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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

Editors in chief Peter Mooslechner, Doris Ritzberger-Grünwald
General coordinator Peter Backé
Scientific coordinators Markus Eller, Thomas Reininger, Julia Wörz
Editing Dagmar Dichtl, Ingrid Haussteiner, Rena Mühldorf, Susanne Steinacher
Design Communications Division
Layout and typesetting Walter Grosser, Birgit Vogt
Printing and production Web and Printing Services

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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 35th 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 coauthored work, each of the coauthors has to fulfill all the entry criteria.

Authors shall send their submissions either by electronic mail to 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 or contact Eva Gehringer-Wasserbauer in the OeNB's Foreign Research Division either by e-mail (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 2013 should be e-mailed to

eva.gehringer-wasserbauer@oenb.at
by May 1, 2013.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2013.

Studies

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

Konstantins Benkovskis,
Ludmila Fadejeva,
Robert Stehrer,
Julia Wörz^{1,2}

The evolution of total factor productivity (TFP) is a key determinant of long-run economic growth of a country. In this paper we analyze the contributions from technological change at the industry level to an economy's aggregate growth performance. Our derivation of economy-wide TFP growth entails three major improvements over the traditional Solow residual approach: First, we allow for non-constant returns to scale as well as changes in the utilization of input factors in our estimation of industry TFP growth. Second, we use a novel approach to aggregate TFP from the industry level to the macro level, which incorporates both direct and indirect effects through intermediate linkages within an economy. Third, we take account of open economy characteristics by assigning an explicit role to terms of trade shocks. Our calculations for the sample of ten Central, Eastern and Southeastern European EU member countries over the time period 1995–2009 are based on the newly available World Input-Output Database (WIOD).

JEL classification: C23, D24, E23, O47

Keywords: Total factor productivity, terms of trade, utilization, input-output table, Central, Eastern and Southeastern Europe

1 Introduction

The global economic crisis has had a severe impact on Central, Eastern and South-eastern Europe (CESEE), a region which is still in a process of catching up to their Western European peers. The catching-up process started only slightly more than two decades ago with the fall of the iron curtain and the transition from centrally planned to market economies. From the mid-1990s to 2008, CESEE countries recorded substantial economic growth supported by strong production factor accumulation, large inflows of foreign capital, and ample credit availability. The “traditional” CESEE growth model has come into question in the recent crisis as credit conditions deteriorated and foreign capital inflows receded. This redirects the focus of attention toward domestic growth drivers and the role of technological change for the region’s growth potential. In the present paper we analyze growth drivers in order to allow for a deeper understanding of these countries’ “technology improvement” structure. In particular we shift attention to total factor productivity (TFP) as the part of economic growth which cannot be attributed to the accumulation and varying utilization of production factors.

The literature on the growth potential of an economy is extensive but – for reasons of data availability – biased toward industrialized countries, often toward the U.S.A. Especially filtering methods require long time series; therefore calculations for the relatively young transition countries in Central, Eastern and Southeastern Europe are less abundant. Nevertheless, interest in the region rose in connection with the recovery from the transformation shock in the early 1990s.

¹ *Latvijas Banka, Monetary Policy Department, konstantins.benkovskis@bank.lv and ludmila.fadejeva@bank.lv; Vienna Institute for International Economic Studies, stehrer@wiiw.ac.at; Oesterreichische Nationalbank, Foreign Research Division, julia.woerz@oenb.at.*

² *This research was conducted during Julia Wörz’s research stay at Latvijas Banka’s Monetary Policy Department under the ESCB External Work Experience program. The authors are deeply indebted to Eduards Sidorovics for his excellent research assistance and would also like to thank Peter Backé, Mārtiņš Bitāns, Markus Eller, Doris Ritzberger-Grünwald, Uldis Rutkaste and two anonymous referees for their valuable comments.*

Later on, EU accession sparked interest in quantitative assessments of the speed of convergence, as the CESEE accession countries entered the EU with a considerably lower per capita income level compared to countries from previous enlargements. In this paper, we focus on the ten CESEE countries that joined the EU in 2004 and 2007.³

A number of features characterize the growth potential in CESEE: First, initial conditions at the outset of the transformation period have shaped the recovery path in the long run. Second, structural reform – representing to a large extent the heart of the transition process – has played an important role. With respect to TFP measurement, this renders the simple production function approach questionable. Very often, the production function approach is based on a one-sector model of the economy which by definition cannot take account of structural change. This simplification is clearly unrealistic and possibly already misleading when applied to countries with a long, uninterrupted economic history. It is all the more inappropriate in the context of transition countries with a short history of impressive convergence toward more advanced economies. Thus, multi-sector models are certainly required that take into account linkages between sectors as well as changes in the economic structure over time. Third, most authors find rather strong fluctuations in potential output for CESEE countries (see Benk et al., 2005). This may simply reflect the fact that these countries have yet to reach their true long-run equilibrium. They may still be going through different phases of adjustment toward mature market-based economies. It may, however, also reflect that cyclical factors are not fully identified by the estimation methods used so far.

Even in a more general setting, the estimation of TFP opens up a range of crucial questions. Ideally, TFP should be measured at the most detailed industry level in order to take account of different production technologies in different activities. Working at the industry level enables us to overcome a major shortcoming of previous production function approaches, i.e. measuring TFP growth in the CESEE region while relying on one-sector models of the economy. Our estimations of TFP consider differences in the production function of individual sectors and allow for non-constant returns to scale and variation in the utilization of input factors.

Not only the accurate estimation of TFP rates but also the correct aggregation of industry-specific results to the country level is a nontrivial task. If correctly done, however, this allows for highly policy-relevant conclusions concerning the contribution of individual sectors to overall TFP growth. Our input-output-based approach yields an estimate of economy-wide TFP growth and accounts for both direct and indirect effects. Thus, technological change in a certain sector not only directly influences aggregate TFP growth, but also produces indirect effects through the use of intermediate goods in production.

Finally, we pay special attention to the fact that the CESEE countries are small and open; hence their growth potential is strongly influenced not only by their domestic production structure, but also by their external linkages (purchase of intermediate inputs from abroad and their ability to export).

We base our estimations on the newly available World Input-Output Database (WIOD), which combines information on input-output tables and international

³ *Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.*

trade in a global input-output table. The use of input-output tables and the time dimension implicit in the WIOD database also takes into account the impact of structural change, a factor which is particularly stressed in the existing literature on economic growth in transition countries. As mentioned above, the transition process by definition virtually implies a great deal of structural change in these economies with strong implications for potential growth prospects.

The paper is organized as follows: Section 2 presents the theoretical framework ranging from the estimation of industry TFP growth rates to their aggregation through input-output tables and their allocation to final use components of the economy. We take account of the high degree of openness of these economies by allowing changes in terms of trade to affect final consumption, investments and exports in subsection 2.3. Section 3 presents the WIOD database. The results are given in section 4 and section 5 concludes.

2 Theoretical Framework

2.1 Derivation of Total Factor Productivity by Industry

The traditional measure of TFP growth is the Solow residual, which is calculated under a set of very restrictive assumptions – perfect competition and constant returns to scale, costless adjustment and thus full utilization of production factors. As a result, the Solow residual systematically includes nontechnological effects like changes in capital utilization or variations in the intensity of workload. Basu and Kimball (1997) pioneered an approach based on more realistic assumptions including imperfect competition and unobserved changes in utilization, which was further implemented by Basu et al. (2001), Basu et al. (2006) and Groth et al. (2006). This approach was also used for CESEE countries by Katay and Wolf (2008) and Fadejeva and Melihovs (2009).

Our approach to evaluate TFP growth at the level of individual industries follows Basu and Kimball (1997). As in the standard approach, a representative firm produces gross output, using capital, labor and intermediate inputs. However, in addition, there are adjustment costs for changing the level of capital and labor. Alternatively, a firm may change the utilization of inputs, which also comes with some costs – higher wage rates for extra hours worked and premium payments for extra efforts of workers with respect to the utilization of labor as well as more rapid depreciation with respect to higher capital utilization. Starting from the intertemporal cost minimization problem of a representative firm, we obtain the following dynamic production function (for technical details, see Basu and Kimball, 1997, and Benkovskis et al., 2012):

$$dy = \gamma^* d\chi + \gamma^* du + dz \quad (1)$$

where $d(\cdot)$ denotes the growth rate of the variable, lower-case letters refer to natural logarithms, and $*$ implies the steady state value, dy is output growth, du denotes changes in utilization and dz corresponds to changes in TFP. $d\chi$ measures the overall input growth based on the observable variables: changes in capital stock (dk), changes in the total number of employees (dl), changes in hours worked per head (dh), changes in the volume of intermediate inputs (dn). Changes in input factors are weighted by their nominal cost shares s_k , s_l and s_n , respectively:

$$d\chi = s_K dk + s_L (dl + dh) + s_N dn \quad (2)$$

Unobservable growth in utilization du can be expressed by the growth rates of the following observable variables:

$$du = \beta_1 dh + \beta_2 (dp^N + dn - dp^I - dk) + \beta_3 (di - dk) \quad (3)$$

where β_1 , β_2 , and β_3 are complex functions of input cost shares, returns to scale, elasticities of the depreciation rate and adjustment cost functions (see Basu and Kimball, 1997), and therefore could be treated as unknown constants. The intuition for the change in hours per worker dh as a proxy for the dynamics of labor utilization is simple: in order to increase the utilization, the firm has to use more labor (more hours by worker or a shift in efforts). Thus, when the number of hours worked increases, the unobserved utilization also increases and the coefficient β_1 is positive. The intuition for the second term (changes in the ratio of real intermediate inputs to capital, $dp^N + dn - dp^I - dk$, whereby dp^N and dp^I are changes in intermediate consumption and investor deflators, respectively) in the utilization equation is related to the nature of capital and intermediate inputs: it is much easier to adjust the volume of intermediate inputs than capital or labor as there are no costs for changing the volume of intermediate inputs. Therefore a firm is likely to use existing capital more intensively when the ratio of intermediate inputs and capital rises. This positive relationship implies a positive sign for the coefficient β_2 .

The interpretation of the third term, the ratio of investment to capital $di - dk$, is more complex. On the one hand, higher utilization intensity of capital is associated with a higher rate of depreciation and therefore also higher investments. On the other hand, a higher investment-to-capital ratio boosts adjustment costs and firms may therefore temporarily decrease capital utilization to reduce the depreciation rate and overall capital costs. Overall, the net effect of the third term depends on the relative size of the two effects above.

Given that the values of β_1 , β_2 , β_3 , and γ^* are known, equations (1)–(3) can be used to estimate dz – changes in TFP. If γ^* is restricted to one and the level of utilization is assumed to be constant, equation (1) reduces to $dy = d\chi + dz$ and dz corresponds to the traditional Solow residual.

2.2 Measuring Aggregate Productivity from Industry Contributions

While the estimation of productivity growth should preferably be done at a disaggregate level in order to account for differences in production functions across industries, the aggregate effect of changes in TFP are of most interest for researchers and policy makers. Groth et al. (2006) note that such an aggregation requires the derivation of the relation between gross output and value added at the industry level, otherwise the aggregate contribution of productivity will be underestimated. In an input-output framework, Basu et al. (2010) go one step further and take advantage of the use table to derive direct and indirect effects of productivity changes. We follow the spirit of this latter approach here and refine it by accounting for the role of industry-specific returns to scale in TFP aggregation.

The previous section described the derivation of TFP growth at the industry level. However, this measures only the direct effects from technological change, while effects coming indirectly through the use of intermediate inputs are not taken into account. The best way to derive both direct and indirect effects of

industry-level TFP growth at the macro level is through the use of input-output tables as they provide information on the use of intermediate products. Table 1 shows a very simplified version of an input-output table for a closed economy with only two products⁴, the same price of a product regardless whether it is consumed or used as an intermediate input, and restricted to only one type of final use (consumption), while taxes and transport margins are ignored. Despite the above restrictions, this table is still useful for understanding how a positive technology shock in one industry transmits into other sectors of the economy and affects final use.

Table 1

Stylized Input-Output Table

| | | Product 1 | Product 2 | Consumption | Total output |
|-------------|-----------|--------------|--------------|-------------|--------------|
| Domestic | Product 1 | $P_1 N_{11}$ | $P_1 N_{12}$ | $P_1 C_1$ | $P_1 Y_1$ |
| | Product 2 | $P_2 N_{21}$ | $P_2 N_{22}$ | $P_2 C_2$ | $P_2 Y_2$ |
| Value added | | VA_1 | VA_2 | ... | VA |
| Total input | | $P_1 Y_1$ | $P_2 Y_2$ | $P^C C$ | |

Source: Authors' compilation.

Note: P_i is the price of a product i , P^C is the price of a consumption basket, N_{ij} is the intermediate input of product j used in the production of i , VA_i is the value added of product i , Y_i is the gross output of product i , C_i is the consumption of product i and C is total consumption.

The assumption of a Cobb-Douglas production function F implies that the shares of inputs in total costs are unchanged, in other words, the structure of the first two columns in table 1 is constant. Another important assumption is that consumer utility is also represented by a Cobb-Douglas function, which implies constant nominal expenditure shares. From those assumptions it follows that the whole nominal structure of the input-output table depends solely on structural parameters of production and utility functions and is therefore unchanged.

Let's rewrite the dynamic production function (1), taking into account that the number of intermediate inputs can exceed one and adding product/industry subscripts:

$$dy_i = \gamma_i^* (s_{K_i} dk_i + s_{L_i} (dl_i + dh_i) + \sum_j s_{N_{ji}} dn_{ji}) + \gamma_i^* du_i + dz_i \quad (4)$$

The constant structure of the nominal input-output table implies that the growth of real gross output, real net output (consumption) and real intermediate consumption of a product are equal ($dy_i = dc_i = dn_{ji}$), which means that the production function of gross output in equation (8) can be replaced by the production function of net output:

⁴ For the moment, we assume that product and industry are synonyms (as in Basu et al., 2010), i.e. each commodity is produced only within one corresponding industry. In reality, however, a commodity may be produced in different industries due to secondary production activities of firms. As a result, industry-by-industry input-output tables differ from product-by-product input-output tables. Only industry-by-industry input-output tables as well as use and supply tables are available in WIOD. Although one can simply use industry-by-industry input-output tables in aggregation, it will implicitly correspond to an industry technology assumption. However, a product technology assumption is more plausible from the theoretical point of view (see System of National Accounts, 1993); therefore in our final aggregation we will switch from industries to products. To implement a product technology assumption, we constructed a product-by-product input-output table from the supply and use tables, using Almon's method (see Almon, 2000, and Eurostat, 2008, for technical details).

$$dc_i = \gamma_i^* (s_{K_i} dk_i + s_{L_i} (dl_i + dh_i) + \sum_j s_{N_{ji}} dc_j) + \gamma_i^* du_i + dz_i \quad (5)$$

Now we can express equation (5) in matrix form and apply inverse transformation.

$$dc = \gamma s_K dk + \gamma s_L (dl + dh) + \gamma B^T dc + \gamma du + dz \quad (6)$$

$$dc = (I - \gamma B^T)^{-1} \gamma s_K dk + (I - \gamma B^T)^{-1} \gamma s_L (dl + dh) + (I - \gamma B^T)^{-1} \gamma du + (I - \gamma B^T)^{-1} dz \quad (7)$$

where $dc = \|dc_i\|_{J,J}$, $dk = \|dk_i\|_{J,J}$, $dl = \|dl_i\|_{J,J}$, $dh = \|dh_i\|_{J,J}$, $du = \|du_i\|_{J,J}$, $dz = \|dz_i\|_{J,J}$, $B = \|s_{N_{ji}}\|_{J,J}$, $\gamma = \text{diag}(\gamma_i^*)_{J,J}$, $s_K = \text{diag}(s_{K_i})_{J,J}$, $s_L = \text{diag}(s_{L_i})_{J,J}$, I is J by J identity matrix, J is the number of products/industries.

