSZAF), Eurostat. For Russia and Ukraine: National central banks, national statistical offices.

<sup>1</sup> Broken down by credit quality categories.

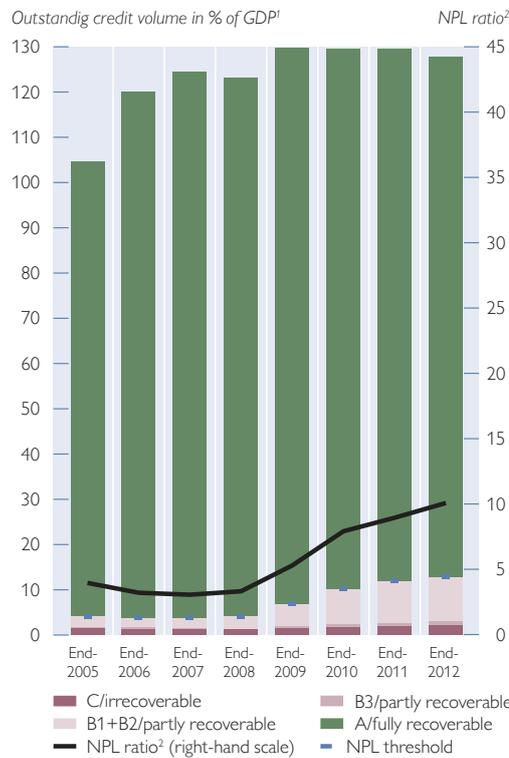
<sup>2</sup> Ratio of NPLs to total loans.

<sup>3</sup> End-2005: Substandard loans represent all NPLs. End-2006 to 2009: Doubtful loans as depicted in this chart include bad loans and substandard loans not timely serviced. End-2010 to 2012: Doubtful loans additionally include timely serviced substandard loans.

Note: Total credit aggregates correspond to national definition.

Chart 2

### Development of Credit Volume and Credit Quality in Croatia (2005–12)



Source: NBC, Eurostat

<sup>1</sup> Broken down by credit quality categories.

<sup>2</sup> Ratio of NPLs to total loans.

Note: Total credit aggregate corresponds to national definition.

## 5 Summary and Assessment

This article builds on a previous study dealing with national definitions of nonperforming loans (NPLs) in ten CESEE countries (Barisitz, 2011) and on a subsequent study focusing on the same issues, in more detail, with respect to nine Western European countries (Barisitz, 2013). The present study points out implications of the findings of Barisitz (2013) for the assessment of NPL definitions in CESEE. The overriding quest is to find an analytical NPL definition that is as comparable as possible across countries in order to help rendering NPLs a more meaningful credit quality indicator for banking supervisors and governments. This study recommends a more streamlined basic definition of NPLs and adds a more systematic survey of (primary and secondary) elements of national NPL definitions to enhance cross-country comparability. The countries dealt with in Barisitz (2011) and in the present study are some of the largest of the CESEE region: Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Russia, Serbia, Slovakia and Ukraine.

Barisitz (2011) found three elements of importance in identifying loans as nonperforming: “principal or interest 90 days or more overdue,” “well-defined weaknesses of loans or borrowers” and the three weakest credit quality categories

“substandard – doubtful – loss.” Since this last element is far from being universally used in Western Europe, its actual meaning may differ perceptibly from one country to another and it is not present in the definition of default by the Basel Committee on Banking Supervision (2004), we regard “substandard – doubtful – loss” as less important than the other two (primary) elements. Findings for Western Europe and further research lead us to suggest that the presence of either of the two primary elements should be regarded as sufficient to classify a loan as impaired. As pointed out in Barisitz (2013), this notion also corresponds to the NPL definition contained in the draft of the EU Capital Requirements Regulation, which will probably enter into force in 2014.

The slightly refocused and simplified NPL definition proposed here leaves findings for six CESEE countries essentially unchanged from those of Barisitz (2011), yet somewhat revises and simplifies the results for Hungary, Romania, Serbia and Ukraine. In all of these four cases, NPL bands are no longer needed to make NPL data as comparable as possible.

Apart from the two primary elements mentioned above, the following secondary elements may cause an upward or downward bias in individual countries’ NPL definitions or data (Barisitz, 2013): (a) the way restructured loans are classified – as NPLs or not, (b) the question whether collateral or guarantees are considered in the classification of a loan or not, (c) the question whether the full outstanding value of a loan is recorded as nonperforming or not, and (d) the question whether a bank is required to downgrade all loans to a given debtor if any of them are classified as impaired (NPL customer view) or not (NPL product view).

Looking at both primary and secondary elements and relating to widespread approaches and benchmarks, the majority of NPL definitions and ratios of the CESEE countries analyzed would seem comparable. Only in the case of Bulgaria do we find a slight upward bias, and in the case of Croatia a slight downward bias, in terms of international comparability. To be internationally comparable, therefore, Bulgaria’s and Croatia’s indicators would need to be corrected slightly downward and slightly upward, respectively. The reader should note that these findings are of a qualitative nature, as a quantification is currently not feasible due to lack of adequate specific data.

Based on these specifications, a look at the development of comparative NPL data in the ten analyzed countries in the period from end-2010 to end-2012 mainly corroborates the findings for the period from end-2005 to end-2010 presented in Barisitz (2011). Overall, NPL levels in these countries have not decreased. At end-2012, seven out of ten countries recorded NPL levels of around or above 10% of total loans (sometimes far above this level). Serbia and Ukraine remain saddled with very high NPL risks, followed by Bulgaria, Croatia, Hungary, Romania and Russia with medium-level to elevated risks. Finally, the Czech Republic, Poland and Slovakia continue to record relatively modest risks.

While the present CESEE data render valuable insights into comparative NPL dimensions and dynamics, for analytical purposes it would be helpful to have more precise information for most countries on additional elements like the currency composition of NPLs or the share of restructured or replacement loans in total NPLs.

Given the challenges of establishing comparability of NPL definitions and data and given the importance of this quest in the face of the lingering economic crisis

and high NPLs in various European countries, the adoption of a common EU NPL definition and the harmonization of secondary elements of national NPL definitions could help enhance transparency and make economic policy more effective. European convergence in the regulation of prudential provisions and asset classification would also work to this effect. Moreover, there is hope that many non-EU countries would begin to apply harmonized definitions if these existed.

Future research could try to shed more light on the denominator (total loans) of NPL ratios to raise the indicator's accuracy in international comparison. The various exit avenues for NPLs could also be studied in more detail, as could the range of national definitions of restructuring and refinancing loans and the panoply of provisioning regimes. Another task would be to attempt to quantify the biases and divergences of NPL definitions and data from the benchmarks this study identified.

Together, the author's previous two NPL studies (Barisitz, 2011; Barisitz, 2013) as well as the present one aim to derive NPL ratios that are roughly internationally comparable in a transparent and replicable manner. We thereby hope to make a background contribution to improving the understanding of a crisis-relevant, complex and sometimes cloudy matter of banking supervision and economic policy.

## References

- Barisitz, S. 2011.** Nonperforming Loans in CESEE – What Do They Comprise? In: Focus on European Economic Integration Q4/11. Vienna: OeNB. 46–68.
- Barisitz, S. 2013.** Nonperforming Loans in Western Europe – A Selective Comparison on National Definitions In: Focus on European Economic Integration Q1/13. Vienna: OeNB. 28–47.
- Basel Committee on Banking Supervision. 2004.** International Convergence of Capital Measurement and Capital Standards – A Revised Framework. Basel: Bank for International Settlements.
- Council of the European Union. 2012.** Proposal for a Regulation of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms – Presidency Compromise. 9715/12. EF 112. ECOFIN 392. CODEC 1251. May 11.
- European Banking Authority. 2013.** Consultation Paper – Draft Implementing Technical Standards – On Supervisory reporting on forbearance and non-performing exposures under article 95 of the draft Capital Requirements Regulation.  
[www.eba.europa.eu/documents/10180/40000/CP-on-Forbearance-and-non-performing-exposures.pdf](http://www.eba.europa.eu/documents/10180/40000/CP-on-Forbearance-and-non-performing-exposures.pdf) (retrieved on July 23, 2013).
- European Banking Authority. 2013.** Risk Assessment of the European Banking System. January.  
[www.eba.europa.eu/documents/10180/16145/EBA-BS-2012-273--Risk-Assessment-Report-January-2013-.pdf](http://www.eba.europa.eu/documents/10180/16145/EBA-BS-2012-273--Risk-Assessment-Report-January-2013-.pdf) (retrieved on, July 23, 2013).
- European Banking Coordination “Vienna” Initiative. 2012.** Working Group on NPLs in Central, Eastern and Southeastern Europe. March.  
[www.imf.org/external/region/eur/pdf/2012/030112.pdf](http://www.imf.org/external/region/eur/pdf/2012/030112.pdf) (retrieved on July 23, 2012).
- European Commission. 2011.** Proposal for a Regulation of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms. COM(2011) 452 final. July 20.

- European Systemic Risk Board. 2013.** ESRB General Board Meeting in Frankfurt: Strengthening the EU's financial system is needed for a sustainable recovery. Press release. March 21. [www.esrb.europa.eu/news/pr/2013/html/pr130321.en.html](http://www.esrb.europa.eu/news/pr/2013/html/pr130321.en.html) (retrieved on March 29, 2013).
- IMF.** Coordinated Compilation Exercise (CCE) for Financial Soundness Indicators (FSIs). Metadata Questionnaires (Bulgaria: February 2007; Croatia: January 2007; Czech Republic: November 2006; Hungary: December 2006; Poland: January 2007; Romania: January 2007; Russia: January 2007; Slovakia: January 2007; Ukraine: December 2009).
- IMF.** Financial Soundness Indicators (FSIs). Metadata Tables (Croatia: 2010 Quarterly; Romania: 2008 Annual; Russia: 2011 Quarterly; Slovakia: 2008 Annual).
- IMF. 2006.** Financial Soundness Indicators Compilation Guide. March. [www.imf.org/external/pubs/ft/fsi/guide/2006/index.htm](http://www.imf.org/external/pubs/ft/fsi/guide/2006/index.htm) (retrieved on July 23, 2013).
- IMF. 2011.** Financial Soundness Indicators. <http://fsi.imf.org> (retrieved on July 23, 2013).

In addition to the above sources, various national regulatory announcements, guidelines, annual reports, reviews and other publications as well as information provided by national experts have been taken into account.

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

Katharina Steiner<sup>1</sup>

*Residential property prices play an important role in many areas of economics and finance. They are used, for example, to determine the value of a major component of real wealth, as an indicator of financial stability risks stemming from residential property price gyrations, or to monitor inflation developments. However, the specific characteristics of residential property make primary data collection and index calculation difficult tasks. Against this background, the aim of this paper is to compare different residential property price indices in terms of price developments and methodologies for the ten Central, Eastern and Southeastern EU Member States (CESEE-10). In doing so, we focus on new developments in data availability for the CESEE-10, in particular the recent release of the Eurostat house price index (HPI). This index is a major step forward, providing improved EU-wide cross-country comparability of housing transaction prices. The comparison of the different data series with the new Eurostat index indicates some differences in the timing of local price peaks and the degree of price dynamics. Moreover, price movements diverged in some CESEE countries in the past two years. The comparison of the new Eurostat index to a price index that is purely based on asking prices exhibits a slightly lower correlation. Panel data research is set to benefit from Eurostat's compilation of national house price indices, while time series analysis will continue to rely on the longer series of national statistics for the time being.*

*JEL classification: C8, E3, P22*

*Keywords: Residential property prices, housing markets, Central, Eastern and Southeastern Europe*

Residential property markets are local markets and therefore used to be considered to be mainly of national interest. In the same vein, property market crises were viewed as local turmoil with no major impact on other economies (e.g. the Swedish, Norwegian and Finnish housing market crisis in the second half of the 1980s and early 1990s). But in 2007–08, the turbulence that started in the U.S. housing and mortgage market turned into a major international economic and financial crisis, as it created massive cross-country spillovers via globalized financial markets and structured products.

When, in the wake of the recent distress in financial markets, the international community started to pay increasing attention to the monitoring of property price developments worldwide, huge information gaps became obvious. Upon recommendation of the Financial Stability Board (FSB) and the International Monetary Fund (IMF) to the G-20 finance ministers and central bank governors, the Bank for International Settlements (BIS) was assigned to collect and disseminate residential property price statistics to visualize the status quo of data coverage.<sup>2</sup> It turned out that data availability and the methodologies for data collection vary to a great extent between countries.

<sup>1</sup> Oesterreichische Nationalbank, Foreign Research Division, [katharina.steiner@oenb.at](mailto:katharina.steiner@oenb.at). The author would like to thank Peter Backé, Zoltan Walko and Josef Schreiner (all OeNB) and Maximilian Mendel (Residential Advisors) for valuable comments.

<sup>2</sup> This information has been available at [www.bis.org](http://www.bis.org) since 2010.

The next step would be to set up common international standards for property price statistics to enhance data quality and cross-country comparability. To date, this remains an open issue at the international level. Meanwhile, Eurostat started work on a Handbook on Residential Property Price Statistics to give practical guidance on setting up residential property price indices and improving their quality. In addition, Eurostat and national statistical institutes (NSIs) undertook a series of pilot projects to develop and compile housing price indices for owner-occupied housing (OOH) in the framework of the Harmonised Index of Consumer Prices (HICP). A key outcome of these efforts is Eurostat's house price index. It was released in early 2013 and aims at raising the cross-country comparability of price data, at least for the 27 EU Member States, including the 10 Member States in Central, Eastern and Southeastern Europe (CESEE-10).<sup>3</sup>

The aim of this study is to (1) briefly discuss the general characteristics of residential property prices and important aspects related to data collection and data processing, (2) to show two different residential property price time series gathered by NSIs for the CESEE-10, (3) to compare these time series to the Eurostat residential property price time series as well as to discuss methodological differences and (4) to touch upon implications for future research that uses house prices.

## 1 Characteristics of Residential Property Price Data

Residential property prices can be used for different purposes: Consumers can use this information to decide whether to buy or to rent a home; experts can use them as a yardstick to measure real wealth, as a financial stability indicator, as input into the consumer price index or as an indicator of macroeconomic activity (Eurostat, 2013a). Each use may require the index to be based on specific primary data and calculation methodologies. For example, buyers and sellers of residential property need the residential property price index to be based on transaction prices to assess house price inflation. By contrast, an economist interested in measuring an economy's (real) housing wealth needs additional information on the housing "stock of non-transacted dwellings" (Eurostat, 2013a). These examples describe the two separate types of residential property price indices which can be distinguished: a price index based on the stock of residential property at a given point in time and an index for residential property sales during a particular period of time (Eurostat, 2013a). As current principal values of non-traded housing stock are mostly not available, reweighting of transaction price data is used to reflect the different mix of houses in the non-traded housing stock.<sup>4</sup>

In general, primary data vary according to geographical location and the point in time when they are measured during a house purchase process (e.g. asking price versus final transaction price). The data can be taken from different sources, e.g. real estate agencies, newspapers or property registers and tax offices. Each of them has advantages and disadvantages. Data taken from property registers often do not offer detailed information on qualitative characteristics of the property, and the

<sup>3</sup> The CESEE-10 include Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

<sup>4</sup> Eurostat's Handbook (Eurostat, 2013a) provides detailed information on these issues and related methodological aspects.

indicated value of the property may be outdated or even incorrect. On the other hand, data taken from real estate agencies may only cover a certain type of residential property, and offer prices often overestimate the price of the real transaction. In addition, the composition of the types of properties sold can change over time and should not be interpreted as a price change (Eurostat, 2013a). Residential property transactions may also be very infrequent, particularly in countries with high rates of homeownership, such as in CESEE, which complicates the data compilation further (Hilbers et al., 2008).

Residential property markets are rather opaque and segmented, as the majority of residential properties is unique. It is therefore important to have information on quality characteristics of residential property, e.g. the size of the land the house sits on, location of the property, age, type (detached/semi-detached house, flat) and materials used (Eurostat, 2013b). As the quality of the property changes over time due to depreciation or renovation activities, the construction of price indices is even more difficult in comparison to typical price indicators of identical goods (Brunauer et al., 2012). Therefore, statisticians construct so-called constant quality indices, e.g. via hedonic regressions.<sup>5</sup> In light of the different methods, Eurostat released its Handbook on Residential Property Price Indices in April 2013 (Eurostat, 2013a), which serves as a comprehensive guideline for collecting and processing residential property price data for statisticians.

In practice, limited availability of primary data (in terms of data frequency, coverage and quality characteristics) often comes into play and constrains the construction of different residential property price time series. In addition, price indices are published more often than nominal price time series. The former, however, do not give any indication of different price levels across geographical areas or different types of properties. Therefore, it is of importance to describe the characteristics of the data applied in detail and exercise caution in the interpretation of the data at hand, given the differences and difficulties in compiling.

## 2 Residential Property Price Indices in CESEE: A Comparison

In CESEE, most countries saw a strong rise in residential property prices until 2007–08, followed by a more or less severe contraction. Price increases partly reflected the catching-up process in the formerly state-controlled housing market. During the privatization process in the early 1990s, houses were often sold below market prices. The subsequent surge in house prices went along with, *inter alia*, (expectations of) rising household income, stronger demand for higher living standards, and – consequently – heightened indebtedness of households and increased lending to households in foreign currency (Huynh-Olesen et al., 2013).

In most CESEE countries, NSIs or the national central bank publish several residential property price series based on different primary data and property characteristics, such as prices for new and/or existing dwellings, flats or houses in different geographical areas, based on transaction or asking prices. Both the BIS and the ECB collect and disseminate residential property price statistics from these national sources; these collections give a good overview of the variety of

<sup>5</sup> Other methods are described in detail in Eurostat (2013a).

available time series<sup>6</sup>. Chart 1 shows two residential property price indices for the whole country and the capital city for each of the CESEE-10,<sup>7</sup> which allow analyzing price volatility, but do not give an indication of the nominal price level. In Bulgaria the price index is available only for the whole country, and in Romania only for the capital city. The indices were selected on the basis of more or less common characteristics, but data availability also constrained the selection. Detailed information on the data characteristics and sources can be found in the annex (table A).

Nominal house prices in CESEE mostly peaked around 2007 and 2008, with the exception of Poland (2009) and Hungary (2011). But in contrast to the transaction price data shown in chart 1, market observers saw Polish housing prices decline already in late 2008. This discrepancy shows that data collection methods matter a lot: For example, the collection of transaction price data on the basis of notarial purchase contracts might be biased by late registrations of property purchases. Overall, the countries with the strongest cumulative price hikes up to the local price peak were also those with the strongest price decline afterwards, namely the Baltics, Bulgaria and Romania. Since 2009–10, prices have been on the rise again in some countries, mainly in Estonia and Latvia. In the other countries, prices were mainly flat or even declined somewhat further, also as a result of a decline in the number of housing transactions.

The comparison of the price index for the capital city and the index for the whole country reveals that the indices moved largely in parallel. Some difference in the timing of the local price peak and the degree of price dynamics can be identified, particularly in Hungary, Poland and Slovenia. In 2012, there was some divergence, as in Slovenia and Lithuania, prices for the whole country declined while capital city house prices increased. In Latvia, the price increase in the whole country seen recently was not as strong as the price increase in the capital city.