The production function in (7) contains both direct and indirect effects of changes in capital, labor and TFP on net output in different products/industries. In this paper we are primarily interested in the last term, $(I - \gamma B^T)^{-1} dz$, which shows the full effect of a change in technology (or a technology shock). The final step is to aggregate the contribution of a technology shock in all products/industries while taking into account their shares in final consumption (which are constant and given by a Cobb-Douglas utility function):

$$dz_c = s_c (I - \gamma B^T)^{-1} dz \quad (8)$$

where dz_c is the contribution of the technology shock to real consumption growth,⁵ and s_c is the share of product i in total nominal consumption.⁶

2.3 Open Economy and Terms of Trade

The input-output table in table 1 has a very restrictive assumption of a closed economy that is absolutely unrealistic in today's world. To show how the inclusion of international trade will affect our analysis, we need to modify our stylized input-output table by including export and import flows.

Table 2

Stylized Input-Output Table including the External Sector

| | | Product 1 | Product 2 | Trade product | Consumption | Total input |
|-------------------|-----------|----------------|--------------|-----------------|-------------|-------------|
| Domestic | Product 1 | $P_1 N_{11}^I$ | $P_1 N_{12}$ | $P_1 X_1$ | $P_1 C_1$ | $P_1 Y_1$ |
| | Product 2 | $P_2 N_{21}$ | $P_2 N_{22}$ | $P_2 X_2$ | $P_2 C_2$ | $P_2 Y_2$ |
| Trade product | | $P^M M_1$ | $P^M M_2$ | ... | $P^M C^M$ | $P^M M$ |
| Value added | | VA_1 | VA_2 | ... | ... | VA |
| Financial account | | ... | ... | $P^M M - P^X X$ | ... | ... |
| Total output | | $P_1 Y_1$ | $P_2 Y_2$ | $P^M M$ | $P^C C$ | |

Source: Authors' compilation.

Note: P_i^M is the price of imported intermediate inputs in product i , P_i^C is the price of imported consumption goods, P^M is the price of total imports, P^X is the price of total exports, M_i is the imported intermediate input used in the production of i , C^M is the imported consumption, M is total imports, X_i is exports of product i and X is total exports.

⁵ In this simplified example, real consumption coincides with real value added and real GDP.

⁶ It can be replaced, for instance, by the nominal structure of government consumption, gross fixed capital formation or exports to calculate the contribution of a technology shock on the growth of these final use components.

In addition to real domestic industries producing commodities 1 and 2, table 2 also includes a “virtual” trade product. It was pointed out by Basu et al. (2010) that the process of international trade can be viewed as a synthetic industry – in order to obtain imported goods, a country is forced to get involved in export activities. When using the terminology of a production function, exports are the inputs of the “virtual” trade industry and imports are the output.⁷ As total nominal imports are equal to the sum of nominal exports and net financial inflows (given by negative net exports, $P^M M - P^X X$), the production function of this “virtual” trade commodity can be expressed by the following equation:

$$M = F_{\text{trade}}(X, P^M M - P^X X, P^X / P^M) = (X + (P^M M - P^X X))(P^X / P^M) \quad (9)$$

Under the assumption that preferences of foreign consumers are also described by a Cobb-Douglas utility function and that the ratio of financial inflows to GDP is constant, the structure of nominal inputs of the “virtual” trade product is constant and its dynamic production function is given by

$$dm = dx + (dp^X - dp^M) \quad (10)$$

where $dp^X - dp^M$ are simply changes in terms of trade and are similar in spirit to changes in technology in (1). Indeed, improvements in terms of trade have the same effect as a positive technology shock in a domestic product – for the same amount of real exports (inputs) a country can obtain (or “virtually produce”) a greater amount of imports (outputs). That is why terms of trade can be regarded as a specific type of TFP affecting final use and, hence, it should be included into analysis.

To analyze the aggregate contribution of changes in TFP and terms of trade, one can still use equation (8), although with a slight modification to include the “virtual” trade product (thus, the number of products increases to $J+1$). The “virtual” trade product has constant returns to scale, thus the diagonal of γ is augmented by one. In the open economy case, the column vector dz contains all J product-specific domestic technology shocks and as the last element – changes in terms of trade. The matrix B now contains the cost shares of domestic intermediate inputs, the cost shares of imported intermediate inputs (last row) and the shares of nominal exports of commodity i to total nominal imports (last column). The row vector s_c also includes the share of imported consumption.

It is important to note that in the presence of an external sector, total value added is no longer equal to total consumption, and to evaluate the contribution of changes in TFP to growth in value added, s_{VA} is used in equation (8) instead of s_c :

$$s_{VA} = \left[(P_1 Y_1 - \sum_i P_i N_{1i}) / VA, \dots, (P_J Y_J - \sum_i P_i N_{Ji}) / VA, -(\sum_i P_i^M M_i) / VA \right] \quad (11)$$

Value added is equal to the sum of domestic final use net of imported intermediate inputs. The final element of s_{VA} in (11) is negative, which ensures that the total effect of changes in terms of trade on value added is zero.

⁷ This might sound counter-intuitive, but recall that we focus on domestic absorption. Thus, imports represent foreign-produced substitutes for domestically produced goods. Since the latter are clearly the output of domestic industries, imports are consequently considered to be the output of the “trade industry” while exports generate the revenue which is necessary to buy these imports from abroad. By selling exports, an economy can consume imports. Hence exports serve as inputs for the trade industry. See e.g. Krugman (1993) for intuitive reasoning.

3 Database Description

To our knowledge, this methodology to calculate aggregate TFP growth has not yet been applied to any other country than the U.S.A. We base our calculations on the newly available World Input-Output Database (WIOD, Timmer et al., 2012), which is especially suited for our purpose as it combines harmonized national supply and use tables (SUTs) with international trade data for a range of countries. National SUTs are not only harmonized across countries in this dataset but also extra- and interpolated over time, which thus yields a panel dataset spanning 40 countries over the years 1995–2009. The sample includes all 27 EU Member States as well as 13 other major countries (such as the U.S.A., Japan, China, Russia and India). National accounts and trade data have been integrated into sets of inter-country (world) input-output tables and supplemented by satellite accounts containing environmental and socioeconomic indicators.

For our estimation of industry-level TFP growth rates, we make use of the socioeconomic accounts as these provide us with all the necessary information on factor inputs, cost shares, utilization and effort at the sector level. The WIOD database contains information for 35 goods- and service-producing industries. Since we merge several of them, our analysis is based on 28 industries.⁸ Industry data are available on gross output, value added, capital stocks, employment levels, intermediate inputs, hours worked, factor compensations, and the respective deflators. With this dataset at hand, we are not only able to adjust for changes in factor utilization, but we can also account for qualitative changes in capital and labor inputs, as according to Basu and Kimball (1997), unaccounted changes in the quality of input factors can be one of the reasons for cyclical fluctuations in the Solow residual. We account for the quality of factors by using a composite of different asset types at different prices and, in the case of labor, a composite of different skill types at different wages.

Furthermore, we add macroeconomic data from the World Bank database which we are going to use as instruments in our TFP estimations. These include information on global prices for oil and other commodities, interest rates, real effective exchange rates, government expenditures as well as global and national GDP and exports and are described in more detail in subsection 4.1 below.

The second step in our analysis – the proper aggregation of industry-specific TFP growth rates – requires the use of the harmonized SUTs, which are the basic building blocks of the WIOD database. National SUTs are typically compiled for selected years (often every five years) and show methodological variations over time. One of the advantages of the WIOD database is the fact that SUTs have been harmonized both over time and across countries by benchmarking available national SUTs on consistent time series from the System of National Accounts.⁹

⁸ As mentioned in footnote 4, we applied Almon's iterative method to construct product-by-product input-output tables from supply and use tables. To achieve robust results, we reduced the size of SUTs by merging several industries. In particular, we merged all three trade and repair sectors (NACE codes 50 to 52), all transport sectors (60 to 63), and we merged the sector of households and employed persons (P, which in most countries was reporting zero output) with other community, social and personal services (O). Finally, we also merged coke, refined petroleum and nuclear fuel industry (23) with chemicals and chemical products (24). A list of all merged industries and their correspondence to original NACE industries and to the Statistical Classification of Products by Activity (CPA) can be found in the appendix to Benkovskis et al. (2012).

⁹ The harmonization is based on Temurshoev and Timmer (2011); details of the various implementation issues in this respect are discussed in Timmer et al. (2012).

4 Results

4.1 Evaluation of TFP Changes

Our empirical model for the estimation of industry TFP growth¹⁰ is given by equation (12) below, which combines equations (1), (2) and (3) and expresses all necessary elements, including the utilization of production factors, in terms of observable variables as explained in section 2.1:

$$dy_{it} = b_0 + \gamma^* d\chi_{it} + b_1 dh_{it} + b_2 (dp_{it}^N + dn_{it} - dp_{it}^I - dk_{it}) + b_3 (di_{it} - dk_{it}) + \xi_{it} \quad (12)$$

where $b_i = \beta_i \gamma^*$, the intercept b_0 allows for the existence of a trend in technical change, and ξ denotes a residual term. By estimating equation (12), we can obtain parameters b_1 , b_2 , b_3 and γ^* (see table 3 below), which allows us to evaluate changes in TFP ($dz = b_0 + \xi$). As we are working with a panel dataset spanning countries, years and industries, we can choose between alternative estimation strategies. Ideally, the estimations are conducted at the most detailed level available; i.e., equation (12) is estimated for every single industry in each country. Unfortunately, this approach cannot be implemented here as the time period covered in WIOD is rather short and covers only 14 observations between 1995 and 2009.

To increase the number of observations, we use panel estimates, whereby we can create the panel in three different ways. The global panel would include all industries and countries, where observations have to be stacked either by countries or by industries. This approach is the simplest but is overly restrictive, as it assumes that returns to scale and other fundamental parameters of the production function determining b_1 , b_2 , b_3 are the same in all industries across all countries. We can also construct a number of panels, separating the panel datasets either by industries or by countries. We choose to work with 28 industry-specific panel datasets, whereby each panel contains a country and time dimension. As the coefficients in equation (12) are driven by parameters which are specific to the underlying production and adjustment cost function of the respective industry, it seems reasonable to assume that coefficients of the same industry are homogenous across countries rather than to impose equal coefficients for different industries in one country.¹¹ We include country fixed effects to control for country-specific characteristics (therefore $\xi_{it} = \mu_i + v_{it}$). Although time-specific fixed effects would help isolate a world business cycle effect, these were not used in the regression. It is rather possible that TFP dynamics are correlated across countries in some industries e.g. due to worldwide technological progress. Thus, the inclusion of time-specific fixed effects would eliminate some part of TFP changes.

Another problem related to the empirical estimation is the potential correlation between input growth and the technology shock. This endogeneity problem is also mentioned in Basu et al. (2006); we argue that there may also be a potential correlation between other right-hand variables and the technology shock. Changes in hours worked per employee can be affected by technological progress related to process innovation and thus better work organization. New technologies may also

¹⁰ In subsection 4.2, industry TFP growth is transformed to product TFP growth by using Almon's procedure.

¹¹ To test the poolability of the data, we ran the regressions for reduced samples (excluding individual countries one by one) and compared the coefficients with those estimated from the full sample. In the vast majority of cases, the coefficients from these reduced samples came to lie within the 95% confidence interval of the full sample coefficients. The exceptions are transport equipment (34 and 35) and other social services and employed persons (O and P) when excluding Portugal.

improve energy efficiency and hence reduce the ratio of intermediate inputs to capital. Finally, technological change is usually associated with the installment of new equipment, which can increase the investment-to-capital ratio.

Therefore we draw on a range of instruments which are uncorrelated with technological change but correlated with the right-hand variables¹² in the estimation of equation (12). The particular set of instruments used may differ from industry to industry. The instruments can be divided into four groups. The first group comprises industry-specific variables such as lagged values of input growth, changes in hours worked, intermediate inputs-to-capital and investment-to-capital ratios. Variables from the second group describe changes in external demand, which is uncorrelated to domestic technology shocks while it explains changes in total inputs. This group contains global GDP growth as well as an index of real external demand for each specific industry in every country (calculated by using WIOD data and applied only to industries producing tradable goods). The third group includes instruments that correlate with country-specific business cycles and therefore correlate strongly with variables proxying for the level of factor utilization.¹³ These are the changes in the three-month money market rate, changes in the real effective exchange rate (both proxies for monetary policy), and changes in government expenditure to GDP (proxy for fiscal policy). Although monetary and fiscal policy react to changes in output (albeit with some time lag), we take advantage of the fact that these policies in general respond to the changes in overall output and not to fluctuations in output of a specific industry.¹⁴ Hence, we argue that the above-mentioned instruments are uncorrelated with technology shocks at the industry level. The final instrument group contains various world prices (here we follow Basu et al., 2006, who use oil prices). All equations include changes in a general world commodity price index as an instrument, while for several industries we add specific commodity price indices – e.g. the food price index in the estimation for agriculture, hotels and restaurants, food, beverages and the tobacco industry, a metal price index for the basic metals and fabricated metal industry, a hardwood price index for the wood industry and construction.

The crucial condition in instrumental variable estimation is that the chosen instruments must be orthogonal to the error process. The orthogonality condition is verified by the Sargan test (also called J-test for overidentified restrictions). For all industries the null hypothesis that instruments are uncorrelated with the error term could not be rejected at the 1% confidence level, while only for three industries (food, beverages and tobacco; pulp, paper, printing and publishing; refined petroleum, chemical products) the null hypothesis was rejected at the 10% confidence level.

¹² The results of the Sargan test for overidentifying restrictions are reported in table 3. The null hypothesis is rejected for the vast majority of industries. The results of first-stage regressions are available upon request.

¹³ Basu et al. (2006) used Federal Reserve “monetary shocks” from an identified VAR as an instrument. Our approach is somewhat similar, although we do not have the opportunity to estimate shocks from a VAR model given the short length of the data.

¹⁴ The recent global economic crisis has to some extent challenged this statement with respect to fiscal policies (recall the European car scrappage schemes in 2009). However, such policies were only applied in a minority of the 40 countries in our sample.