As far as the methodology used to compute the price indices is concerned, both indices are mainly based on transaction prices per square meter, except for the indices for Romania, Slovakia and Poland (REAS, national central bank and NSI, respectively).<sup>8</sup> They comprise both new and existing dwellings. The data provided by the NSIs or national central banks are mostly also available via the ECB or BIS database.

<sup>6</sup> The ECB provides publicly available data via its Statistical DataWarehouse (SDW). The BIS provides publicly available data at <http://www.bis.org/statistics/pp.htm>. The another's compilation of data definitions for the CESEE-10 is available upon request.

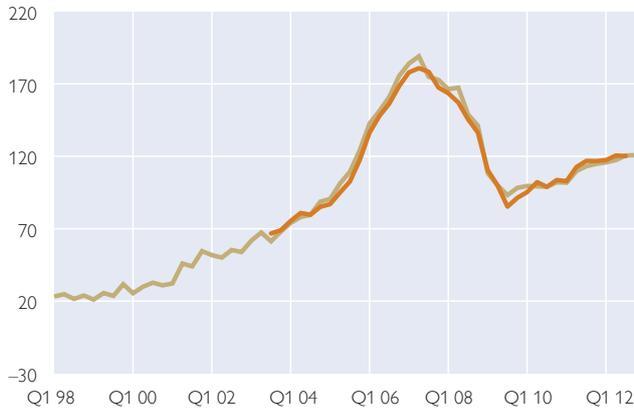
<sup>7</sup> These residential property price indices were applied in the descriptive and empirical studies by Hildebrandt et al. (2012) and by Huynh-Olesen et al. (2013).

<sup>8</sup> Asking (= offer) prices for the capital city are used in Romania and Poland due to a lack of long-term transaction price data. The same applies to house prices in the capital city in Slovakia. A comparison between transaction and asking price data shows broadly similar price movements over time in all CESEE-10 countries, but the magnitude of the price changes differs somewhat (Hildebrandt et al., 2012).

### Indices for the Whole Country and the Capital City Moved Similarly

#### Nominal House Prices in Estonia

Index (2010=100)



Source: ECB, NSI.

#### Nominal House Prices in Latvia

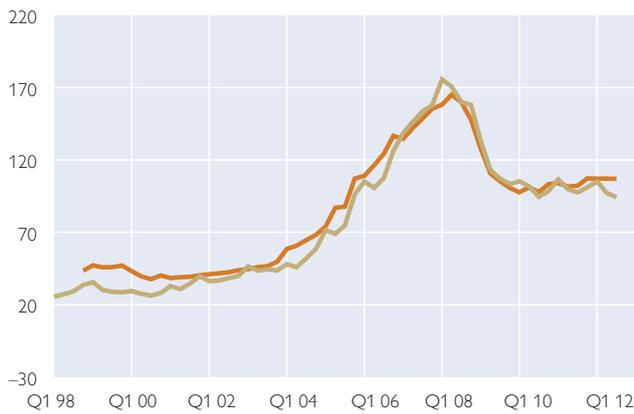
Index (2010=100)



Source: ECB, NSI.

#### Nominal House Prices in Lithuania

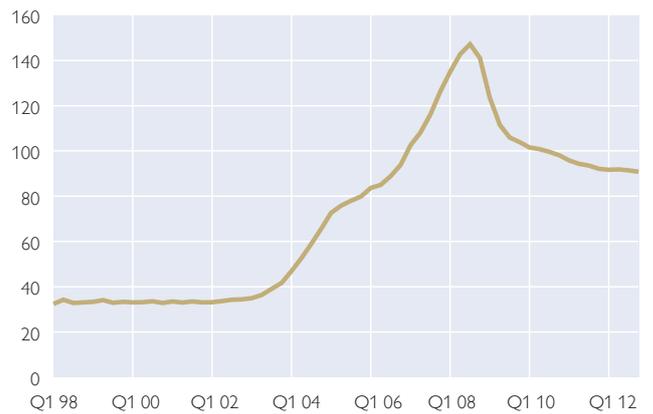
Index (2010=100)



Source: NSI.

#### Nominal House Prices in Bulgaria

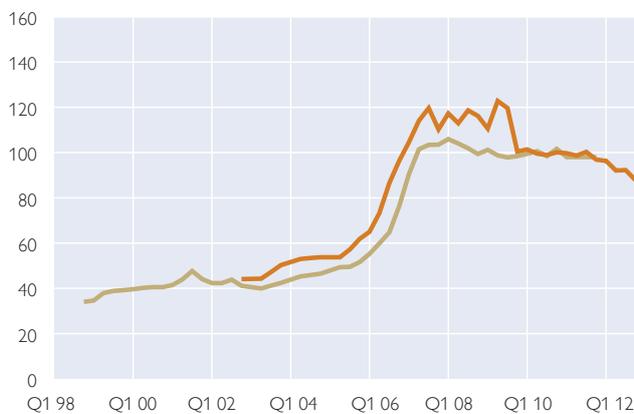
Index (2010=100)



Source: NSI.

#### Nominal House Prices in Poland

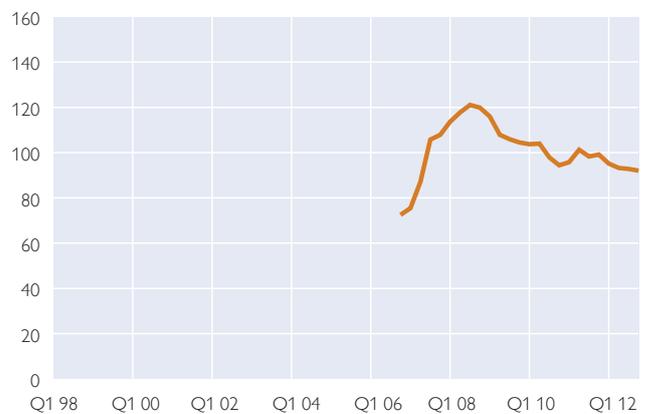
Index (2010=100)



Source: BIS, NSI.

#### Nominal House Prices in Romania

Index (2010=100)



Source: REAS.

— House prices in the capital city — House prices in the whole country

### Indices for the Whole Country and the Capital City Moved Similarly

#### Nominal House Prices in the Czech Republic

Index (2010=100)



Source: NSI.

#### Nominal House Prices in Slovakia

Index (2010=100)



Source: National central bank.

#### Nominal House Prices in Slovenia

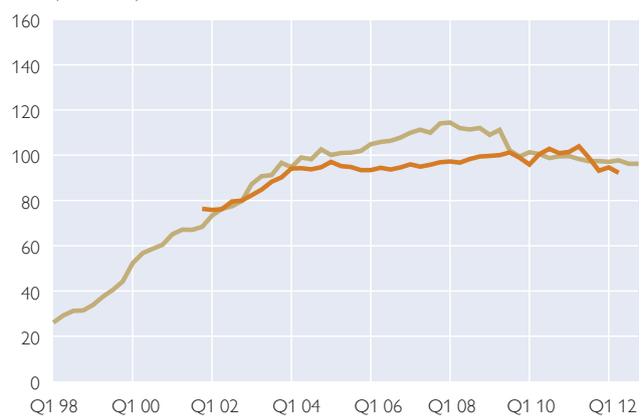
Index (2010=100)



Source: ECB, BIS (capital city); ECB, NSI (whole country).

#### Nominal House Prices in Hungary

Index (2010=100)



Source: ECB, national central bank (capital city), FHB Banking Group (whole country).

— House prices in the capital city — House prices in the whole country

### 3 Comparison of the Eurostat House Price Index with Other Residential Property Price Indices

As the demand for high-quality and, particularly, cross-country comparable house price statistics increased during the past decade, Eurostat cooperated with the NSIs within the owner-occupied housing pilot project to set up a (largely) harmonized database, in the following referred to as the Eurostat house price index (HPI). It is a constant quality residential property price index to measure inflation in the residential property market. Eurostat collects the national data provided by the NSIs, which should be based on broadly comparable methodologies, and conducts additional quality checks (Eurostat, 2013b). The Eurostat HPI is available for all 27 EU Member States (except Poland) as well as Iceland and Norway on a quarterly basis. So far, there are no data available for Croatia. Eurostat also computes country group aggregates for the euro area and the EU-27 on the basis of these time series.

As far as the methodology used to calculate the Eurostat HPI is concerned, the primary data are more similar than those on which the indices shown in chapter 1 are based. According to Eurostat (2013b), the Eurostat HPI captures quarterly changes in average transaction prices of “all kinds of residential property purchased by households (flats, detached houses, terraced houses, etc.), both new and existing.” Owner-built dwellings are excluded, whereas the land component of the residential property is included; the methodology thus follows the gross acquisition approach. The Eurostat index measures pure price changes as it is adjusted for changes in quality. However, the number and type of determining characteristics of the properties can change over time; therefore these factors are also controlled for.<sup>9</sup> But the Eurostat HPI too is conditional on data availability as shown by the example of Bulgaria, for which the data do not exactly match the theoretical description of what the Eurostat HPI should comprise: The Eurostat HPI corresponds entirely to the price index shown in chapter 1, which, however, comprises only existing flats instead of all kinds of residential property as required under the definition of the Eurostat HPI. Nevertheless, it is a good proxy given that the data are based on prices in district centers of 27 big cities and as no other data are (publicly) available. Eurostat (2013b) admits that there is “a variety of data sources both for weights (National Account data, Household Budget Survey data, Construction Statistics, etc.) and prices (administrative data, bank (mortgage) data, construction companies, real estate agents, etc.)” used in compiling the data set. In addition, the price concept may vary (e.g. transaction versus asking prices). Another shortcoming of the Eurostat HPI is that there is no detailed information on the price segments and specific property types the price is based on. In addition, it is an average price, which clearly shows trends, but does not make it possible to identify exceptional local or regional price developments. Despite the fact that proxies are used in view of scarce data availability, a clear advantage of the Eurostat HPI is that Eurostat monitors and assesses the soundness of the methodologies applied and the adherence to its recommendations at the national level (Eurostat, 2013b). This enhances cross-country comparability, although for the time being the relative shortness of the Eurostat time series constrains the empirical analysis, in particular time series analysis.