Table 3

Estimation Results

| Industry | Coefficients | | | | No. of countries | No. of observations | Sargan test (p-value) |
|---|--------------|----------|-----------------------------|----------|------------------|---------------------|-----------------------|
| | $d\chi$ | dh | $\frac{dn+dp^N-}{-dk-dp^I}$ | $di-dk$ | | | |
| Agriculture, forestry and fishing | 0.032 | -0.029 | 0.928*** | 0.018 | 40 | 360 | 0.620 |
| Mining and quarrying | 0.548*** | 0.171 | 0.121 | -0.019 | 40 | 393 | 0.684 |
| Food, beverages and tobacco | 1.076*** | 0.155 | -0.049 | 0.012 | 40 | 407 | 0.017 |
| Textiles and textile products | 0.909*** | 0.052 | 0.122 | -0.004 | 40 | 398 | 0.254 |
| Leather and footwear | 0.940*** | 0.040 | 0.180* | 0.021 | 39 | 350 | 0.463 |
| Wood and products of wood and cork | 0.975*** | 0.296 | 0.199 | -0.034 | 40 | 394 | 0.669 |
| Pulp, paper, printing and publishing | 1.001*** | 0.103 | 0.031 | 0.003 | 40 | 407 | 0.080 |
| Refined petroleum, chemical products | 0.998*** | 0.007 | -0.082 | 0.012 | 40 | 404 | 0.019 |
| Rubber and plastics | 0.936*** | 0.112*** | 0.120* | -0.007 | 40 | 407 | 0.705 |
| Other non-metallic mineral products | 0.997*** | 0.398 | 0.087 | -0.018 | 40 | 404 | 0.226 |
| Basic metals and fabricated metal | 0.841*** | 0.275 | 0.132 | -0.009 | 40 | 407 | 0.327 |
| Machinery, n.e.c. | 0.852*** | 0.447** | 0.230 | -0.051** | 40 | 407 | 0.112 |
| Electrical and optical equipment | 1.159*** | 0.099 | -0.113 | -0.009 | 40 | 401 | 0.685 |
| Transport equipment | 0.497*** | -0.073 | 0.734*** | -0.069 | 40 | 399 | 0.599 |
| Manufacturing, n.e.c; recycling | 0.924*** | 0.281 | 0.147 | -0.034 | 40 | 396 | 0.479 |
| Electricity, gas and water supply | 0.572*** | -0.036 | 0.305** | 0.011 | 40 | 403 | 0.134 |
| Construction | 0.942*** | 0.132 | 0.163* | -0.030 | 40 | 404 | 0.983 |
| Trade | 0.745*** | 0.110 | 0.360** | 0.005 | 40 | 407 | 0.169 |
| Hotels and restaurants | 0.919*** | 0.038 | 0.419 | -0.026 | 40 | 394 | 0.508 |
| Transport | 0.909*** | 0.189 | 0.155* | 0.004 | 40 | 402 | 0.494 |
| Post and telecommunications | 1.168*** | 0.075 | -0.028 | -0.015 | 40 | 404 | 0.392 |
| Financial intermediation | 1.131*** | 0.174 | -0.154 | -0.015 | 40 | 401 | 0.504 |
| Real estate activities | 1.103*** | 0.015 | -0.083 | -0.012 | 40 | 407 | 0.925 |
| Other business activities | 1.177*** | 0.527** | -0.180 | 0.006 | 40 | 405 | 0.562 |
| Public administration and defense | 0.773*** | 0.137 | 0.088 | 0.006 | 39 | 392 | 0.463 |
| Education | -0.684 | -0.065 | 0.502 | 0.055 | 40 | 401 | 0.908 |
| Health and social work | 0.021 | 0.439 | 0.160 | -0.084* | 40 | 394 | 0.649 |
| Other social services; employed persons | 1.377* | -0.827 | 0.073 | -0.088 | 40 | 401 | 0.346 |

Source: Authors' estimations.

Note: Estimates were made by using a two-stage least square (TSLS) model allowing for country-specific fixed effects. The panel consists of 40 countries covered in the WIOD database (data for Luxembourg are missing for the "leather and footwear" industry and for India for the "public administration and defense" sector); the adjusted time period is 1997 to 2009. *, **, and *** denote significance at the 10%, 5%, and 1% level, respectively; heteroscedasticity and autocorrelation consistent (clustered) standard errors used.

As a final technical detail, overall input growth $d\chi$ in equation (2) is defined as weighted growth of observed input factors: capital, hours worked, and the volume of intermediate inputs. Their weights in total factor input are given by their shares in total costs. In contrast to the theoretical model, these shares vary in the data, therefore we follow OECD (2001) and calculate \tilde{s}_K , \tilde{s}_L and \tilde{s}_N as an average of input shares in the current and previous period.

The estimation results of equation (12) are shown in table 3. We observe almost constant returns in most industries, as indicated by the coefficient $d\chi$, which is often near unity. The exceptions are agriculture, health and social work, and education, where estimated returns to scale are insignificant and close to zero (even negative for education), as well as mining, energy, trade, public administration and the manufacture of transport equipment with pronounced decreasing returns to scale. Most of these results seem plausible from an economic point of view. In the education sector, a doubling in the number of schools and teachers will not affect the number of pupils, and even if the quality of education increases, it will most likely not double. A similar logic can be applied to the public administration and health sectors. The output in mining and quarrying is obviously linked

to the amount of natural resources within the territory of a country, and the output of agriculture is to a large extent driven by weather conditions, which explains diminishing returns to scale in these industries.

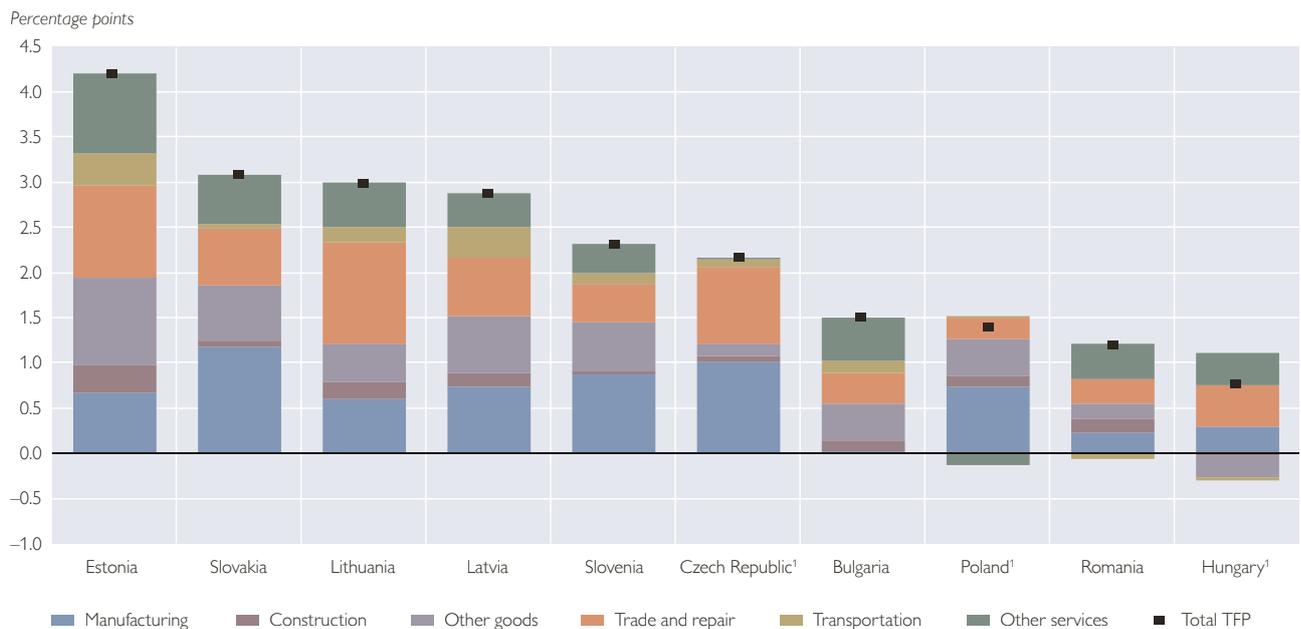
As to proxies for the level of utilization, all statistically significant coefficients have the expected sign; increases in hours worked per employee and in the intermediates-to-capital ratio lead to higher output growth, while a higher investment-to-capital ratio lowers output growth. The results in table 3 suggest that all three proxies for utilization are equally important and restricting the analysis only to one proxy (e.g. changes in hours, as in Basu et al., 2006) would imply a loss of important information. However, it should be noted that in many industries none of the above-mentioned proxies is significant, which may be due to a certain lack of homogeneity in industries across countries. We made an attempt to improve the regression by adding several cross terms and allowing coefficients to vary according to the capital intensity of an industry or to the income level of a country. This did not lead to worthwhile improvements of the results.

4.2 Aggregate Contribution of Technology and Terms of Trade Changes

Finally, we can now use the information on TFP growth in individual industries and calculate the contribution of TFP growth and terms of trade changes to the growth of real value added and various final use components. This is done in equation (8). Matrix γ is formed by results reported in table 3 (the negative and statistically insignificant coefficient reflecting negative returns to scale in the education sector was replaced by zero). The vector dz now contains product TFP changes. At first, we obtain industry-specific TFP changes from equation (12),

Chart 1

Total Factor Productivity and Industry Contributions to Value Added Growth, 1996–2009



Source: Authors' calculations.

¹ 1996–2007.

using the industry coefficients from table 3, and then transform them into a product TFP vector by using the Almon procedure (without sign restriction). Similarly to the cost shares used in the previous subsection, matrix B and row vectors s_c and s_{VA} are calculated as an average of current and previous period weights.

Chart 1 depicts the average percentage point contribution of TFP to real domestic value added growth after the aggregation of industry-specific TFP growth rates for the ten CESEE EU members over the period 1996 to 2009. The total contribution of TFP to real growth in the economy's value added (black dots) is broken down into contributions of individual sectors (stapled columns) accumulating both direct and indirect effects. As a first observation we see that the average contribution of TFP varied widely between the ten countries in the region. The Baltic states and Slovakia emerged as the top performers during our observation period, with an average contribution of above 2.5 percentage points per annum. But also Slovenia (2.3 percentage points) and Slovakia (2.2 percentage points) showed a high average annual contribution of TFP to value added growth. The remaining five countries lagged behind, with the average TFP contribution ranging from 0.8 percentage points in Hungary to 1.5 percentage points in Bulgaria. According to our calculations, Hungary had reasonably high TFP growth in the period from 2000 to 2004.

One explanation for these differences might be found in the initial gap to the technological frontier. For example, the comparison of Slovakia and the Czech Republic suggests that TFP growth (and hence its contribution to overall growth) was lower in the Czech Republic, simply because of the higher degree of industrialization of the economy at the beginning. As a result, foreign investors mainly acquired existing factories and improved existing technologies, while FDI in Slovakia more often comprised greenfield investments, thus laying the foundations for new technologies to be brought to the country. Another factor might be related to the exchange rate regime. With one exception (Czech Republic), the highest contributions of technological change to total value added growth were recorded in countries with a fixed exchange rate at the end of the observation period. Fixing the exchange rate can act as a “structural whip,” i.e. the lack of the exchange rate as a cushion for external shocks may foster structural change and thus raise the efficiency in the economy.¹⁵ Clearly, this can only be an additional explanatory factor as for some countries (i.e. Slovakia and Slovenia) the frequent realignments or crawling peg regime undermined the pressure on industrial restructuring.

In general, we observe considerably higher TFP growth rates in the CESEE countries compared with Western Europe. On average, the contribution of TFP growth to total growth amounted to 2.4 percentage points annually over the 1996–2007 period in this region. In the EU-15, TFP growth added on average 1 percentage point to overall growth in value added. Sweden and the U.K. showed the highest efficiency gains (TFP growth added an average 2 percentage points to GDP growth). Apart from these two outperformers, the contribution of TFP

¹⁵ Austria experienced such a “structural whip” in the 1980s with the schilling peg to the Deutsche mark.

growth was often higher in small and peripheral countries (at around 1.5 percentage points) than in the more advanced, large EU countries.¹⁶

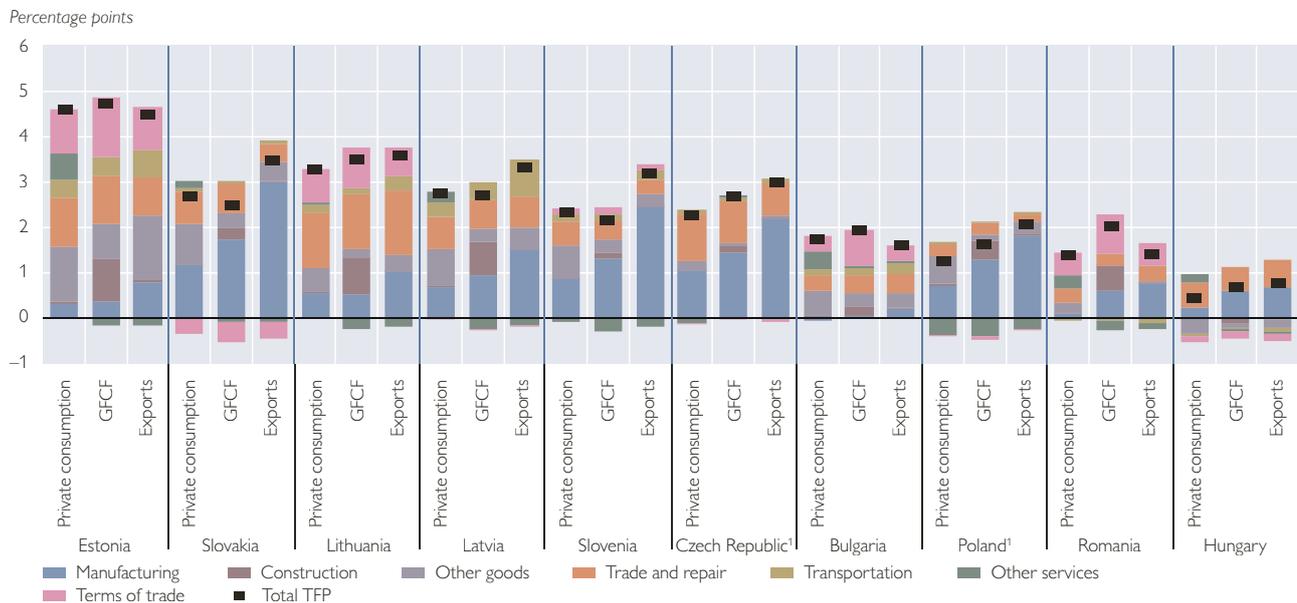
Not only the magnitude of the overall TFP contribution, which we associate very broadly with technological change, but also the contribution of individual industries or sectors to overall TFP differs between individual CESEE countries. Technological progress in goods-producing industries contributed strongly to overall TFP growth in Poland, the Czech Republic, Slovenia and Slovakia. In contrast, services TFP drove economy-wide TFP growth in Bulgaria, Hungary and Lithuania. Estonia, Latvia and Romania show a more balanced mix between TFP growth in services and goods-producing industries.

Within the goods sector, manufacturing TFP plays the most important role. It is worth noting that also Hungary shows on average stable positive TFP growth in manufacturing industries. In the Baltic states and Bulgaria, also technological progress in other goods-producing industries – comprising agriculture, mining and energy products – has had a stronger (or equally strong) influence on economy-wide TFP growth than manufacturing TFP. In Bulgaria, the dismantling of the predominance of heavy industry and the re-orientation toward light industries implied an initial negative contribution of TFP growth in manufacturing; however, since 1998 manufacturing TFP (in particular in textiles and chemicals) has been making an increasingly positive contribution to overall value added growth. Within the service sector, it is mostly TFP in trade and repair which impacts most strongly on total TFP growth. However, in Bulgaria it was financial and business services and in Romania public services (both subsumed under other services in chart 2) that contributed most markedly to services TFP. In Latvia and Estonia, TFP growth in the transportation industry is also of major importance.

So far we have aggregated the contribution of domestic industry-specific TFP growth to total value added TFP growth. As explained above, there is no theoretical role for terms of trade effects when we focus on total value added. In the following, we will trace out how industry TFP affects growth in different final use components of an economy. In this context, changes in terms of trade may improve or worsen the consumption or investment possibilities of the economy without altering the production possibilities. But before we turn to contributions to TFP growth by final use component, let us compare the contribution of TFP growth in three important GDP components. Chart 2 shows the contribution of TFP growth to growth in private consumption, gross fixed capital formation and exports for each country. Again, TFP growth in each final use component is broken down by contributions from individual industries. Most CESEE countries show the highest contribution of TFP in the export sector. This is particularly pronounced in the Czech Republic, Slovakia, Slovenia, Poland, Hungary, Lithuania and Latvia, which points toward rapid technological progress in outward-oriented industries. Set aside potential negative developments in external demand for these countries in the near future related to the euro area crisis, this constitutes a solid foundation for future export-led growth. Strong productivity gains in the export sector are certainly related to substantial foreign investment in outward-oriented industries. The analysis of explanatory factors behind TFP growth in this sector is, however,

¹⁶ Given the focus on CESEE countries, we do not display the results for all countries here. The results for all 27 EU countries are, however, available from the authors on request.

Comparison of TFP Growth Contributions across Final Use Components, 1996–2009



Source: OeNB.

¹ 1996–2007.

beyond the scope of this paper. Estonia, Romania and Bulgaria exhibit the highest TFP contribution in the production of investment goods. Thus, in all countries, technological change was fastest in the production of either investment or export goods, which implies a sizeable long-term growth potential.

The contribution of individual sectors is rather similar for different end-use components. Again, efficiency gains in manufacturing account for a sizeable fraction of TFP growth in Slovakia, Slovenia, the Czech Republic, Poland, and Latvia. Services dominate TFP growth in Lithuania and Bulgaria. Chart 2 shows another interesting detail, namely the effect of changes in terms of trade on consumption, investment and export possibilities. Individual CESEE countries react rather differently to changes in relative export and import prices.

Table 4 displays more detailed results averaged over two periods of time: the precrisis period from 1996 to 2007 and the full sample period until 2009. Terms of trade changes only play a minor role as was to be expected; however, in some countries their contribution is nonnegligible. In general, a positive contribution of terms of trade changes should go hand in hand with a real appreciation tendency: if export prices increase faster than import prices, then more imports for domestic absorption can be purchased for the same amount of exports in the short run. However, as this also entails a loss in competitiveness, the substitution effect implies an ambiguous net effect. In Estonia, Lithuania, Romania and Bulgaria, the net effect was positive on average, and the positive contribution of terms of trade changes to consumption and investment growth was rather sizeable. In contrast, in Slovakia and Hungary, terms of trade changes affected consumption and investment growth negatively. In the remaining countries, the effects of terms of trade changes were negligible and TFP growth was driven primarily by technology shocks.

Table 4

Average Contribution of Total Factor Productivity and Terms of Trade to Growth of Real Final Use Components in CESEE

| | Private consumption | | | Gross fixed capital formation | | | Exports | | |
|------------------|---------------------|------------|-------|-------------------------------|------------|-------|---------|------------|-------|
| | TFP | Technology | ToT | TFP | Technology | ToT | TFP | Technology | ToT |
| 1996–2007 | | | | | | | | | |
| Bulgaria | 1.76 | 1.40 | 0.36 | 1.92 | 1.08 | 0.85 | 1.75 | 1.38 | 0.37 |
| Czech Republic | 2.27 | 2.28 | -0.02 | 2.68 | 2.71 | -0.03 | 2.99 | 3.03 | -0.04 |
| Estonia | 5.10 | 3.83 | 1.28 | 5.14 | 3.41 | 1.73 | 5.04 | 3.78 | 1.25 |
| Hungary | 0.45 | 0.59 | -0.14 | 0.67 | 0.84 | -0.17 | 0.78 | 0.94 | -0.16 |
| Latvia | 3.38 | 3.28 | 0.10 | 3.46 | 3.29 | 0.17 | 3.85 | 3.77 | 0.08 |
| Lithuania | 3.92 | 2.98 | 0.94 | 4.35 | 3.26 | 1.09 | 4.18 | 3.40 | 0.78 |
| Poland | 1.26 | 1.30 | -0.04 | 1.64 | 1.70 | -0.06 | 2.08 | 2.10 | -0.02 |
| Romania | 1.43 | 0.78 | 0.65 | 2.31 | 1.19 | 1.12 | 1.64 | 1.01 | 0.64 |
| Slovakia | 2.77 | 3.02 | -0.26 | 2.44 | 2.81 | -0.38 | 3.54 | 3.81 | -0.27 |
| Slovenia | 2.89 | 2.85 | 0.04 | 2.71 | 2.65 | 0.05 | 3.83 | 3.80 | 0.03 |
| 1996–2009 | | | | | | | | | |
| Bulgaria | 1.74 | 1.40 | 0.34 | 1.93 | 1.15 | 0.78 | 1.61 | 1.26 | 0.35 |
| Czech Republic | | | | | | | | | |
| Estonia | 4.59 | 3.64 | 0.95 | 4.72 | 3.38 | 1.34 | 4.50 | 3.54 | 0.96 |
| Hungary | | | | | | | | | |
| Latvia | 2.75 | 2.77 | -0.02 | 2.71 | 2.73 | -0.02 | 3.30 | 3.32 | -0.01 |
| Lithuania | 3.29 | 2.54 | 0.74 | 3.50 | 2.62 | 0.88 | 3.58 | 2.96 | 0.62 |
| Poland | | | | | | | | | |
| Romania | 1.38 | 0.89 | 0.49 | 2.02 | 1.15 | 0.87 | 1.41 | 0.92 | 0.49 |
| Slovakia | 2.68 | 3.03 | -0.34 | 2.48 | 2.94 | -0.45 | 3.47 | 3.83 | -0.35 |
| Slovenia | 2.34 | 2.21 | 0.13 | 2.15 | 1.98 | 0.17 | 3.19 | 3.06 | 0.12 |

Source: Authors' calculations.

Note: Calculated based on equation (8) and estimation results from table 3. Percentage point contribution to logarithmic growth (100dy). TFP = total factor productivity, ToT = terms of trade. Results for 2008 and 2009 are missing for the Czech Republic, Hungary and Poland due to the switch to NACE 2 and the consequent lack of NACE 1.1 data on capital stocks for those years.

Based on our industry TFP growth estimations, we can also trace the results over time.¹⁷ Overall, TFP growth showed notable ups and downs in many countries in the late 1990s, with occasional negative TFP growth evident in the mid-1990s in the Czech Republic and Romania. The period 2000–2007 was characterized by particularly strong TFP growth in all countries. The 2008/09 crisis left its mark also in terms of lower or sometimes negative TFP growth. These fluctuations may partly reflect a methodological weakness in our industry-specific TFP estimations,¹⁸ but there are also economic arguments for weaker technological progress in an uncertain and unfavorable economic environment. Both the financial means and the incentives to improve existing technologies may be impaired in times of economic distress. However, again, individual countries differ in their time path of TFP growth rates: In the 2000–2007 period, most countries – i.e. Estonia, Latvia, Lithuania and Slovenia, to name them in descending order – showed huge technological progress ranging on average from 4.9% to 2.7% per year over that period. In contrast, Poland recorded high TFP growth between

¹⁷ These results are not shown here for space constraints but are available from the authors on request.

¹⁸ Our approach to estimate industry-specific TFP growth rates in country-year panels and separately for each industry may come at the cost of not being able to purge the residual from all cyclical factors. This potential caveat can arise as individual countries differ and we are not able to fully eliminate the effects of individual business cycles. The only remedy would be to include country-year fixed effects, but this is precluded by the panel dimension.

1995 and 2000 but considerably weaker improvements since. As mentioned before, TFP growth in Hungary started to decline from relatively high levels as early as 2005 and became almost zero or turned negative even in the years prior to the crisis.

Unfortunately, due to data constraints, we cannot analyze the years 2008 and 2009 for all countries.¹⁹ We observe a decline in TFP growth in most countries in 2008, in Latvia and Slovakia even one year earlier. Slovenia and Romania show an increase in TFP growth in 2008 compared with 2007, but a sharp drop into negative territory in 2009. In contrast, TFP growth in Slovakia and Estonia remained positive even in 2009.

5 Summary and Conclusions

According to endogenous growth theory, technological progress plays a vital role in ensuring economic growth. In this paper, we calculate total factor productivity growth, using a novel approach. We start by calculating TFP at the most detailed industry level in order to take account of different production technologies in different activities. This allows us to overcome a major shortcoming of previous production function approaches to measuring TFP growth in the CESEE region, which rely on a one-sector model of the economy. Our framework is flexible enough to incorporate non-constant returns to scale and variation in the utilization of input factors.

Being constrained by a short time dimension – which is typical of our country sample – we estimate TFP separately for each industry, thus pooling the data across all 40 countries available in the database. We employ instrumental variable estimation to control for endogeneity between factor growth, utilization and TFP and we include country fixed effects. Our results point to constant returns in most industries. Only mining, energy, trade and repair, public administration and the manufacture of transport equipment show decreasing returns to scale while estimated returns to scale are insignificant and close to zero in agriculture, health and social work and education. These results seem plausible from an economic point of view.

After this careful estimation of industry-specific TFP growth, we aggregate TFP growth from the industry level, using information from national input-output tables and following a methodology proposed by Basu et al. (2010). This procedure entails a number of crucial assumptions and decisions, in particular concerning the choice between the product-specific and industry-specific technology assumption. We work with the theoretically recommended product technology assumption. All our calculations are based on the WIOD database, which provides input-output tables that are harmonized across countries and interpolated over time. This gives us a rich panel dataset suitable for comparisons across countries and over the period 1996–2009.

On average, we find rather large differences in TFP growth between individual CESEE countries. The Baltics and Slovakia exhibit the highest TFP growth over this period. Their average annual TFP growth rates of roughly 3% (4.2% in

¹⁹ The Czech Republic, Hungary and Poland switched their national accounts classification to NACE 2 with the reporting year 2008, thus we were not able to obtain comparable data on capital stocks for the last two years in our sample.

the case of Estonia) surpass those of Romania and Hungary (roughly 1%) by a wide margin. As a comparison, TFP growth in Germany averaged 0.5% over the same period; the unweighted EU-15 average TFP growth rate of almost 1% was very much influenced by rather high annual TFP growth of about 2% in the U.K. Thus, the positive TFP growth differential for most CESEE countries suggests technological convergence of these countries toward Western Europe and the international technological frontier. While technological progress in goods-producing industries contributed most strongly to overall value added growth in Poland, the Czech Republic, Slovenia and Slovakia, efficiency gains in the service sector were of greater importance in Bulgaria, Hungary and Lithuania.

We also looked at the contribution of TFP to the growth of individual final use components. Productivity gains in the export sector proved to be of particular importance in most economies. While TFP growth in the export sector also played an important role in Estonia, Bulgaria and Romania, its contribution was even higher in the production of investment goods in these three countries. This suggests that technological progress in outward-oriented industries was particularly fast, possibly fueled by foreign direct investment in the export sector. However, these developments also imply that export-led growth can be a viable option for the recovery of these countries, provided they are able to orient their export production toward fast-growing import markets.

While domestic TFP growth plays by far the most important role for the growth of individual GDP components, some countries also exhibit a nonnegligible contribution from terms of trade changes, especially in the investment sector. However, terms of trade changes may exert either a positive or a negative influence on overall growth depending on whether the price effect or the substitution effect of a real appreciation dominates. While the positive price effect clearly dominates in Bulgaria, Estonia, Lithuania and Romania, this was not the case in Slovakia and Hungary. The comparatively strong negative terms of trade effect for the production of consumption and investment goods in these countries may be related to the fact that – correcting for non-price factors such as, for example, improvements in quality – these countries hardly experienced a real appreciation over the observation period. Nevertheless, technological progress in domestic industries by far offset the negative terms of trade effect in all affected countries. Over time, we observe that the boom period 2000–2007 was accompanied by strong TFP growth in the region, whereas the reaction to the crisis differed substantially between countries. While TFP growth generally receded in 2008 (in Latvia and Slovakia already in 2007 and in Slovenia and Romania only in 2009), it remained positive and fairly strong in Estonia.

This novel approach to growth accounting gives interesting insights into drivers of economic growth and details concerning the sectoral origin of technological growth in an economy. Moreover, with this methodology, we can assess the importance of domestic as well as international linkages within an economy and between economies. We find that not only the growth contribution of productivity gains differs greatly between CESEE countries, but also terms of trade changes affect individual economies in the region in radically different ways. This effect depends on the degree of real appreciation in individual countries and is as such related to the specific combination of price and non-price developments impacting international competitiveness.

In general, the fact that the contribution of TFP growth was highest in the production of export and investment goods is quite encouraging. In contrast, lower TFP growth especially in recent years and already prior to the global economic crisis – for example in Hungary, which nevertheless showed average TFP growth rates comparable with Western European countries – deserves attention and a careful analysis of the underlying reasons.

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<http://www.wiod.org/database/index.htm> (retrieved on May 9, 2012).

Nonperforming Loans in Western Europe – A Selective Comparison of Countries and National Definitions¹

Stephan Barisitz²

As a follow-up study to the author's previous paper on "Nonperforming Loans in CESEE – What Do They Comprise?", the present contribution focuses on the definitions of nonperforming loans (NPLs) in a number of Western European nations – Austria, Finland, France, Germany, Ireland, Italy, Portugal, Spain and the United Kingdom. Supervisors or at least general practice in the majority of Western European countries seem to endorse the rule that for a loan to be nonperforming, at least one of two (primary) elements has to be present: (1) principal or interest 90 days or more overdue, and (2) existence of underlying well-defined weaknesses of loan or borrower. However, there are also other (secondary) elements that have an impact on NPL measurement and the comparability of definitions: the question whether a restructured loan is classified as NPL or not, whether the presence of a collateral or guarantee influences loan classification or not, whether the full outstanding value or only part of a loan is reported as nonperforming, and whether a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired or not. While these elements may introduce upward or downward biases into some nations' NPL definitions and ratios, and these would need to be further investigated, the above-outlined NPL rule appears to constitute a feasible yardstick for most of the countries mentioned above. Moreover, this definition is also in line with a draft EU ruling for a Capital Requirements Regulation (CRR).

JEL classification: G12, G21, G32, G33

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

1 Introduction

After stocktaking and comparing credit quality classifications and nonperforming loan (NPL) definitions in Central, Eastern and Southeastern Europe (CESEE) in a previous paper (Barisitz, 2011), the current study briefly describes the respective classifications and definitions used in the Western part of the EU in order to have a broad European picture of how credit qualities tend to be ranked and what is typically regarded as an NPL. This would seem timely in a situation where Europe is coping with financial instability, banking sector weaknesses and a debt crisis. The economic stagnation or slow growth that many European countries are currently facing is not at all conducive to reining in crisis-triggered elevated NPL levels. In order to better capture what these bad loans actually stand for, to develop meaningful benchmarks, therefore to make NPL indicators easier to compare from country to country, and consequently to make it easier for policymakers to interpret comparative data and draw conclusions, it appears helpful to look at

¹ 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.

² Oesterreichische Nationalbank (OeNB), Foreign Research Division, stephan.barisitz@oebn.at. The author is grateful to Tamiko Bayliss and Martin Brooke (Bank of England), Adelaide Cavaleiro (Banco de Portugal), Andrea Generale (Banca d'Italia), Neill Killeen (Central Bank of Ireland), Cristina de Luna Abella (Banco de España), Franck Sédillot (Banque de France) and Benno Wink (Deutsche Bundesbank) for providing precious information. Peter Backé, Markus Eller, Martin Gächter, Andreas Greiner, Mariya Hake, Aleksandra Riedl, Thomas Schin, Zoltan Walko (all OeNB) made helpful comments and suggestions. I am particularly indebted to Ulrich Gunter, Peter Mooslechner, Thomas Reininger, Doris Ritzberger-Grünwald (all OeNB) and to an anonymous referee for their numerous remarks and proposals.

national NPL definitions in some detail. In this sense, increased international data transparency can be a necessary ingredient to effective policy. As yet, there is no EU- or euro area-wide definition of NPLs. However, this gap will probably soon be closed, a circumstance which will be referred to in more detail below in section 2.