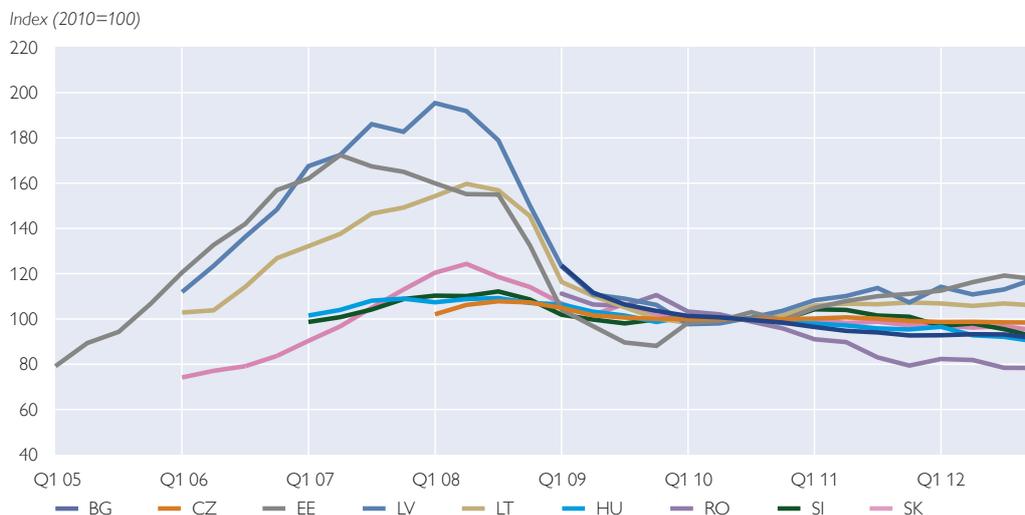
Chart 2 shows the Eurostat HPI for the CESEE-10. Similar to the price indices shown in chapter 2, the Eurostat data also suggest that the countries with the highest growth of house prices were those with the strongest price correction thereafter (namely the Baltics). But the time series only start in the first quarter of 2005 and do not capture the period of price increases in the late 1990s and the first half of the 2000s.<sup>10</sup> Nevertheless, the chart shows that the cumulated price increase from 2005 to the local price peak was more or less fully reversed by the price decline until 2010 in all countries. Since then, prices have picked up again in Estonia, Latvia and – to some extent – in Lithuania and Slovenia. In Romania, residential property prices have been on a declining path since end-2009, while prices in Slovenia have been decreasing since 2011. In most countries, however, house price volatility moderated in the course of 2011 and 2012.

<sup>9</sup> Details can be found in the *Technical Manual on Owner-Occupied Housing – House Price Indices*.

<sup>10</sup> The time series for Bulgaria are too short and do not cover the period of the price increase in the years 2004 to 2008.

Chart 2

### Eurostat CESEE Nominal House Price Index



Source: Eurostat.

Note: No data available for Poland.

Comparing the price developments according to the Eurostat HPI with price growth according to the national price indices for the capital city and the whole country as described in chapter 2 reveals that all indices show similar price movements. The correlation coefficient of the Eurostat HPI and the two price indices confirms this proposition (table 1, columns 1 and 2). The correlation is high for all countries, ranging between 0.71 for Slovenia (transaction prices for the whole country) and 1.0 for Bulgaria (transaction prices in the capital city). Hungary is an exception, showing almost no correlation of the Eurostat HPI with the price index

for the capital city because prices did not move in parallel from the beginning of 2007 to end-2009. Comparing the correlation coefficients of the different time series with the Eurostat HPI per country does not show great differences in the strength of the correlation. The correlation of the Eurostat HPI with the index based on asking prices in the capital city is the only one to show somewhat lower coefficients for some countries (table 1, column 3). These asking prices are taken from REAS, a private sector real estate advisory company. The data are mainly taken from the primary market and partly based on local market monitoring and expert judgment of the primary market; this method of collection is

Table 1

### Correlation of the Eurostat House Price Index with Selected Other Indices

| Based on       | Correlation with the residential property price index for |                    |               |
|----------------|---|--------------------|---------------|
|                | the whole country   | the capital city   |               |
|                | transaction prices  | transaction prices | asking prices |
| Czech Republic | 0.96  | 0.96               | 0.90          |
| Slovakia       | 0.90  | 0.99               | 0.97          |
| Poland         | n.a.  | n.a.               | n.a.          |
| Hungary        | 0.91  | 0.03               | 0.83          |
| Slovenia       | 0.71  | 0.79               | 0.80          |
| Estonia        | 0.97  | 0.98               | 0.99          |
| Latvia         | 0.95  | 0.92               | 0.93          |
| Lithuania      | 0.97  | 0.98               | 0.94          |
| Bulgaria       | 1.00  | n.a.               | 0.99          |
| Romania        | n.a.  | 0.83               | 0.83          |

Source: Author's calculations.

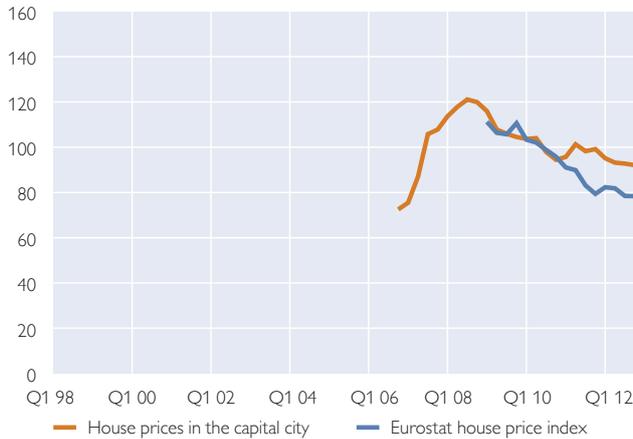
Note: No Eurostat data available for Poland.

Chart 3

### Diverging Developments of Price Indices in Romania and Latvia

#### Nominal House Prices in Romania

Index (2010=100)

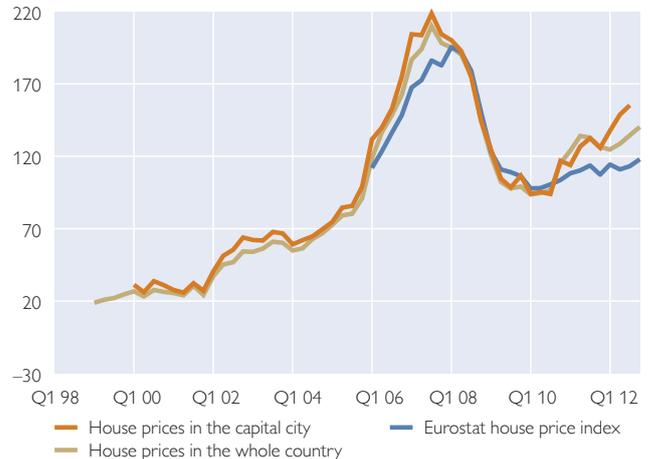


Source: REAS (capital city).

Note: No long-term series index for the whole country available.

#### Nominal House Prices in Latvia

Index (2010=100)



Source: National central bank (capital city and whole country).

slightly different from the data collection methods applied for the other time series shown above.

On the one hand, the high correlation of the data strengthens the validity of the national time series described in section 2. On the other hand, the similarity might not be surprising because Eurostat's HPI is based on data material compiled by the same NSIs.

Despite the high overall correlation, the price developments according to the different indices slightly diverged in the past three years, to some extent in Lithuania and Slovenia, and particularly so in Romania and Latvia (chart 3). In Romania, the two indices have diverged particularly strongly since 2011. While the Eurostat HPI points to a continued strong price decrease, the other house price time series increased somewhat in the first half of 2011 before slightly declining again according to the national statistics. In Latvia, the indices show differences in the level of growth and the timing of the price peak. While the national price indices indicate the nominal price peak at end-2007, the Eurostat HPI shows that the price peak took place a couple of quarters later. The divergent development of the indices since 2011 is even more striking. While house prices in the capital city rose much more strongly than those in the whole country, the Eurostat HPI increased at a much slower pace. These examples show that it is important to conduct robustness checks applying different residential property price time series in empirical analyses of housing markets.

Supplementing chart 3, table B in the annex shows the correlation coefficients for two subsample periods, namely the pre- and post-crisis period, for all countries to help find out whether the correlation changes over time. Evidence is mixed in this respect, but pre- and post-crisis correlation coefficients often do not differ substantially. The correlation coefficient was higher before the crisis compared to the post-crisis period for some countries (for transaction prices in the whole country in Latvia, Slovakia and Slovenia; for transaction prices in the capital city in

Latvia and Hungary), whereas in other countries it increased thereafter (for transaction prices in the whole country in Hungary and in the capital city in Slovenia). Caution is warranted in the interpretation of the results for some countries as the availability of pre-crisis data is very limited or there are no data available at all, for instance for Bulgaria and Romania (see table B in the annex).

#### 4 Summary

The comparison of different price indices reveals similar residential property price developments in CESEE over time. Measuring the correlation coefficients of the newly released Eurostat HPI and the national residential property price indices for the whole country and the capital city, which are mainly based on transaction prices, confirm this finding. However, the data show diverging results for the timing of the local price peak and the degree of price dynamics. Most recently, the movement of the Eurostat HPI and the respective two national price indices diverged to a greater extent, particularly in Latvia and Romania.

Supplementing the analysis of transaction price indices, asking prices for dwellings in the capital city provide a different picture of the market. Nevertheless, they show broadly the same price movements over time, again with some variation in the timing of the price peak and the degree of price dynamics. The correlation of the asking prices in the capital city with the Eurostat HPI is somewhat lower compared to the correlation of the Eurostat HPI with the transaction prices, given the different data collection methods for transaction and asking price data.

Overall, the fundamental difficulties in collecting primary house price data persist. But the efforts at the international level to harmonize the various methods are an important step forward. They are particularly valuable for cross-country panel data studies and allow overcoming the problem of too short time series for longitudinal time series analysis. Also, short-term series might fail to reflect broad movements of house prices (Maeso-Fernandez et al., 2004). In general, given the still limited availability of long-term series, the quality of research using housing prices can be assured only by detailed reporting of data and methodologies applied and by supplementing the findings with additional residential property market data (e.g. building permits, residential property investment).

While the situation concerning house price data in CESEE EU Member States has improved, much less progress has been seen with respect to commercial real estate prices. In fact, there appear to be no country-wide price indices available for commercial real estate. This makes it difficult to monitor price dynamics in this market segment and, as a consequence, to assess e.g. financial stability risks stemming from the commercial real estate market.

## References

- Brunauer, W., W. Feilmayr and K. Wagner. 2012.** A New Residential Property Price Index for Austria. In: Statistiken – Daten und Analysen Q3/12. 90–102.
- Eurostat. 2013a.** Handbook on Residential Property Prices Indices (RPPIs). Eurostat Methodologies & Working Papers. [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-RA-12-022/EN/KS-RA-12-022-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-12-022/EN/KS-RA-12-022-EN.PDF) (retrieved on July 25, 2013).
- Eurostat. 2013b.** Housing price statistics. Reference Metadata in Euro SDMX Metadata Structure (ESMS). [http://epp.eurostat.ec.europa.eu/cache/ITY\\_SDDS/EN/prc\\_hps\\_esms.htm](http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/prc_hps_esms.htm) (retrieved on July 25, 2013).
- Eurostat. 2013c.** [http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/methodology/hps/house\\_price\\_index](http://epp.eurostat.ec.europa.eu/portal/page/portal/hicp/methodology/hps/house_price_index) (retrieved on July 25, 2013).
- Hilbers, P., A. W. Hoffmaister, A. Banjerji and H. Shi. 2008.** Residential Property Price Developments in Europe: A Comparison. IMF Working Paper 211.
- Hildebrandt, A., R. Martin, K. Steiner and K. Wagner. 2012.** Residential Property Markets in CESEE EU Member States. In: Focus on European Economic Integration Q1/12. 8–30.
- Huynh-Olesen, D. T., K. Steiner, A. Hildebrandt and K. Wagner. 2013.** Residential Property Prices in Central, Eastern and Southeastern European Countries: The Role of Fundamentals and Transition-Specific Factors. In: Focus on European Economic Integration Q2/13. 52–76.
- Maeso-Fernandez, F., C. Osbat and B. Schnatz. 2004.** Towards the estimation of equilibrium exchange rates for CEE acceding countries: methodological issues and a panel cointegration perspective. ECB Working Paper 353. April.

## Annex

Table A

### Detailed Information on Nominal House Price Indices in the CESEE-10 (2010=100)

| Country        | House prices for the whole country |                            |                                    |   |                       | House prices for the capital city |                            |                                    |   |                           |
|----------------|------------------------------------|----------------------------|------------------------------------|---|-----------------------|-----------------------------------|----------------------------|------------------------------------|---|---------------------------|
|                | Geographical area                  | Type of dwellings          | Statistical concept                | Time span of original time series                                       | Primary source        | Geographical area                 | Type of dwellings          | Statistical concept                | Time span of original time series                                       | Primary source            |
| Bulgaria       | Big cities (27 district centers)   | Existing flats             | Transaction price per square meter | Q1 1997–Q4 2012, quarterly data   | NSI                   | n.a.                              | n.a.                       | n.a.                               | n.a.  | n.a.                      |
| Czech Republic | Whole country                      | Existing flats             | Transaction price per square meter | Q1 2004–Q4 2012, quarterly data   | NSI                   | Capital city                      | Existing flats             | Transaction price per square meter | Q1 1998–Q2 2012, quarterly data   | NSI                       |
| Estonia        | Whole country                      | Existing and new flats     | Transaction price per square meter | Q3 2003–Q4 2012, quarterly data   | NSI                   | Capital city                      | Existing and new flats     | Transaction price per square meter | Q3 2003–Q1 2013, quarterly data   | NSI                       |
| Hungary        | Whole country                      | n.a.                       | Transaction price per square meter | Q1 1998–Q4 2012, quarterly data   | FHB Banking Group     | Capital city                      | Existing dwellings         | Transaction price per square meter | Q4 2001–Q2 2012, quarterly data   | National central bank     |
| Latvia         | Whole country                      | Existing and new flats     | Transaction price per square meter | Q1 2000–Q4 2012, quarterly data   | NSI                   | Capital city                      | Existing and new flats     | Transaction price per square meter | Q1 2000–Q1 2013, quarterly data   | NSI                       |
| Lithuania      | Whole country                      | Existing and new flats     | Transaction price per square meter | Q4 1998–Q4 2012, quarterly data   | NSI                   | Capital city                      | Existing and new flats     | Transaction price per square meter | Q4 1998–Q2 2012, quarterly data   | NSI                       |
| Poland         | Big cities                         | Existing flats             | Transaction price per square meter | Q4 2002–Q4 2012, quarterly data, index calculated from price-level data | NSI                   | Capital city                      | Existing flats             | Asking price per square meter      | Q4 2002–Q1 2013, quarterly data, index calculated from price-level data | Private organization, BIS |
| Romania        | n.a.                               | n.a.                       | n.a.                               | n.a.  | n.a.                  | Capital city                      | Existing and new dwellings | Asking price per square meter      | Q4 2006–Q4 2012, quarterly data   | REAS                      |
| Slovakia       | Whole country                      | Existing and new dwellings | Asking price per square meter      | Q1 2002–Q4 2012, quarterly data   | National central bank | Capital city                      | Existing and new dwellings | Asking price per square meter      | Q1 2002–Q3 2012, quarterly data, index calculated from price-level data | National central bank     |
| Slovenia       | Whole country                      | Existing dwellings         | Transaction price per square meter | Q1 2003–Q4 2012, quarterly data   | NSI                   | Capital city                      | Existing flats             | Transaction price per square meter | Q1 2003–Q1 2013, quarterly data   | NSI                       |

Source: ECB, BIS, author's compilation based on Hildebrandt et al. (2012) and Huynh-Olesen et al. (2013).

Note: For the purpose of the empirical analysis in Huynh-Olesen et al. (2013), some of the time series for the whole country were extrapolated backward on the basis of other available price indices. For Bulgaria and Romania, the time series were used interchangeably for the whole country and the capital city given the lack of other longer time series. For more details see the annex in Huynh-Olesen et al. (2013).

Table B

**Correlation of the Eurostat House Price Index with Selected Other Indices  
in the Pre- and Post-Crisis Periods**

Correlation with the residential property price index for

| Based on       | the whole country  |      |             |      | the capital city   |      |             |      |               |      |             |      |
|----------------|--------------------|------|-------------|------|--------------------|------|-------------|------|---------------|------|-------------|------|
|                | transaction prices |      |             |      | transaction prices |      |             |      | asking prices |      |             |      |
|                | pre-crisis         |      | post-crisis |      | pre-crisis         |      | post-crisis |      | pre-crisis    |      | post-crisis |      |
|                |                    |      |             |      |                    |      |             |      |               |      |             |      |
| Czech Republic | 1.00               | (2)  | 0.99        | (15) | 1.00               | (2)  | 0.97        | (17) | 1.00          | (2)  | 0.93        | (19) |
| Slovakia       | 0.94               | (10) | 0.74        | (19) | 0.99               | (10) | 0.97        | (18) | 0.99          | (7)  | 0.97        | (19) |
| Poland         | n.a.               | (0)  | n.a.        | n.a. | n.a.               | n.a. | n.a.        | n.a. | n.a.          | n.a. | n.a.        | n.a. |
| Hungary        | 0.54               | (6)  | 0.91        | (19) | 0.58               | (6)  | 0.22        | (17) | -0.69         | (6)  | 0.87        | (18) |
| Slovenia       | 0.95               | (6)  | 0.79        | (19) | 0.72               | (6)  | 0.91        | (18) | 0.98          | (6)  | 0.79        | (19) |
| Estonia        | 0.99               | (14) | 0.97        | (19) | 0.99               | (14) | 0.97        | (18) | 0.89          | (7)  | 0.96        | (19) |
| Latvia         | 0.96               | (10) | 0.89        | (19) | 0.93               | (10) | 0.84        | (18) | -0.21         | (7)  | 0.94        | (19) |
| Lithuania      | 0.98               | (10) | 0.96        | (18) | 0.99               | (10) | 0.99        | (18) | 0.63          | (7)  | 0.96        | (19) |
| Bulgaria       | n.a.               | (0)  | 0.99        | (16) | n.a.               | n.a. | n.a.        | n.a. | n.a.          | n.a. | 0.99        | (16) |
| Romania        | n.a.               | (0)  | n.a.        | n.a. | n.a.               | n.a. | n.a.        | n.a. | n.a.          | n.a. | 0.83        | (16) |

Source: Author's calculations.

Note: The nominal house price peak occurred in the years 2007-08 in most countries (except Hungary (Q2 2011) and Poland (Q2 2009)). For reasons of simplicity, the two sub-samples representing the pre- and post-crisis period were divided in Q2 2008 starting/ending at the first/last available data point (see table A in the annex). Figures in brackets indicate the number of observations available per period.