This paper deals with nine selected Western EU Member States for which sufficient relevant information is available and which are perceived to be broadly representative of Western Europe: Austria, Finland, France, Germany, Ireland, Italy, Portugal, Spain and the United Kingdom. The selection appears relatively balanced because it comprises countries often considered as “euro area core countries” (Austria, Finland, France, Germany) as well as others considered as “euro area periphery countries” (Ireland, Portugal, Spain) plus Italy plus the largest EU member outside the euro area (the U.K.).³ One could also regard the whole sample as including five “large” (France, Germany, Italy, Spain, the U.K.) and four “small” (Austria, Finland, Ireland, Portugal) countries.

Section 2 first describes and compares loan classifications and official (as far as they exist) NPL definitions used in the selected countries. Based on this comparative description, we then aim to derive an analytical NPL definition which should be as comparable as possible across all analyzed countries (and, of course, need not be identical with existing official definitions). Some elements of NPL comparability in CESEE are added in a succinct overview. Section 3 provides a quick glance at available NPL data for Western European countries from international sources (IMF Financial Stability Indicators, ECB Consolidated Banking Data). Respective findings with regard to the aimed-for analytical NPL definition are explained in section 4, which also summarizes the study and draws some conclusions.

2 Overview of Regulatory NPL Definitions in Selected Western European Countries

2.1 NPL Content and Thresholds

Internationally, NPL definitions often refer to three elements (see Barisitz, 2011, p. 46): (1) “principal or interest 90 days or more overdue” (or “90 days+”, based on the IMF Financial Soundness Indicators Compilation Guide), (2) the presence of underlying “well-defined weaknesses” of either the loan or the borrower (commonly used, e.g. in the loan classification scheme of the Institute for International Finance (IIF))⁴, and (3) the frequently applied credit quality categories⁵ (also proposed by the IIF), the weakest three of which (“substandard – doubtful – loss/write-off”) typically correspond to NPLs.

Interestingly, while most of the ten CESEE countries analyzed in the previous study work with the above-mentioned credit quality categories, more than half of

³ NPLs tend to be relatively higher in the more crisis-prone periphery countries than in the core countries (see charts 1 and 2, even if data are not strictly comparable across charts and countries, which is why this study is being undertaken).

⁴ A “well-defined weakness” would typically correspond to a bank’s assessment that the borrower’s economic or financial standing has seriously deteriorated, which could even happen before the expiry of the “three months overdue” period. This could i.a. include the debtor’s insolvency and/or bankruptcy, the introduction of bankruptcy proceedings or the debtor’s seeking of restructuring measures within this timeframe. Thus it is judged improbable that the borrower will fulfil his or her obligation without the bank resorting to the liquidation of available collateral.

⁵ The entire range is: standard – watch/special mention – substandard – doubtful – loss/write-off.

the nine Western European nations the present study focuses on do not provide prescriptive classification categories. Only Austria, Italy and Spain apply such gradings.⁶ The risk categories applied in Austria are called “standard,” “watch/special mention,” “nonperforming” and “loss.” Given that the “nonperforming” category includes “loans whose repayment... appears partly or fully jeopardized” (see table 1), the last two categories can be regarded as impaired. Italy features “performing loans,” “substandard loans,” “past due/overdrawn more than 90 days,” “bad loans” and “restructured exposures.” The Banca d’Italia views loans under the last four of these credit quality categories (from “substandard” to “restructured exposure”) as NPLs. However, substandard loans in Italy are defined as “loans to customers that are in temporary difficulties that can be expected to be cleared up in a reasonable time” (IMF Monetary and Financial Systems Department, 2004, p. 24; IMF, Coordinated Compilation Exercise for Financial Soundness Indicators, Metadata Questionnaire Italy, 2006, subsection E3.1). This does not appear to qualify as a “well-defined” or “serious weakness” (in the commonly used sense mentioned above). Therefore, the corresponding official NPL definition would seem relatively strict in an international comparison. Spain distinguishes “standard,” “substandard,” “doubtful due to customer arrears,” “doubtful for reasons other than customer arrears,” and “write-off” loans. According to the Banco de España, the last three categories comprise NPLs; this appears to be in line with the two NPL elements mentioned above (“90 days+” and “well-defined weakness”), since the category “doubtful due to customer arrears” refers to arrears of more than three months and the category “doubtful for reasons other than customer arrears” relates to reasonable doubts about full repayment on contractual terms. France subdivides NPLs in “créances douteuses” and “créances irrécouvrables,” but does not provide other categories.

As table 1 shows, the existence of “well-defined weaknesses” is a salient feature of NPLs in all but two (Finland, the U.K.) of the Western European countries under observation. In Portugal, the well-defined weaknesses refer only to the bankruptcy or liquidation of the debtor. The NPL requirement of 90 days+ is present (at least as a generally accepted practice) in all Western European countries. Two countries (Finland, the U.K.) limit themselves to a sole 90 days+ rule, not supplemented by any other NPL criterion.

Therefore, supervisors or at least general practice in the majority of the countries under observation appear to endorse the rule that for a loan to be nonperforming, at least one of two elements has to be present: (1) principal or interest 90 days or more overdue, (2) existence of underlying well-defined weaknesses of either the loan or the borrower.⁷ This rule means that either of these two elements is a sufficient criterion to classify a loan as nonperforming.

The second element can certainly not be seized with the same precision as the first and therefore leaves some room for interpretation and is probably even associated with some fuzziness. This may be one of the reasons why the Financial Soundness Indicators (FSIs) Compilation Guide (IMF, 2006), particularly in its updated version of November 2007, focused solely on the criterion of 90 days+ (Barisitz,

⁶ Many of the following remarks are illustrated or explained in more detail in table 1, which also provides detailed information on the respective sources.

⁷ This also goes for the great majority of CESEE countries analyzed in Barisitz (2011).

2011, pp. 47–48). On the other hand, the reality and ubiquity of the Western European (and the CESEE) authorities' use of the criterion of well-defined weaknesses is such that – at least in the case of European countries – we feel this criterion cannot be ignored. This understanding also corresponds to the definition of default by the Basel Committee on Banking Supervision (2004)⁸ and is consistent with the IIF's credit quality classification. As explained above, within the range of its credit quality categories, Spain seems to illustrate well the two salient characteristics of NPLs in its two intermediary grades.

In line with overall international practice (according to the IIF), most of the countries analyzed classify restructured or replacement loans as impaired, at least in the first months after restructuring; in Austria, Germany and the U.K., however, classification depends on banks' practices (see table 1).

Again in line with international practice, the countries analyzed (with the – partial – exception of Portugal) do not take into account collateral or guarantees in classifying loans.

On the question of whether the full value (or only overdue installments or another amount) of an NPL should be recorded as nonperforming, the clear majority of countries opt for recording the full value, which is in line with common practice. However, there is the notable exception of Portugal, and qualifications have to be made for Austria, Germany and the U.K.

Finally, on the issue whether a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired, a majority can be found against downgrading (except for Finland and Ireland, which are in favor; Portugal and Spain have downgrade requirements which are, however, weaker than such rules usually are), thus adhering to the “NPL product view” as opposed to the “NPL customer view.”⁹

⁸ See *Basel Committee on Banking Supervision (2004), paragraph 452:*

“Definition of default

A default is considered to have occurred with regard to a particular obligor when either or both of the following events have taken place:

- *The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realizing security (if held).*
- *The obligor is past due more than 90 days on any material credit obligation to the banking group.”*

⁹ *What we describe as “downgrade requirement” thus corresponds to the “NPL customer view,” whereas our “lack of downgrade requirement” equals the “NPL product view.”*

Table 1

Outline of Features of National NPL Definitions

| Country | 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 | | | | | |
| Austria | OeNB: Ausweisrichtlinie zur Meldung der Anlage zum Prüfungsbericht (AP), based on Regulation No. 298 of the Austrian Financial Market Authority (September 15, 2010); Coordinated Compilation Exercise (CCE) for Financial Soundness Indicators (FSIs): Answers to Austria's Metadata Questionnaire (January 2007); IMF Financial Soundness Indicators (IMF FSIs): Austria Metadata Tables (2011 Quarterly) | Yes (generally accepted practice) | Yes (repayment of interest or principal appears partly or fully jeopardized) | Risk categories: standard – watch/special mention – nonperforming (loans whose repayment of interest or principal appears partly or fully jeopardized) – loss (credit loss has become a certainty); <i>author's suggestion: the last two categories should define NPLs</i> | Depends on banks' practice | No | Outstanding net value of loan (after deduction of cumulative value adjustments) | No |
| Finland | Finanssivalvonta – Finansinspektionen – Financial Supervisory Authority: Standard RA 4.6 – Reporting of non-performing and zero-interest assets (February 2011); CCE FSIs: Answers to Finland's Metadata Questionnaire (April 2007); IMF FSIs: Finland Metadata Tables (2007 Annual) | Yes | – | No prescriptive classification categories (impairment loss measured as difference between loan's carrying amount and present value of loan's estimated future cash flow) | Classification as impaired; reclassification as performing upon court decision (until debtor again becomes delinquent on repayment of principal or interest for period of 90 days) | – | Yes | Yes |
| France | CCE FSIs: Answers to France's Metadata Questionnaire (January 2007); IMF FSIs: France Metadata Tables (2008 Annual) | Yes | Yes (objective evidence of impairment of loan) | No prescriptive classification categories, except for NPLs, which according to the Autorité de contrôle prudentiel of the Banque de France consist of "crédances douteuses" (claims that present a probable, but not certain, risk of default on a loan) and "crédances irrécupérables" (claims that are definitely lost) | Usually classification as impaired (yet each bank is responsible for its own credit risk assessment) | No | Yes | No |

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 | Source | Essential features of NPLs ¹ | | Categories of credit quality classification ² | Classification of restructured/replacement loans | Existence of collateral/guarantees considered in determining classification of loan | Full outstanding value of loan recorded as NPL ³ | Downgrade requirement ⁴ |
|---------|---|---|---|---|--|---|--|------------------------------------|
| | | Principal or interest payments 90 days overdue (90 days+) | Well-defined weaknesses of borrower or loan | | | | | |
| Germany | Bundesanstalt für Finanzdienstleistungsaufsicht: Verordnung über die Prüfung der Jahresabschlüsse der Kreditinstitute und Finanzdienstleistungsinstitute sowie die darüber zu erstellenden Berichte (Prüfungsberichtsverordnung November 2009); IMF FSIs: Germany Metadata Tables (2011 Quarterly) | Yes | Yes (the bank deems it improbable that debtors will fulfill their credit obligations without the bank resorting to the liquidation of available collateral) | No prescriptive classification categories | Depends on banks' practice | No | Full outstanding value of loan as well as net value of loan (after deduction of value adjustments) recorded as nonperforming | No |
| Ireland | CCE FSIs: Answers to Ireland's Metadata Questionnaire (February 2007); IMF FSIs: Ireland Metadata Tables (2010 Quarterly) | Yes | Yes (payment in full of principal or interest is not expected even if less than 90 days overdue) | No prescriptive classification categories | Classified as nonperforming | No | Yes | No |
| Italy | IMF Monetary and Financial Systems Department: Detailed Assessment of Compliance with the Basel Core Principles for Effective Banking Supervision – Italy, April 2004; CCE FSIs: Answers to Italy's Metadata Questionnaire (August 2006); IMF FSIs: Italy Metadata Tables (2008 Annual) | Yes | Yes (borrower insolvent, even when insolvency is not ascertained by court; or borrower in temporary difficulties that can be expected to be cleared up in a reasonable time; however, whether this second indication corresponds to a well-defined weakness seems doubtful) | Categories: performing – substandard loans (loans to customers in temporary difficulties that can be expected to be cleared up in a reasonable time) – past due/overdrawn more than 90 days – bad loans (loans to insolvent customers, even when insolvency is not ascertained by court) – restructured exposures (loan for which a bank, upon granting a moratorium on repayment, renegotiates the loan at lower-than-market interest rates); while, according to Banca d'Italia, the last four (including restructured loans) qualify as NPLs, for purposes of international comparison one could opt for the last three since substandard loans would not appear to correspond to a well-defined weakness of the borrower or loan considering their official definition (temporary nature of difficulties, expectation that they will be cleared up, etc.) | Classified as nonperforming | No | Yes | Yes |

Source: Author's compilation from various sources.

¹ At least one of the two features quoted should be present.

² Customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL.

³ Or only overdue installments or amount estimated as nonrecoverable.

⁴ A bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired.

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 | Source | Essential features of NPLs ¹ | | Categories of credit quality classification ² | Classification of restructured/replacement loans | Existence of collateral/guarantees considered in determining classification of loan | Full outstanding value of loan recorded as NPL ³ | Downgrade requirement ⁴ |
|----------|---|---|---|--|---|---|--|--|
| | | Principal or interest payments 90 days overdue (90 days+) | Well-defined weaknesses of borrower or loan | | | | | |
| Portugal | CCE FSIs: Answers to Portugal's Metadata Questionnaire (March 2006); IMF FSIs: Portugal Metadata Tables (2008 Quarterly) | Yes | Yes, partly (bankruptcy or liquidation of the debtor) | No prescriptive classification categories | Classified as non-performing; (in order to change status to performing; at least interest payments fallen due should have been cleared; moreover, the overall value of payments in arrears and respective interest represent less than 25% of outstanding capital plus interest fallen due) | Yes (while the mere existence of a collateral or guarantee does not prevent the classification of an impaired loan as non-performing, the strengthening of existing collateral can contribute to the upgrading of the loan quality) | No; amount recorded as nonperforming reflects installments overdue for more than 90 days plus, if applicable, an amount considered to be of doubtful recovery ⁵ | A credit institution is required to classify as doubtful debts all loans granted to the same client only if the overall value of payments in arrears and respective interest represents at least 25% of outstanding capital plus interest fallen due |

⁵ An amount is considered to be of doubtful recovery when the interest and capital arrears exceed 25% of outstanding capital plus interest fallen due or payments are overdue for more than 6, 12 or 24 months for operations with an initial maturity of respectively less than 5, 5 to 10 or more than 10 years or payments fall due of all credit granted to an individual client, where the overall value of payment in arrears and respective interest represents at least 25% of outstanding capital plus interest fallen due.

Source: Author's compilation from various sources.

¹ At least one of the two features quoted should be present.

² Customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL.

³ Or only overdue installments or amount estimated as nonrecoverable.

⁴ A bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired.

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.

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Outline of Features of National NPL Definitions

| Country | Source | Essential features of NPLs ¹ | | Categories of credit quality classification ² | Classification of restructured/replacement loans | Existence of collateral/guarantees considered in determining classification of loan | Full outstanding value of loan recorded as NPL ³ | Downgrade requirement ⁴ |
|-----------------------|---|--|---|--|--|---|---|--|
| | | Principal or interest payments 90 days overdue (90 days+) | Well-defined weaknesses of borrower or loan | | | | | |
| Spain | Banco de España: Circular 4/2004 (CBE 4/2004) Anejo IX, modificado para Circular 2/2012: Entidades de credito: Normas de informacion financiera publica, y reservada, y modelos de estados financieros; IMF FSIs: Spain Metadata Tables (2010 Annual) | Yes | Yes (reasonable doubts about full repayment of loan; or loans classified as doubtful due to country risk) | Categories: standard – substandard – doubtful due to customer arrears (of more than three months) – doubtful for reasons other than customer arrears (reasonable doubts about full repayment on contractual terms) – write-off (possibility of recovery is remote); according to Banco de España, the last three qualify as NPLs | Classified as non-performing (unless at least the current interest receivable – disregarding interest for late payment – is paid and unless new effective guarantees or collateral are provided or there is reasonable certainty that the customer can make payment on schedule) | Generally not | Yes | A creditor is required to downgrade all loans to a common debtor if the loans classified as impaired or doubtful due to arrears exceed 25% of all the outstanding loans to that debtor |
| United Kingdom | Information provided by the Bank of England; IMF FSIs: United Kingdom Metadata Tables (2008 Quarterly) | Yes (while no standardized definition, generally accepted principle) | – | No prescriptive classification categories | Depends on banks' internal policy | No | Yes (after deduction of specific provisions) | No (depends on the individual loan characteristics) |

Source: Author's compilation from various sources.

¹ At least one of the two features quoted should be present.

² Customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL.

³ Or only overdue installments or amount estimated as nonrecoverable.

⁴ A bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired.

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 | Source | Essential features of NPLs ¹ | | Categories of credit quality classification ² | Classification of restructured/replacement loans | Existence of collateral/guarantees considered in determining classification of loan | Full outstanding value of loan recorded as NPL ³ | Downgrade requirement ⁴ |
|--|--|---|--|--|---|---|---|------------------------------------|
| | | Principal or interest payments 90 days overdue (90 days+) | Well-defined weaknesses of borrower or loan | | | | | |
| <i>Memorandum item</i> | | | | | | | | |
| Institute for International Finance (IIF) | IMF: 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 the 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 loan as impaired | Yes | – |

Source: Author's compilation from various sources.

¹ At least one of the two features quoted should be present.

² Customary categories according to the IIF: standard – watch – substandard – doubtful – loss; last three: NPL.

³ Or only overdue installments or amount estimated as nonrecoverable.

⁴ A bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired.

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.

2.2 Elements of NPL Comparability

2.2.1 Primary Elements

As regards consideration of the two primary elements found essential for the definition of NPLs – (1) 90 days+, (2) well-defined weaknesses¹⁰ – the majority of definitions or practical understanding of NPLs appear comparable across the countries under observation. This goes for Austria, France, Germany, Ireland, Portugal (with qualification, see below) and Spain (see table 2). These countries' general practice appears to endorse the rule that for a loan to be nonperforming, at least one of the above two primary elements has to be present.

Finland's and the U.K.'s pure 90 days+ rule is probably somewhat less strict than qualifying for either (1) or (2) or both as it does not capture the possibility of a loan not yet 90 days overdue but witnessing a serious weakness. As mentioned above, the Banca d'Italia's official view that NPLs also include loans to customers in temporary difficulties that can be expected to be cleared up in a reasonable time (called substandard loans) would appear stricter than the above-outlined commonly endorsed definition; this is because the latter requires a weakness to be well-defined or serious, in some cases even referring to a borrower's insolvency. Portugal's definition of an impaired loan (90 days+ and/or bankruptcy or liquidation of the borrower) is stricter than Finland's, but less strict than the common definition, since a Portuguese debtor faced with a well-defined weakness but not

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 ¹ |
|----------------|--|---|---|
| Austria | No bias (comparable) | Downward bias | Slight downward bias |
| Finland | Downward bias | Upward bias | Possibly no bias |
| France | No bias (comparable) | No bias (comparable) | No bias (comparable) |
| Germany | No bias (comparable) | Downward bias | Slight downward bias |
| Ireland | No bias (comparable) | No bias (comparable) | No bias (comparable) |
| Italy | Upward bias | Upward bias | Upward bias |
| Portugal | Slight downward bias | Downward bias | Downward bias |
| Spain | No bias (comparable) | No bias (comparable) | No bias (comparable) |
| United Kingdom | Downward bias | Downward bias | Downward bias |

Source: Author's assessment and compilation.

¹ 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. Since this is a definitional, not a data-based study, the bias unfortunately cannot be quantified. Therefore, in qualitative terms, a slight downward bias e.g. for primary elements of a country's NPL definition (like that of Portugal) is found to be a bias that is clearly weaker than the downward bias previously identified for the respective NPL definition of another country (like Finland), as explained in the text. A slight downward bias can also arise as a result of the aggregation of a lack of bias for primary elements of a country's NPL definition and of a downward bias for its secondary elements (like for Austria or Germany).

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

¹⁰ See the first two columns of table 1.

yet bankrupt nor 90 days in delay with payments would still be performing according to domestic regulations, but not so according the internationally wide-spread view. At this stage, possible suggested corrections cannot be quantified because the present study is a purely definitional one.

2.2.2 Secondary Elements

Some other important elements do not constitute immediate defining components of NPLs and could therefore be called secondary elements. They may, however, have an upward or downward impact on individual countries' NPL definition and data¹¹: The way restructured credits or replacement loans are classified – as NPLs or as performing loans – can influence the overall NPL ratio, particularly in times of crisis, when the share of replacement loans tends to rise. Or if the existence of a collateral or guarantee is taken into account in the grading of a loan in the sense that the quality of a loan deemed to be saddled with serious weaknesses is upgraded to “performing” thanks to the presence of a high-value or liquid collateral, this can of course impact the impaired credit ratio. The same goes more generally for the issue of what is actually recorded as an NPL: the full outstanding value of the loan or just the sum of overdue installments or an amount gauged by the credit institution to be nonrecoverable (which could only be a fraction of the full amount). If NPLs are measured as the latter, resulting ratios of NPLs to total loans can be substantially lower than they would be if full outstanding values were entered. Finally, whether a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired (downgrade requirement for multiple loans, or NPL customer view) or not (NPL product view) can also make a nonnegligible difference.

Considering international approaches to the classification of assets described in the IMF's FSIs Compilation Guide (2006) and the IIF's suggested credit quality classification as well as average European practice, in the following we try to arrive at some comparability benchmarks for the secondary elements mentioned above. Country-specific practices can then be assessed against these benchmarks, which may reveal upward or downward biases with respect to comparability for countries in question.

Treatment of restructured or replacement loans: According to the FSIs Compilation Guide (IMF, 2006, p. 259), “payments on restructured loans (...) are often treated identically with impaired assets (...) until a record of payment is established, after which they can be upgraded.” Moreover, in the majority of analyzed countries, restructured loans are classified as NPLs (at least for an initial period of a couple of months), which can thus serve as a benchmark.

Consideration of collateral or guarantee when measuring loan quality: As the FSIs Compilation Guide (IMF, 2006, p. 258) points out, “there is some prevalence of the practice not to consider declines in the value of loan collateral or guarantees as a basis for classifying the loan as impaired,” which gives “weight to the view that the quality of a loan should be judged in its own right independent of collateral and guarantees.” This provides a clear benchmark, which is moreover supported by practice in almost all the countries analyzed.

¹¹ These elements are described in the four right-hand columns of table 1.

Total loan or only part of loan recorded as nonperforming: A clear majority of countries analyzed appears to support the view that “the amount of loans (and other assets) recorded as nonperforming should be the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue” (IMF, 2006, p. 46).

Existence of downgrade requirement for multiple loans: On the issue whether to downgrade all loans to a common debtor if any of these loans are classified as impaired (NPL customer view versus NPL product view), neither the FSIs Compilation Guide nor the IIF’s credit quality classification seem to take a clear stand. Most countries under observation do not apply the downgrade requirement. They thus practice the NPL product view. Therefore, to judge comparability with respect to this issue we choose the less demanding benchmark, namely the nonexistence of a downgrade requirement.¹²

Proceeding from these comparative benchmarks, which are in line with the predominant practices in the region (replacement loans treated as NPLs at least for initial period, collateral not considered when judging loan quality, total gross value of loan recorded as nonperforming, no downgrade requirement for multiple loans), some of the countries analyzed may feature upward or downward biases of NPL ratios worth mentioning (see tables 1 and 2).

In Austria replacement loans are not generally or categorically classified as NPLs, but according to banks’ practice; and it is not the full outstanding value of the loan that is recorded as nonperforming, but the net value (after deduction of cumulative value adjustments). Regarding the other secondary elements, Austria hits the benchmark. This would point in the direction of a downward bias of secondary elements that influence Austria’s NPL ratio, which, combined with the lack of bias of primary elements, implies that Austrian NPL data would have to be slightly corrected upward to be internationally comparable to most of the countries analyzed in this study. As mentioned earlier, as Finland’s NPL definition does not include well-defined weaknesses, the primary elements for Finland may be biased downward; but the country applies the downgrade requirement for multiple loans (i.e. it adheres to the NPL customer view), which according to our chosen standard would influence the NPL ratio in the opposite sense. Downward and upward pressures may (possibly) cancel each other out in Finland’s case.

Whereas France occupies a relatively balanced position regarding primary as well as secondary elements of NPL definition and data, Germany’s NPL ratio, on account of secondary elements, not unlike Austria’s, would appear somewhat downward biased, implying that Germany’s NPL data might need to be (somewhat) corrected upward to be internationally comparable. Yet differences between Germany and France may not be very large either. Ireland’s NPL definition overall appears comparable to that of France and quite balanced (as tables 1 and 2 depict).

As mentioned earlier, Italy’s NPL definition regarding primary elements appears relatively strict by international comparison. And if one adds the fact that Italy applies the downgrade requirement (to multiple loans), the upward bias of the country’s NPL ratio is reinforced. Therefore, based on the available information, in Italy’s case it would appear strongly recommendable to exclude “substandard

¹² From a general supervisory viewpoint it would of course be preferable to apply the stricter NPL customer view (downgrade requirement) as a benchmark.

loans” (defined as loans to customers in temporary difficulties) from the NPL definition to facilitate comparability across borders and to avoid providing possibly too high indications of Italian NPL ratios in international comparisons.

The downward bias of Portugal’s NPL definition and ratio is not only due to its primary elements (as explained above), but also to other factors, among them an interesting peculiarity of the country’s recording of NPLs: According to the Banco de Portugal, in contrast to the authorities of almost all other analyzed countries, an NPL is not measured at its full outstanding value, but at the sum of installments overdue for more than three months plus, if applicable, an amount assessed to be of doubtful recovery (see table 1). For international comparability, therefore, an upward adjustment of Portugal’s NPL ratio would very likely be needed.

While Spain, somewhat along the lines of France, features a rather balanced overall position, the U.K.’s NPL definition and ratio would seem to be biased downward, given its sole 90 days+ rule, supplemented by two rather generously formulated secondary elements (classification of replacement loans according to banks’ internal policy, NPL recorded net of specific provisions).

2.2.3 Elements of NPL Comparability in CESEE: A Succinct Overview

As described in Barisitz (2011), the great majority of NPL definitions of CESEE countries analyzed (Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Russian Federation, Serbia, Slovakia and Ukraine) feature both of the above-mentioned primary elements (90 days+, well-defined weaknesses). As regards secondary elements of NPL comparability in CESEE (that have not yet been discussed): Like in Western Europe, a majority of analyzed CESEE countries tend to classify restructured or replacement loans as impaired. They quasi-unanimously favor recording the full value of an NPL as nonperforming. However, in contrast to the practice of the majority of analyzed Western European countries, the majority of CESEE countries, under some conditions, do allow for the (change of) value of collateral or guarantee to impact loan classification. Moreover, also at variance with the typical approach in the Western part of the continent, yet in line with a conservative supervisory stance, a clear CESEE majority comes out in favor of downgrading all loans to a given debtor if any of these loans are classified as impaired (NPL customer view).¹³

2.2.4 EU-Wide Definition of NPLs in the Making

Therefore, we can conclude that the general NPL rule (90 days+ and/or serious weaknesses) we hoped could serve as a common yardstick and basis for further refining international and European comparisons has broadly fulfilled our expectations. What’s more, this definition is not only in line with the Basel Committee of Banking Supervision’s definition of default, but it also essentially corresponds to the respective definition of default contained in the European Commission’s proposal for a Capital Requirements Regulation (CRR), a draft EU Council and

¹³ The author suggests to deal with these secondary elements of NPL comparability for CESEE countries as well as with implications of the above Western European findings for the respective assessment of comparable NPL concepts in CESEE in more detail in a brief future study.

Parliamentary regulation.¹⁴ Apart from only minor modifications, the Council (Ecofin) maintained this definition in its CRR proposal submitted to the European Parliament in May 2012.¹⁵ It may be expected that an EU-wide definition of NPLs will enter into force along these lines in the next couple of years and thus become applicable across EU member countries.¹⁶ The relevant article in the CRR proposal includes a provision for the European Banking Authority's (EBA) guidelines on its application. This provides an opportunity to achieve an EU standard also for the secondary elements of NPLs, and thus for refining the definition of NPLs. Whether these guidelines will be sufficiently detailed to assure a better comparability of data and how much national scope for interpretation will actually be retained remains to be seen.

3 NPL Developments in Selected Western European Countries

Two prominent sources for international or European NPL data are the IMF Financial Soundness Indicators (FSIs)¹⁷ and ECB Consolidated Banking Data (CBD¹⁸). Both sources provide general NPL definitions: IMF FSI data would ideally correspond to the recommendation given in the FSIs Compilation Guide, which focuses on the criterion of “principal or interest payments 90 days overdue” (IMF, 2007, p. 6; see also Barisitz, 2011, pp. 47–48). ECB CBD define loans as “doubtful and nonperforming if either the obligor has filed for bankruptcy or similar protection from creditors or the obligor is past due more than 90 days on any material credit obligation to the banking group or the bank has taken action because it considers that the obligor is unlikely to pay his or her debt obligations to the banking group in full without recourse by the bank to actions such as realizing the security.”¹⁹ Yet the relevance to be attached to these indicators, particularly for comparative purposes, is immediately cut back in both cases by qualifications:

- FSIs: “Due to differences in consolidation methods, national accounting, taxation, and supervisory regimes, data are not strictly comparable across countries.”
- CBD: “Doubtful and nonperforming loans should be interpreted with caution, since their definitions differ between countries.”

As shown above, this study is an attempt to indicate some of the salient national definitional differences, relating to the explained primary and secondary elements of definitions; this study also points to possible adjustments in order to render NPL definitions more comparable across the country sample.

Bearing in mind the above-mentioned important provisos as well as the fact that national authorities are the ultimate sources of both the FSI and the CBD data series, we can now compare NPL data provided by the IMF and the ECB regarding

¹⁴ European Commission (2011), Article 174: Default of an obligor; for the wording of the draft article, see annex.

¹⁵ Council of the European Union (2012), Article 174: Default of an obligor.

¹⁶ Furthermore, the NPL rule also appears to be consistent with the NPL definition used by the European Banking Authority (EBA) in the compilation of its “Key risk indicators.”

¹⁷ See <http://fsi.imf.org> and Barisitz (2011, pp. 47–49, 61).