# CESEE-Related Abstracts from Other OeNB Publications

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

## **A Global Macro Model for Emerging Europe**

Martin Feldkircher

This paper puts forward a global macro model comprising 43 countries and covering the period from Q1 1995 to Q4 2011. Our regional focus is on countries in Central, Eastern and Southeastern Europe (CESEE) and the Commonwealth of Independent States (CIS). Applying a global VAR (GVAR) model, we are able to assess the spatial propagation and the time profile of foreign shocks to the region. Our results show that first, the region's real economy reacts nearly equally strongly to a U.S. output shock as it does to a corresponding euro area shock. The pivotal role of the U.S.A. in shaping the global business cycle thus seems to partially offset the region's comparably stronger trade integration with the euro area. Second, an increase in the euro area's short-term interest rate has a negative effect on output in the long run throughout the region. This effect is stronger in the CIS as well as in Southeastern Europe, while it is comparably milder in Central Europe. Third, the region is negatively affected by an oil price hike, with the exception of Russia, one of the most important oil exporters worldwide. The oil-driven economic expansion in Russia seems to spill over to other – oil-importing – economies in CIS, thereby offsetting the original drag brought about by the hike in oil prices. Finally, our results corroborate the strong integration of advanced economies with the global economy. By contrast, the responses in emerging Europe are found to be more diverse, and country-specifics seem to play a more important role.

To be published in the *OeNB Working Paper* series.

## **Measuring Financial (In)Stability in Emerging Europe: A New Indexed-Based Approach**

Petr Jakubík,  
Tomáš Slačik

The importance of assessing financial stability in emerging Europe has increased rapidly since the recent financial crisis. Against this background, in the present paper we contribute to the existing literature in a twofold way: First, by using a broad range of indicators from money, bond, equity and foreign exchange markets, we develop a comprehensive financial instability index (FII) that gauges the level of financial market stress in some key Central, Eastern and Southeastern European (CESEE) countries. In a second step, we perform a panel estimation to investigate which macroprudential indicators that cover both internal and external imbalances explain the evolution of our FII over the past more than 15 years. Our analysis suggests that both the levels and changes of some indicators (such as credit growth and the level of private sector indebtedness) play an important role for financial stability. Moreover, we find that the impact of some key indicators on financial (in)stability is nonlinear and varies over time depending on market sentiment.

Published in *Financial Stability Report 25*.

## Event Wrap-Ups

# OeNB Seminar: Monetary Policy Regimes in CIS Economies and Their Ability to Provide for Price and Financial Stability

Compiled by Julia Wörz

On May 15, 2013, Professor Marek Dabrowski, former president of the Center for Social and Economic Research (CASE) in Warsaw and professor of economics, held a seminar at the Oesterreichische Nationalbank (OeNB) to discuss the economic outcomes of different monetary policy regimes in CIS economies since the early 1990s. Dabrowski was a co-founder of CASE and chairman of the Supervisory Council until 2011. Besides his academic career, he also held the positions of First Deputy Minister of Finance of the Republic of Poland (1989–90), Member of Parliament (1991–93) and Member of the Monetary Policy Council of Narodowy Bank Polski (1998–2004). He has been involved in policy advising and policy research in a wide range of CESEE countries since the late 1980s and is the author of several academic and policy papers as well as the editor of several books.

At the OeNB seminar, Dabrowski gave a comprehensive overview of monetary policy regimes in the CIS countries, highlighting the convertibility of CIS currencies, exchange rate trajectories, inflation performance, exchange rate arrangements and monetary policy frameworks in these countries. He elaborated on the evolution of monetary policy regimes with a special focus on the perspective of inflation targeting. One of the major challenges for the CIS countries was to achieve price stability after the transformational shock. In the first half of the 1990s, the dissolution of the Soviet ruble area led to very high inflation or even hyperinflation in the CIS countries, which moderated to two-digit levels after the introduction of new currencies and stabilization programs. However, this partial progress was not accompanied by sufficient fiscal policy support; in addition central banks' foreign exchange reserves were unstable and, in general, too low. All these factors added to the financial crisis of 1998/99. The currently excessive stocks of foreign exchange reserves, especially in Russia, should therefore be interpreted as a lesson from the 1998 crisis, i.e. as a build-up of safeguards and not as a sign of mercantilist policies. The economic boom of the 2000s allowed for a return to macroeconomic stability with stronger fiscal fundamentals, but nevertheless proved insufficient when it came to withstanding the shock from the global financial crisis of 2008/09.

Dabrowski went on to illustrate the regulatory frameworks and exchange rate trajectories of individual CIS countries, stating that all countries currently adopt an intermediate (hybrid) monetary policy regime with more flexibility than ten years ago. The choice of monetary policy regime is not strongly related to inflation performance in the region. Turkmenistan, for example, which employs an exchange rate peg, records the lowest inflation in the region but also imposes a number of price controls. Russia's performance, by contrast, improved in times when the Russian ruble was more flexible, suggesting some advantage of exchange rate flexibility.

By way of conclusion, Dabrowski argued that the fact that inflation targeting does not work in the CIS countries yet is mostly attributable to a widespread "fear of floating." He advised against the continuation of hybrid regimes in an increasingly financially integrated global environment as such regimes are nontransparent, noncredible and difficult to operate. The CIS countries are not yet fully integrated into the global financial markets, their financial sectors are strongly dominated by

the banking sector. Moreover, the level of dollarization is high in the CIS with the exception of Russia and Kazakhstan. Finally, Dabrowski outlined the pros and cons of free-floating exchange rate regimes versus hard pegs without adopting a clear preference for either. In particular, he highlighted the problem of choosing the right anchor when trade structures are very diversified.

The general discussion was opened by a question about the underlying reasons for persistently high inflation in the CIS. Until 2011, inflation rates in the region were above those observed in all other emerging markets. Dabrowski pointed out that inflation rates have come down in relative terms in the last two years due to Russia's performance and rising inflation rates in Asia following quantitative easing in the United States. Still, the generally weak inflation performance in the CIS can be attributed to ill-defined monetary policies in the region, involving multiple targets and instruments. In response to a question on the surprisingly small role the euro plays in the CIS countries despite strong geographical and trade ties with the euro area, he clarified that the majority of trade is in U.S. dollar-denominated energy products and that euro-relevant trade ties are considerably less pronounced. Another question referred to the experience of other emerging markets, where exchange rates were often a source of shocks rather than a shock absorber, and the specific experience of CIS countries in this respect. Dabrowski emphasized that the ability of exchange rate movements to act as a buffer against external shocks depends on the degree of capital mobility and is in general limited to the short run. In the medium to long run, he sees some room for counter-cyclical reactions under a floating exchange rate regime.

# 73<sup>rd</sup> East Jour Fixe: Croatia – The 28<sup>th</sup> EU Member State

Compiled by  
Isabella Moder and  
Katharina Steiner<sup>1</sup>

## Introduction

The OeNB's 73<sup>rd</sup> East Jour Fixe on June 17, 2013, focused on Croatia, which will become the 28<sup>th</sup> Member State of the European Union on July 1, 2013. The event dealt with structural reforms designed to boost growth and convergence in Croatia and provided an assessment of the impact of EU accession on regional trade patterns. In addition, speakers explored ways to ensure and enhance macrofinancial stability in Croatia. To conclude, the future of the Western Balkans was discussed from a political point of view. The following review provides a summary of the main issues discussed at the event.

## The EU – A “Moving Target”

*Peter Mooslechner*, Executive Director of the OeNB, opened the event by highlighting that Croatia's road toward EU membership had resembled an effort at approaching a “moving target” in difficult times. During the first years of Croatia's accession process, the EU experienced two major waves of enlargement, growing to comprise a total of 27 Member States by 2007.

Then in 2008, the EU was fully hit by the outbreak of the economic and financial crisis, and – as a response to an environment characterized by macroeconomic changes – it has since seen an unprecedented deepening of economic governance. At the same time, Croatia, as well as the rest of the CESEE region, had to cope with enormous macroeconomic challenges: With the beginning of the crisis in 2008, the catching-up process vis-à-vis the EU nearly came to a halt or even reversed in some countries (in terms of GDP per capita). In light of these recent economic and region-wide developments, Peter Mooslechner pointed out that although Croatia's EU accession is a major accomplishment, it also entails a number

Chart 1

## Croatia's Run-Up to EU Membership – Approaching a “Moving Target” in Difficult Times...



Source: OeNB.

<sup>1</sup> Compiled on the basis of notes taken by Leonie Decrinis, Mariya Hake, Mathias Lahnsteiner, Josef Schreiner, Tomáš Slačik (all OeNB, Foreign Research Division) and Sandra Dvorsky (OeNB, European Affairs and International Financial Organizations Division).

of new challenges for Croatia: The country is about to join the EU in a difficult macroeconomic environment; at the same time, strengthened economic governance in the EU will reduce the scope for national policymaking. Moreover, enhanced surveillance will have implications for Croatia's monetary convergence process (ERM II accession, euro adoption).

The Hrvatska narodna banka (HNB) and the OeNB have been cooperating successfully for many years. Among other activities, so-called “informal dialogue” meetings between the two institutions were established in April 2006; preparations for this year's meeting are currently underway. The prime topics covered by the “informal dialogue” were Croatia's progress in the EU accession negotiations as well as practical aspects and institutional topics including institutional changes at the EU level. In addition, financial stability issues have been, and will remain, an integral part of each dialogue meeting.