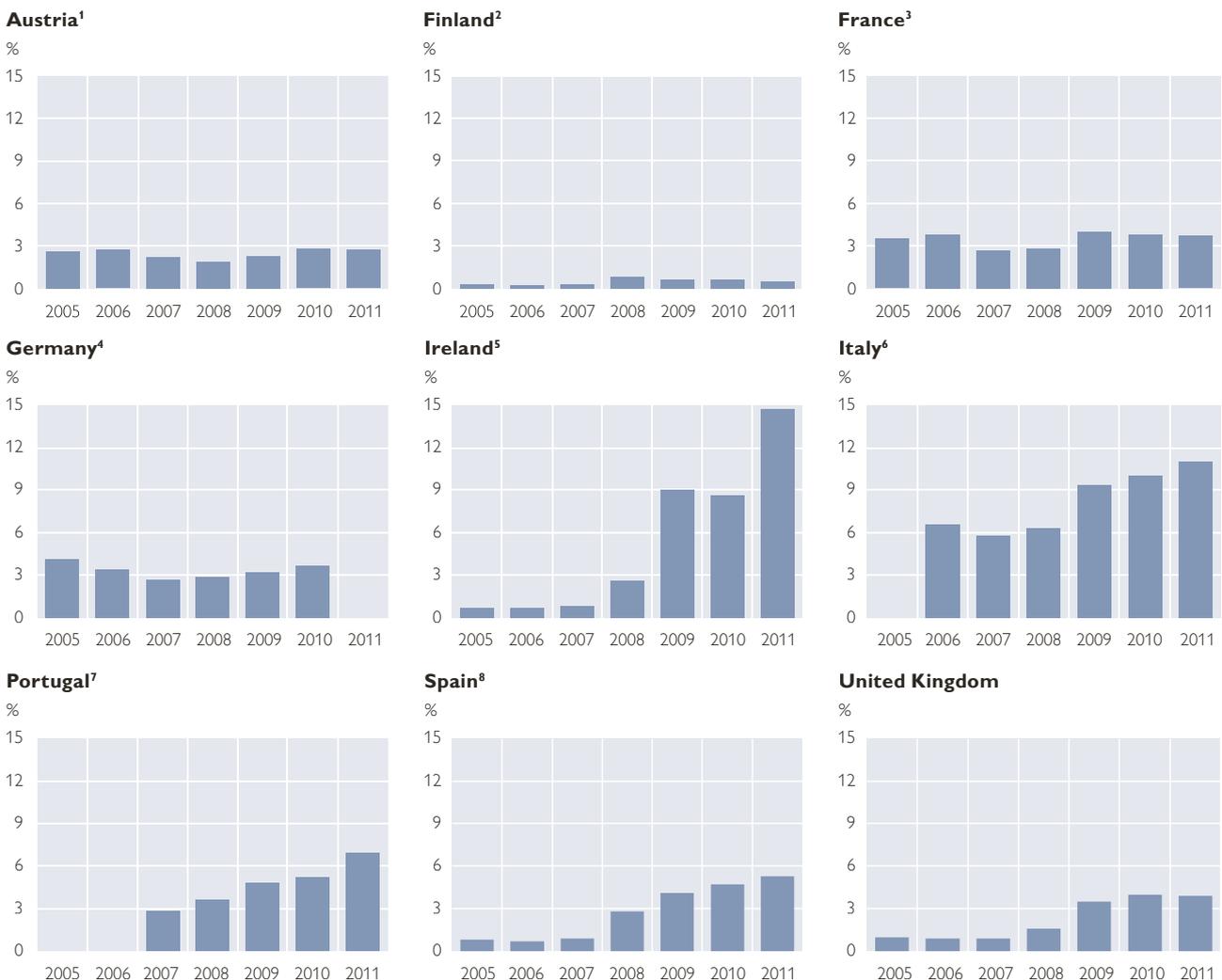
¹⁸ See <http://www.ecb.int/stats/money/consolidated/html/index.en.html>.

¹⁹ This definition shows some similarity to the definition of default by the Basel Committee on Banking Supervision (2004), although it is not immediately clear what doubtful loans are in relation to NPLs.

the countries under observation. Interestingly, a look at charts 1 and 2 reveals that depicted dynamics of NPL developments for the same countries bear some resemblance, while absolute levels clearly differ in most cases. Overall, as expected, we typically see declines in NPL ratios in the economic boom period up to 2007/08, which are followed by increases or higher levels in the crisis years. Euro area periphery countries, like Ireland, Portugal and Spain, feature relatively high NPL ratios which, moreover, tend to further rise pronouncedly. Austria, Finland, France and Germany, by contrast, show overall lower and less sharply rising rates.

Chart 1

Ratio of Banks' NPLs to Total Loans According to IMF FSIs



Source: IMF, Global Financial Stability Report (GFSR) statistics (FSI data), April 2012.

¹ Does not include subsidiaries and branches abroad of foreign-controlled deposit takers.

² NPLs reported net of specific provisions.

³ Loans are classified as nonperforming on the basis of impairment, which is not linked to a 90-day criterion.

⁴ Methodological break in 2009 due to changes in the regulatory reporting framework for the audit of banks.

⁵ All licensed banks.

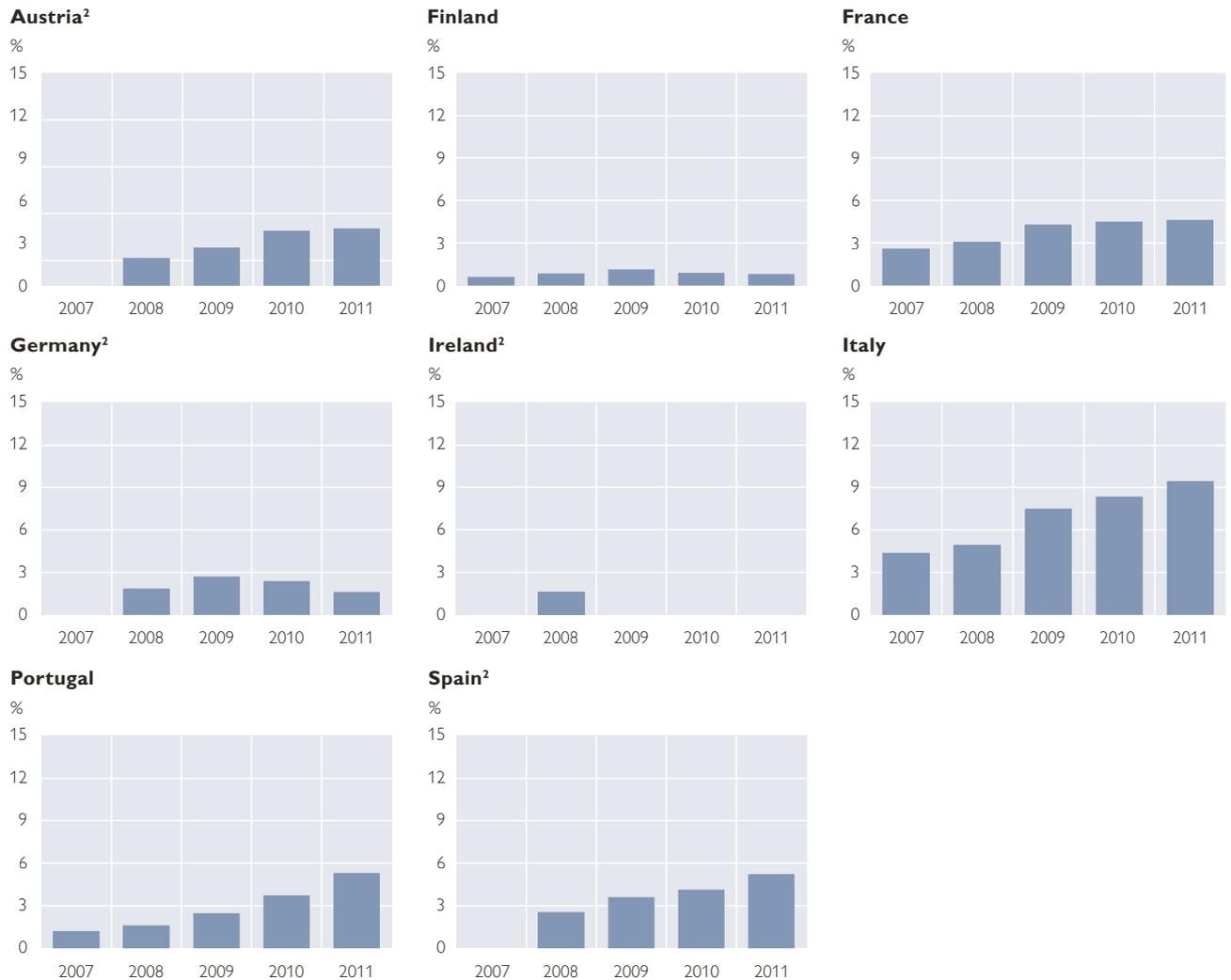
⁶ Exposure to borrowers in a state of insolvency (even when not recognized in a court of law) plus exposures to borrowers in a temporary situation of difficulty.

⁷ Break in the series in 2007 due to more comprehensive coverage. A new calculation method for NPLs that follows the methodology of the FSIs Compilation Guide was introduced in September 2011. Historical annual data have been revised accordingly, back to 2006.

⁸ Includes loans to the private sector, public administration, other credit institutions and nonresidents.

Gross Total Doubtful and Nonperforming Loans in Selected Countries According to ECB CBD

% of total debt instruments and total loans and advances, year-end, according to ECB CBD¹



Source: ECB CBD.

¹ Loans are defined as doubtful and nonperforming if either the obligor has filed for bankruptcy or similar protection from creditors or the obligor is past due more than 90 days on any material credit obligation to the banking group or the bank has taken action because it considers that the obligor is unlikely to pay his or her debt obligations to the banking group in full without recourse by the bank to actions such as realizing the security. Doubtful and nonperforming loans should be interpreted with caution, since their definitions differ between countries.

² Where data are not available, columns are not depicted. This is particularly the case for the U.K., for which no CBD NPL data are currently available and whose chart therefore has been omitted from this presentation, and for Ireland, for which only data for 2008 are available.

Both the FSI and CBD sets expectedly feature Italian data at a relatively high level, while U.K. data are among the more modest (according to the FSI series, while the CBD do not feature U.K. data). This is in line with our expectations because, as noted above, we have found Italy's NPL ratio to bear a pronounced upward bias (which would require a downward correction to make the ratio internationally comparable) and the U.K.'s ratio to contain a distinct downward bias (calling for an upward correction).

4 Summary and Conclusions

After comparing credit quality classifications and nonperforming loan (NPL) definitions in selected CESEE countries in a previous paper (Barisitz, 2011), the current study focuses on these gradings and definitions in selected Western European nations (Austria, Finland, France, Germany, Ireland, Italy, Portugal, Spain and the U.K.) in order to generate a broad European picture of how loan qualities are ranked and NPLs typically identified. As table 1 shows, supervisors or at least general practice in the majority of the countries analyzed (i.e. except Finland, Italy and the U.K.) appear to endorse the rule that for a loan to be nonperforming, at least one of two (primary) elements has to be present: (1) principal or interest 90 days or more overdue, and (2) existence of underlying well-defined weaknesses of the loan or the borrower. Finland and the U.K. have a slightly weaker standard in this respect, while Italy has a stricter one.

However, there are also other (secondary) elements that have an impact on NPL measurement and on the comparability of definitions: the question whether a restructured loan is classified as NPL or not, whether the presence of a collateral or guarantee influences loan classification or not, whether the full outstanding gross value or only (the overdue or net) part of a loan is reported as nonperforming and whether a bank is required to downgrade all loans to a given debtor if any of these loans are classified as impaired (NPL customer view) or not (NPL product view).

Taking an overall view of primary and secondary elements and relating to widespread approaches, four of the analyzed Western European countries' NPL ratios would seem comparable, while two countries' NPL ratios appear to feature a downward bias, two a slight downward bias and one an upward bias. Common international practice (a loan is identified as NPL if at least one of two criteria apply: loan overdue 90 days+ or serious underlying weaknesses; a replacement loan is at least initially classified as impaired; collateral is not considered in loan classification; the full outstanding gross value of a loan is recorded as NPL) is essentially applied in three (France, Ireland, Spain) of the nine countries analyzed. Finland seems to possess an upward and a downward bias with regard to different aspects important for NPL assessment, which therefore could imply some reciprocal canceling out.

Two countries – Austria and Germany – show slight downward biases. Thus, the NPL definitions and ratios of these two countries, in order to be internationally comparable, would need minor upward corrections. Two countries exhibit clear downward biases (Portugal, the U.K.) and one country (Italy) stands out due to its upward bias. In the case of Italy, the upward bias (pointing to a possibly too high recording of NPLs when regarded in an international environment) could be somewhat attenuated by excluding “substandard loans” (loans to customers in temporary difficulties that can be expected to be cleared up in a reasonable time) from NPLs. At this stage, possible suggested corrections cannot be quantified because the present study is a purely definitional one.

As described in Barisitz (2011), the great majority of NPL definitions of the CESEE countries analyzed then (Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Russian Federation, Serbia, Slovakia and Ukraine) feature both of the above mentioned primary elements (90 days+, well-defined weaknesses). In this important respect, therefore, the majority of CESEE countries join

the majority of Western European countries analyzed. Secondary elements of NPL comparability in CESEE are partly treated like in Western Europe.

A quick glance at available NPL data series from international sources (IMF Financial Stability Indicators, ECB Consolidated Banking Data) for the Western European countries under observation reveals that underlying definitions include qualifications (“not strictly comparable across countries,” “should be interpreted with caution, since (...) definitions differ across countries”) which imply that these definitions – for lack of more detailed country-specific information – unfortunately fail to provide a breakthrough to sufficiently tackle the comparability problem (for FSI data, see also Barisitz, 2011).

Summing up, we can conclude that the general NPL rule (90 days+ and/ or serious weaknesses) we hoped could serve as a common yardstick and basis for further refining international and European comparisons has broadly fulfilled our expectations. What’s more, this definition is not only in line with the Basel Committee of Banking Supervision’s definition of default, but it also essentially corresponds to the respective definition of default contained in the European Commission’s proposal for a Capital Requirements Regulation (CRR), which the Council (Ecofin) submitted to the European Parliament in May 2012. It may be expected that an EU-wide definition of NPLs will enter into force along these lines in the next couple of years and thus become applicable across EU member countries. The relevant article in the CRR proposal includes a provision for EBA guidelines on its application. This provides an opportunity to achieve an EU standard also for the secondary elements of NPLs and thus for refining the definition of NPLs.

There are fields for future research. We suggest to deal with the secondary elements of NPL comparability for CESEE countries as well as with implications of the findings on Western Europe for the respective assessment of comparable NPL concepts in CESEE in more detail in an upcoming study. Depending on the availability of sufficient data, analytical work could also investigate economic implications or consequences of the definitional differences and could attempt the quantitative estimation of national upward or downward biases. Moreover, follow-up studies could strive to cover the entire euro area, or better all EU countries, to provide a comprehensive reference for policymakers.

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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.

Annex: **Default of an Obligor According to the European Commission (2011)**

Excerpt from **European Commission (2011).**

Article 174

Default of an obligor

1. In quantifying the risk parameters to be associated with rating grades and pools, institutions shall apply the following approach to determining when an obligor has defaulted. For the purposes of this Chapter, a default shall occur with regard to a particular obligor when either of the following has taken place:
 - (a) the institution considers that the obligor is unlikely to pay its credit obligations to the institution, the parent undertaking or any of its subsidiaries in full, without recourse by the institution to actions such as realising security;
 - (b) the obligor is past due more than 90 days on any material credit obligation to the institution, the parent undertaking or any of its subsidiaries.

For overdrafts, days past due commence once an obligor has breached an advised limit, has been advised a limit smaller than current outstandings, or has drawn credit without authorisation and the underlying amount is material.