### **Reforms Are Difficult but Crucial in Challenging Times**

In his keynote address, *Paul Vandoren*, Head of the Delegation of the European Union to the Republic of Croatia, elaborated on opportunities and challenges in the context of Croatia's EU accession. He, too, pointed out that Croatia enters the European Union in a difficult economic environment that demands continuing reform efforts, which shall not ease after accession on July 1, 2013. Greater efforts will be necessary in order to cope with competitive pressures and to fully reap the benefits of access to the single European market, which Vandoren identified as the most important benefit for Croatia after EU accession. A further important benefit relates to the increasing availability of EU funds, which has the potential to boost the Croatian economy provided that proper funding priorities are defined at the national, regional and local level, the administrative capacity to manage those funds is put in place and cofunding requirements are met. He further laid out the country's economic potential, which, among other things, consists in its attractiveness as a tourist destination and its scope for attracting more foreign direct investment (FDI, in particular greenfield investment). In order to do so, however, problems in relation to (perceived) corruption, red tape and the judicial system's persistent lack of efficiency need to be addressed. Further challenges for Croatia relate to reviving job-rich growth, strengthening public finances, promoting competitiveness and, more generally, adapting to a dynamic economic environment.

### **Discussing Croatia's (Lack of) Competitiveness and Potential Sources of Growth**

The first session, chaired by *Thomas Gruber*, Head of the Central, Eastern and Southeastern European Analysis Unit (Foreign Research Division, OeNB), was dedicated to real economic developments. *Sanja Madzarevic-Sujster*, Senior Country Economist at the World Bank Croatia Office, focused on the status quo of, and way forward for, market reforms in Croatia in her presentation. Prior to the financial and economic crisis, the key driver of economic growth had been capital accumulation, especially in the area of civilian construction. By comparison, the contributions of total factor productivity and labor were very limited compared to other Central European economies. This implies that existing resources could have been used more efficiently but also that total factor productivity and labor could be potential growth drivers in the future. Since the onset of the crisis, Croatia's

competitiveness has declined. The Croatian economy's main weaknesses are insufficiently developed institutional settings, a lack of innovation and the labor market, which has the lowest participation and employment rate in the entire European Union. Especially for young people, labor market entry is constrained. Thus, apart from several measures to improve the investment climate in Croatia, reforms to increase labor market flexibility will also be necessary. Currently, macroeconomic vulnerabilities mainly stem from the fiscal position and high external debt. All this means that basing the growth strategy on further capital accumulation and high levels of external financing is unrealistic and expenditure-based consolidation remains a priority. Considering these fiscal constraints, the EU structural funds that Croatia will receive present an opportunity. However, having the right development strategies and sufficient fiscal space for cofinancing is important to absorb these funds and prevent them from being used for “roads leading to nowhere.”

The issues of competitiveness and investment climate were also referred to by the next speaker, *William Bartlett*, Senior Research Fellow at The London School of Economics and Political Science, who discussed whether Croatia is catching up or falling behind. In order to catch up, it is necessary to be able to absorb new technologies, attract capital and participate in global markets. Other important factors are institutions that provide incentives for investment and competitiveness as well as productive entrepreneurship. When looking at FDI inflows, there was a noticeable increase from 2006 to 2008. In the course of the crisis, FDI plunged and has not picked up again since. Goods exports also decreased sharply in 2009, but goods exports managed to return to the 2008 level by 2011. Given Croatia's comparatively weak external competitiveness, a capital inflow-based growth model is currently not an option; instead, internal sources of growth need to be tapped. Unlike the previous speaker, Bartlett argued that public expenditure should not be cut and said he favored a more efficient way of conducting fiscal policy and an increase of spending in the education sector. This could be financed by additional taxes when incorporating the grey sector into the economy and would thus not increase public debt.

### **What Impact Will EU Accession Have on Regional Trade Patterns?**

*Mario Holzner*, economist at the Vienna Institute for International Economic Studies, discussed whether and how EU accession will change Croatia's trade flows with its neighboring non-EU countries. In a first step, he looked at past experience from Croatia joining the Central European Free Trade Agreement (CEFTA) in 2007. Since then, surprisingly little has changed in the country's trade structure except for a slight change of imports, related to lower demand for investment goods during the crisis. In a next step, Holzner analyzed whether EU accession will differ markedly from being subject to the CEFTA agreement, and what is to be expected from EU accession. To address this question, he introduced a partial equilibrium model on trade and tariffs to analyze total real trade flows. The model only incorporates first-round effects and is based on a scenario of zero percent tariff rates for trade between Croatia and the EU and the EU bilateral tariff rates for Croatia's trade with CEFTA and the rest of the world. The results of the simulations indicate only little change for Croatia's exports except for a moderate reduction of exports to Serbia and Kosovo. In parallel, exports to the rest of the world will also

decline modestly, while there will be gains from increased exports to the EU. Also, domestic sales are expected to fall moderately. An analysis of possible welfare changes indicates that consumer prices in Croatia might fall by 0.39% and real output by 0.41% in the short run. In other words, Croatian production might suffer a bit after EU accession; however, as Holzner argued, EU funds will compensate this loss many times over.

### Nonperforming Loans Weigh on Future Credit Growth

Financial stability aspects were at the core of session 2. *Tomislav Galac*, Chief Advisor at the HNB, briefly described the main features of the Croatian banking sector, which is historically characterized by high capital adequacy and a high level of liquidity. However, nonperforming loans (NPLs), which are particularly high in the nonfinancial corporate sector, and the relatively low NPL coverage ratio may dampen future credit growth. A comparison with other CESEE countries reveals that Croatia's overall NPL ratio is in the middle range – with the caveat that NPL data that are harmonized across all countries are not available. Galac further shared his opinion that Croatia's relatively low NPL coverage ratio does not give cause for major concerns since, and as long as, banks' capital adequacy is high. Overall, for short-term NPL resolution, institutions need to find an optimal balance between an early collection of NPLs (or the collateral attached to them) on the one hand and the restructuring of NPLs on the other hand. In the long run, the government needs to improve institutions and rules related to NPL resolution.

Another issue with respect to macrofinancial stability is the country's persistently high degree of financial euroization. Measures to address this issue during the period from 2004 to 2008 proved to be only partly and temporarily effective. Some recommendations by the European Systemic Risk Board (ESRB) have already been implemented, but rules on required reserves on foreign currency loans and limits to foreign currency funding still have to be introduced. Overall, the HNB is reviewing its microprudential measures for procyclicality but credit institutions also have to contribute their share in promoting lending to new creditworthy clients, Galac highlighted. Since 2012, credit growth in Croatia has been stalling, and both supply and demand are to be blamed. The ensuing panel discussion with representatives of Austrian and Croatian commercial banks as well as participants arguing from the supervisory perspective was chaired by *Peter Backé*, Deputy Head of the OeNB's Foreign Research Division, and dealt with the issues raised by Tomislav Galac in greater detail. Overall, the panelists shared the view that, as the economy is being hit by long-lasting recession, NPLs are the main risk for macrofinancial stability and that NPL resolution is key to future credit growth in Croatia.

Both *Hrvoje Dolenec*, Chief Economist with Zagrebacka banka d.d. (UniCredit Group), and *Birgit Niessner*, Chief Analyst of CEE Macro/Fixed Income Research (Erste Group Bank AG), started off by saying that the Croatian financial sector is an asset – not a liability – to the economy. Recently, banks in Croatia have been facing deleveraging in the household and corporate sectors, paired with fairly strong credit demand from the public sector. In the past, credit flows were tilted to the nontradable sectors, especially to the construction sector, as highlighted by Birgit Niessner. Today, however, due to demand and supply constraints, too little investment activity is financed – especially in manufacturing and the SME sector.

*Franz Pauer*, Senior Expert with the OeNB's Financial Markets Analysis and Surveillance Division, discussed the main factors behind stalled credit growth. He argued that on the supply side, capitalization and liquidity were no restricting factors, but that risk awareness had increased and that obstacles in the collection of collateral were hampering credit supply, too. On the demand side, indebtedness of households caused by consumption purposes is already high, and demand is low in view of the economic recession. Franz Pauer also elaborated on the macroprudential measure, the so-called Loan-to-Local Stable Funding Ratio (LLSFR), implemented to improve the funding structure of Austrian banks not only in Croatia, but in all countries hosting Austrian banks' subsidiaries. The panel concluded by highlighting the need for the supply of new credit for profitable investment projects and for higher risk-bearing capacity. However, restarting credit growth is difficult due to the comparatively high leverage of the Croatian economy and will therefore take some time.

### **Clearer Accession Perspective Needed for Western Balkans**

The OeNB's 73<sup>rd</sup> East Jour Fixe concluded with a discussion of the future of the Western Balkans region from a broader political perspective and the point of view of EU integration. *Wolfgang Petritsch*, Austria's Ambassador to the OECD, started out by highlighting that the recent history of the Western Balkans has been dominated by the relations between Serbs and Croats on the one hand and by the Kosovo question on the other. While some challenges – such as the name issue regarding the Former Yugoslav Republic of Macedonia or the weak level of federal state power in Bosnia-Herzegovina – remain, others – such as the Kosovo issue – seem to stand a good chance of being resolved, not least thanks to the “soft power” of the EU. Against this background, however, Petritsch stressed that the EU will have to fundamentally overhaul its strategy vis-à-vis the Western Balkans since conditionality related to the prospect of eventual EU membership has been losing power as a political tool to bring about reforms and institutional change. This is also due to the fact that Russia and Turkey are establishing themselves as major players in Southeastern Europe, in addition to the European Union. While for the EU, which aims at creating a peaceful unified Europe, the Western Balkans are particularly a political issue, Russia's and Turkey's main interest is in economic opportunities. Thus, Petritsch urged the EU to give the Western Balkan countries and – most of all – its citizens a clearer accession perspective, as intended in the EU's Thessaloniki Declaration of 2003. In this respect, he called on Croatia to play a brokering and catalyzing role in the process of further integrating the Western Balkans and thereby promote the further unification of Europe.

## Annex: Croatia – Facts and Figures (2012)

Table A1

### Croatia – Selected Indicators

#### Key figures

|  |      |
|--|------|
| Population in million  | 4.4  |
| GDP in EUR billion   | 43.9 |
| GDP per capita in purchasing power standards, % of EU-27 average | 58.1 |

#### Gross value added (data for 2011)

|   |      |
|---|------|
| Agriculture, forestry and fishery in % of total gross value added | 4.9  |
| Industry excluding construction in % of total gross value added   | 20.6 |
| Building and construction in % of total gross value added         | 6.0  |
| Services in % of gross total value added                          | 68.5 |

#### Financial sector

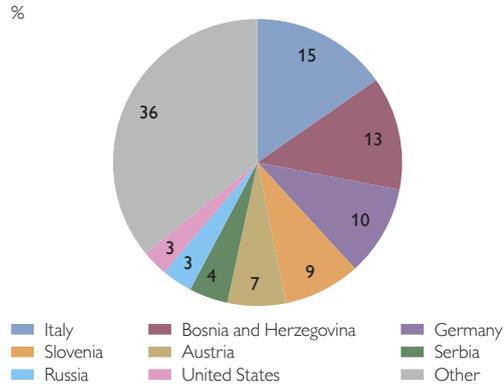
|   |       |
|---|-------|
| Total assets in % of GDP                              | 123.5 |
| Foreign ownership share of banks in % (data for 2011) | 90.6  |
| Nonperforming loans in % of total loans               | 10.1  |

Source: Ameco, IMF, HNB, EBRD.

Note: Unless otherwise stated values refer to 2012.

Chart A1

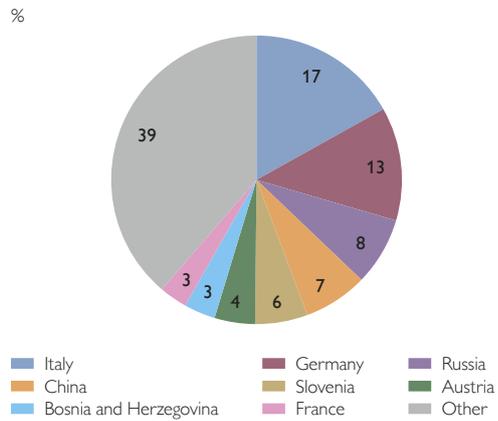
### External Sector: Exports by Country



Source: wiw.

Chart A2

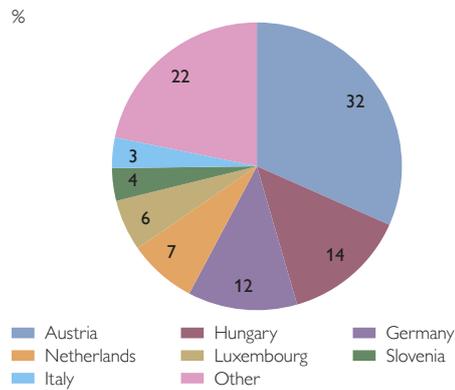
### External Sector: Imports by Country



Source: wiw.

Chart A3

### External Sector: Inward FDI by Country of Origin



Source: wiw.

Notes

# 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.

[www.oenb.at/de/presse\\_pub/period\\_pub/unternehmen/geschaeftsbericht/geschaeftsberichte.jsp](http://www.oenb.at/de/presse_pub/period_pub/unternehmen/geschaeftsbericht/geschaeftsberichte.jsp)

[www.oenb.at/en/presse\\_pub/period\\_pub/unternehmen/geschaeftsbericht/geschaeftsbericht.jsp](http://www.oenb.at/en/presse_pub/period_pub/unternehmen/geschaeftsbericht/geschaeftsbericht.jsp)

## **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.

[www.oenb.at/de/geldp\\_volksw/konjunktur/konjunktur\\_aktuell.jsp](http://www.oenb.at/de/geldp_volksw/konjunktur/konjunktur_aktuell.jsp)

## **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.

[www.oenb.at/en/presse\\_pub/period\\_pub/volkswirtschaft/geldpolitik/monetary\\_policy\\_and\\_the\\_economy.jsp](http://www.oenb.at/en/presse_pub/period_pub/volkswirtschaft/geldpolitik/monetary_policy_and_the_economy.jsp)

## **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.

[www.oenb.at/de/presse\\_pub/period\\_pub/statistik/fakten/fakten\\_zu\\_oesterreich\\_und\\_seinen\\_banken.jsp](http://www.oenb.at/de/presse_pub/period_pub/statistik/fakten/fakten_zu_oesterreich_und_seinen_banken.jsp)

[www.oenb.at/en/presse\\_pub/period\\_pub/statistik/fakten/facts\\_on\\_austria\\_and\\_its\\_banks.jsp](http://www.oenb.at/en/presse_pub/period_pub/statistik/fakten/facts_on_austria_and_its_banks.jsp)

## **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.

[www.oenb.at/en/presse\\_pub/period\\_pub/finanzmarkt/finanzmarktstabilita/financial\\_stability\\_report.jsp](http://www.oenb.at/en/presse_pub/period_pub/finanzmarkt/finanzmarktstabilita/financial_stability_report.jsp)

## **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.

[www.oenb.at/en/presse\\_pub/period\\_pub/volkswirtschaft/integration/focus\\_on\\_european\\_economic\\_integration.jsp](http://www.oenb.at/en/presse_pub/period_pub/volkswirtschaft/integration/focus_on_european_economic_integration.jsp)

## **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. In addition, special issues on selected statistics topics are published at irregular intervals.

[www.oenb.at/de/presse\\_pub/period\\_pub/statistik/statistiken/statistiken\\_-\\_daten\\_und\\_analysen.jsp](http://www.oenb.at/de/presse_pub/period_pub/statistik/statistiken/statistiken_-_daten_und_analysen.jsp)

## Research Update

English | quarterly

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

[www.oenb.at/en/presse\\_pub/period\\_pub/volkswirtschaft/newsletter/einleitung.jsp#tcm:16-171525](http://www.oenb.at/en/presse_pub/period_pub/volkswirtschaft/newsletter/einleitung.jsp#tcm:16-171525)

## 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:

[www.oenb.at/en/geldp\\_volksw/zentral\\_osteuropa/News/newsletter/cesee\\_newsletter.jsp](http://www.oenb.at/en/geldp_volksw/zentral_osteuropa/News/newsletter/cesee_newsletter.jsp)

## OeNB Workshop 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.

[www.oenb.at/en/presse\\_pub/period\\_pub/volkswirtschaft/workshops/workshops.jsp#tcm:14-172875](http://www.oenb.at/en/presse_pub/period_pub/volkswirtschaft/workshops/workshops.jsp#tcm:14-172875)

## 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.

[www.oenb.at/en/presse\\_pub/research/020\\_workingpapers/\\_2013/working\\_papers\\_2013.jsp#tcm:16-256010](http://www.oenb.at/en/presse_pub/research/020_workingpapers/_2013/working_papers_2013.jsp#tcm:16-256010)

## 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.

[www.oenb.at/en/presse\\_pub/period\\_pub/volkswirtschaft/vowitagung/economics\\_conferences.jsp](http://www.oenb.at/en/presse_pub/period_pub/volkswirtschaft/vowitagung/economics_conferences.jsp)

## Proceedings of the Conference on European Economic Integration

English | annually

The OeNB's annual CEEI conference 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.

[http://www.oenb.at/en/geldp\\_volksw/zentral\\_osteuropa/Events/archive\\_programs\\_ceei.jsp](http://www.oenb.at/en/geldp_volksw/zentral_osteuropa/Events/archive_programs_ceei.jsp)

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

[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.

[www.oenb.at/en/presse\\_pub/period\\_pub/finanzmarkt/barev/barev.jsp](http://www.oenb.at/en/presse_pub/period_pub/finanzmarkt/barev/barev.jsp)

# Addresses

|   | Postal address                         | Telephone/Fax/E-mail  |
|---|--|---|
| <b>Head Office</b><br>Otto-Wagner-Platz 3<br>1090 Vienna, Austria<br>Internet: <a href="http://www.oenb.at">www.oenb.at</a>   | PO Box 61<br>1011 Vienna, Austria      | Tel: (+43-1) 404 20-6666<br>Fax: (+43-1) 404 20-042399<br>E-mail: <a href="mailto:oenb.info@oenb.at">oenb.info@oenb.at</a>        |
| <b>Branch Offices</b>   |  |   |
| <b>Northern Austria Branch Office</b><br>Coulinstraße 28<br>4020 Linz, Austria  | PO Box 346<br>4021 Linz, Austria       | Tel: (+43-732) 65 26 11-0<br>Fax: (+43-732) 65 26 11-046399<br>E-mail: <a href="mailto:regionnord@oenb.at">regionnord@oenb.at</a> |
| <b>Southern Austria Branch Office</b><br>Brockmanngasse 84<br>8010 Graz, Austria  | PO Box 8<br>8018 Graz, Austria         | Tel: (+43-316) 81 81 81-0<br>Fax: (+43-316) 81 81 81-046799<br>E-mail: <a href="mailto:regionsued@oenb.at">regionsued@oenb.at</a> |
| <b>Western Austria Branch Office</b><br>Adamgasse 2<br>6020 Innsbruck, Austria  | Adamgasse 2<br>6020 Innsbruck, Austria | Tel: (+43-512) 908 100-0<br>Fax: (+43-512) 908 100-046599<br>E-mail: <a href="mailto:regionwest@oenb.at">regionwest@oenb.at</a>   |
| <b>Representative Offices</b>   |  |   |
| <b>New York Representative Office</b><br>Oesterreichische Nationalbank<br>450 Park Avenue, Suite 1202<br>10022 New York, U.S.A.   |  | Tel: (+1-212) 888-2334<br>Fax: (+1-212) 888-2515  |
| <b>Brussels Representative Office</b><br>Oesterreichische Nationalbank<br>Permanent Representation of Austria to the EU<br>Avenue de Cortenbergh 30<br>1040 Brussels, Belgium |  | Tel: (+32-2) 285 48-41, 42, 43<br>Fax: (+32-2) 285 48-48  |