In the case of retail exposures, default at facility level shall also be considered for the purposes of paragraph 2.

An advised limit comprises any credit limit determined by the institution and about which the obligor has been informed by the institution.

Days past due for credit cards commence on the minimum payment due date.

In all cases, the exposure past due shall be above a threshold, defined by the competent authorities. This threshold shall reflect a level of risk that the competent authority considers to be reasonable.

Institutions shall have documented policies in respect of the counting of days past due, in particular in respect of the re-ageing of the facilities and the granting of extensions, amendments or deferrals, renewals, and netting of existing accounts. These policies shall be applied consistently over time, and shall be in line with the internal risk management and decision processes of the institution.

2. For the purpose of point (a) of the paragraph 1, elements to be taken as indications of unlikelihood to pay shall include:
 - (a) the institution puts the credit obligation on non-accrued status;
 - (b) the institution recognises a specific credit adjustment resulting from a significant perceived decline in credit quality subsequent to the institution taking on the exposure;
 - (c) the institution sells the credit obligation at a material credit-related economic loss;
 - (d) the institution consents to a distressed restructuring of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or, where relevant fees. This includes, in the case of equity exposures assessed under a PD/LGD Approach, distressed restructuring of the equity itself;
 - (e) the institution has filed for the obligor's bankruptcy or a similar order in respect of an obligor's credit obligation to the institution, the parent undertaking or any of its subsidiaries;
 - (f) the obligor has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of a credit obligation to the institution, the parent undertaking or any of its subsidiaries.
3. Institutions that use external data that is not itself consistent with the determination of default laid down in paragraph 1, shall make appropriate adjustments to achieve broad equivalence with the definition of default.
4. If the institution considers that a previously defaulted exposure is such that no trigger of default continues to apply, the institution shall rate the obligor or facility as they would for a non-defaulted exposure. Should the definition of default subsequently be triggered, another default would be deemed to have occurred.
5. EBA shall develop draft regulatory technical standards to specify the conditions according to which a competent authority shall set the threshold referred to in paragraph 1 which an exposure shall qualify as past due.
EBA shall submit those draft regulatory technical standards to the Commission by 31 December 2014.
Power is delegated to the Commission to adopt the regulatory technical standards referred to in the first sub-paragraph in accordance with the procedure laid down in Articles 10 to 14 of Regulation (EU) No 1093/2010.
6. EBA shall issue guidelines on the application of this Article. Those guidelines shall be adopted in accordance with Article 16 of Regulation (EU) No 1093/2010.

Understanding Central Banks' Role in Enlargement – Governance Issues

Isabella Lindner,
Gabriela Mihailovici¹

The EU's enlargement policy is enshrined in the Treaty on European Union, which lays down the requirements for the accession of any European state. It is against this background that Southeastern European (SEE) national central banks (NCBs) strive to prepare for the challenges of enlargement.

This paper relies on the practical experience with three EU accession support projects of the European System of Central Banks (ESCB) to draw a general EU accession road map for applicant countries on which the accession framework for an NCB should be based. During preaccession, an NCB would be well advised to develop governance to improve its decision-making capacity. In this paper, we have defined three forms of governance: First, good governance to ensure the fulfillment of economic, legal and institutional requirements; second, external governance for an NCB to participate in accession coordination at the national and EU level; and third, internal governance comprising operational and institutional changes inside an NCB.

If NCBs do not pursue a consistent path toward good governance, they might – in the medium to long run – be affected by risks of a strategic, economic, operational and institutional nature. Thus, successful acceding NCBs make EU accession a top priority of their strategy. An NCB's policy of coordination should be the key policy for effective central bank governance. We therefore recommend that an NCB establish an EU coordination mechanism, an EU coordinator, coordination guidelines and an EU Scenario Process to continuously implement the changes necessary for successful ESCB/EU membership. This process will be more effective if NCBs cooperate in technical projects and draw on the experience of other NCBs.

JEL classification: E58, K0, Z18

Keywords: Central bank, enlargement, governance, policy of coordination

1 Introduction

The EU's enlargement policy is enshrined in the Treaty on European Union², which lays down the requirements for the accession of any European state. In December 2006, the European Council renewed the consensus on enlargement among the EU-27 on the basis of the consolidation of commitments, fair and rigorous conditionality and good communication with the public. The EU's capacity to integrate new members is also a key concern. The explicit aim is to extend the zone of peace, stability, democracy and prosperity (European Commission, 2011b). The countries of the Western Balkans have made essential steps toward enlargement: Croatia is scheduled to join the EU in July 2013; the Former Yugoslav Republic of Macedonia, Montenegro, and Serbia have candidate status; Albania as well as Bosnia and Herzegovina are still potential candidate countries.³ It is against this background that the national central banks (NCBs) of Southeastern Europe (SEE) strive to prepare in the best possible way for the challenges of enlargement. In our experience, NCBs can significantly contribute to successful European integration because they are highly professional economic policy actors and usually

¹ Oesterreichische Nationalbank (OeNB), European Affairs and International Financial Organizations Division, isabella.lindner@oenb.at; Banca Națională a României (NBR), gabriela.mihailovici@bnro.ro. The authors would like to thank Renata Baric (CBBH), Tonny Lybeck (IMF), Sandra Dvorsky and Romana Lehner (all OeNB) for valuable advice on this paper. Opinions expressed in this paper do not necessarily reflect the official viewpoint of the Banca Națională a României, the OeNB or the Eurosystem.

² Article 49 of the Treaty on European Union; formerly Article 237 of the EEC Treaty.

³ With regard to Kosovo, the European Commission has adopted a Communication on a Feasibility Study for a Stabilisation and Association Agreement (SAA). This study confirms that an SAA can be concluded between the EU and Kosovo in a situation where EU Member States maintain different views on status (European Commission, 2012a).

enjoy credibility in their respective countries. This credibility is an asset when communicating reform requirements in the run-up to accession, but also during EU membership.

The European integration process at its various stages poses different challenges for all these NCBs. These challenges are first, participation in the EU accession screening and negotiations; second, fulfillment of the economic and legal requirements for EU membership; and third, the institutional preparation and organizational changes for EU membership, including integration into the European System of Central Banks (ESCB). However, some uncertainty reigns as to the conditions to be fulfilled on the way to EU membership, which obviously comprise more than just complying with the *acquis communautaire*, the body of EU law. The step-by-step integration of the NCBs into the European economic and financial decision-making mechanisms and the respective EU/ESCB committees changes their role as well as their working methods at all hierarchical levels and in all areas of their work. How are the main institutional, economic and legal governance issues for successful integration determined? What sort of governance models and blueprints should NCBs follow on their way to integration?

Based on the assumption that central banks are both “complex institutions which straddle the ground between politics and economics” and “public policy institutions involved in economic governance at the national, international and EU levels” (Quaglia, 2008), our study has a twofold aim: first, to describe the role of a central bank in accession, its policy instruments for effective integration, and second, to investigate the practical relevance of a central bank’s governance as a key policy instrument. How we consider and design the governance mandate of a central bank in accession as well as what focus we put on devising the policy of coordination inside the central bank in the strategic context of accession is our main contribution to the current debate between academics and practitioners in the enlargement area. We demonstrate that the new tasks and activities specific to a central bank in accession and their appropriate institutional setting is a matter of degree. Moreover, only an efficient policy of coordination inside the central bank leads to effective central banking governance.

The paper starts by sketching out the challenges of the European integration process at its various stages. Section 2 presents a general EU accession road map for applicant countries on which the accession framework for an acceding central bank should be based. Section 3 elaborates on a number of features of central banking governance that a central bank could develop during enlargement to improve its policy of coordination and hence its decision-making capacity. In this context, we define three forms of governance: First, good governance to ensure the fulfillment of economic, legal and institutional EU requirements; second, external governance determining an NCB’s participation in accession coordination at the national and at the EU level; and third, internal governance comprising operational and institutional changes required inside an NCB. In all three types of governance, the policy of coordination plays a decisive role in achieving good governance at all stages of enlargement and after accession. Section 4 concludes.

Our analysis and descriptions are based mostly on practical experience, which we gathered in three ESCB projects funded by the Instrument for Pre-Accession Assistance (IPA) and coordinated by the European Central Bank (ECB), namely the Technical Assistance Programme for the National Bank of Serbia (ESCB Needs Analysis for

the National Bank of Serbia; 2008 to 2009⁴), the Eurosystem Technical Assistance Programme for the Central Bank of Bosnia and Herzegovina (2010 to 2011), and the Central Bank Cooperation Programme with the National Bank of Serbia (Strengthening the institutional capacities of the National Bank of Serbia; 2011 to 2013). These projects covered several areas of central banking, including EU accession support, which centered on introducing best practice and reaching EU standards in EU coordination.

2 Accession Framework – The Road Map

The 2003 European Council in Thessaloniki confirmed that the future of the Western Balkans lies within the EU once conditions for membership have been met. To quote Winston Churchill (Macmillan, 2008), “the Balkans produce more history than they can consume”; therefore, special care will have to be applied to the political, economic and cultural (re)integration of the Western Balkans. However, to ensure the continued support of the present EU Member States and given the experience of past enlargements, there will be no “discounted membership.”

While the EU “deepening versus widening” dilemma was very fashionable at the beginning of the 21st century as one of the core questions in the field of European integration (De Witte, 2002; Kelemen et al., 2011), not too much literature was written on policy responsibility and the effectiveness of task allocation. As Miles (2004) put it, “economists are far from having developed anything like a comprehensive theory to enable us to understand the all-embracing nature and impact of EU enlargement.” The recent global financial crisis and the present difficulties in some euro area countries have highlighted the importance of a further consolidation of economic and fiscal governance in the euro area. EU policy options in enlargement will therefore also be influenced by the way the EU will evolve as a political and economic multi-dimensional entity.

2.1 EU Accession – How Is It Done at the EU Level?

In six rounds of enlargement,⁵ the EU has gradually refined the procedures and conditions to guide and assist a candidate country in preparing for its obligations as a Member State. All applicants are expected to join the EU on the basis of the same criteria,⁶ though at their own pace, depending on their individual progress in putting into place and implementing the necessary reforms and conditions. Strengthening the rule of law, improving governance, providing for capacity and institution building and implementing economic reforms according to the Europe 2020⁷ concept are major change challenges for countries in the Western Balkans. The accession process is a powerful tool for transforming national institutions, as the EU applies economic and political conditionality and monitors progress at every stage of accession. This conditionality provides the incentive to

⁴ Funded by Community Assistance for Reconstruction, Development and Stabilisation (CARDS).

⁵ 1973: Denmark, Ireland, the United Kingdom; 1981: Greece; 1986: Portugal, Spain; 1995: Austria, Finland, Sweden; 2004: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia; 2007: Bulgaria, Romania.

⁶ Originally taken from Article 2 of the Convention of 8 April 1904 between France and Great Britain and well-known in U.S. constitutional law as “the doctrine of the equality of states.”

⁷ Europe 2020 is the EU’s growth and structural policy strategy.

embark on difficult reforms and to overcome the vested interests of powerful groups in applicant countries. However, experience has shown that conditionality is best fulfilled when combined with program money supplied by the IMF and by macrofinancial assistance from the EU.

We present a description of the EU accession road map defined for the purpose of this article (adapted from Cermak and Lindner, 2012) in box 1.

Box 1

Road Map for the Integration of Applicant Countries^{1,2}

Potential Candidate Country

The implementation of the **Stabilisation and Association Agreement (SAA)** provides a framework for dialogue and future negotiations: Individual Progress Reports outline political and economic reforms necessary to apply for EU membership. A country that does not fulfill certain baseline conditions laid down in the progress report should not apply, as it will be refused candidate status.

The **application for membership** is sent to the EU Council, which requests the European Commission (the Commission) to prepare a report (opinion, or “avis”).

- To prepare the report, the Commission sends a (very comprehensive) questionnaire to the applying country.
- On the basis of the report, the EU Council decides unanimously whether to confer the status of candidate country on the applicant country or not, and when to open negotiations with the country.

Candidate Country

For each candidate country, the EU determines a **negotiating framework** that establishes the general guidelines and conditions for accession negotiations. The Commission may start the screening process (see below) even with a candidate country.

Candidate Country with Opened Negotiations

Before starting negotiations in substance, the Commission conducts a detailed **screening process**. Each of the 35 negotiation chapters is screened separately, but in parallel:

- **Step 1:** Presentation and explanation of EU legislation (the *acquis*)
- **Step 2:** Examination and comparison of national legislation with the entire EU *acquis*
- The goal for the candidate country is to understand the *acquis* and its implications for national legislation (harmonization, transposition and implementation) and for the Commission to ascertain how far the country already meets membership requirements and what needs to be done.
- Some **intermediate screening stages** could be considered if the Commission identifies further issues that need to be addressed. For example, the Commission evaluates a country's national legislation harmonization with the *acquis* and finds that it has to be improved. In a next step, the Commission circulates a draft report on the factual part of the intermediate screening exercise to the candidate country (usually, the Ministry for European Integration) for feedback.

¹ The authors gratefully acknowledge valuable comments on a previous version of this box by Franz Cermak (European Commission, DG Enlargement).

² See also, for instance, European Commission (2002).

- The Commission completes a **screening report** which assesses the country's state of preparedness and gives a recommendation to the EU Council on whether to open negotiations on a certain chapter or whether to require that certain conditions (**opening benchmarks**) be met first. If opening benchmarks are established for certain chapters, a candidate country has to develop and implement an action plan before a negotiation chapter is opened.

Based on the Commission's recommendation, the EU Council unanimously decides whether to **open chapters of negotiation** or not.

Negotiations take place in a format of intergovernmental conferences (EU Member States: permanent representatives in Brussels; candidate country: ambassador or chief negotiator).

- Negotiations are based on the candidate country's adoption, implementation and enforcement of the acquis. For candidate countries, it is essentially a matter of agreeing on how and when to adopt and implement the EU rules and procedures. For the EU, it is important to obtain guarantees on the date and effectiveness of each candidate country's alignment with the relevant part of the acquis. Negotiations also cover financial arrangements as well as possible transitional arrangements requested either by the Member States or by the candidate country.
- Negotiations are conducted individually, based on the merits of each applicant country. The acquis is not negotiable.
- On the basis of the screening report and the opening benchmarks, the applicant country drafts a **negotiating position** for each negotiating chapter outlining problems in aligning with the existing acquis and proposing solutions to be negotiated. Based on the negotiating position of the candidate country, the Commission prepares a so-called draft negotiating position consisting of a request for further information, of the EU position on special negotiation conditions (i.e. derogations, temporary exemptions or safeguard measures, transition periods, etc. requested either by the applicant country or a Member State) and of benchmarks for closure. To avoid competitive advantages, derogations or transition phases are very rarely granted. The applicant country usually has to find solutions at the national level for any such issue.
- The duration of negotiations can vary, depending on each candidate country's correct transposition and implementation of the acquis.
- **Closure of a chapter of negotiations** (provisional closure) occurs when the EU Council unanimously agrees on the EU common positions, which are based on the Commission's draft common position. Closure demonstrates a high level of alignment with the acquis, fulfillment of the benchmarks and agreement on transition of measures. However, "Nothing is agreed until everything is agreed" to ensure the irreversibility of the process in all areas and full and effective implementation of the acquis.
- Progress is closely monitored by the Commission and reported to the EU Council. This implies that the negotiation chapters are closed provisionally and can be reopened in case a candidate country deviates e.g. from agreed implementation of the acquis.

Acceding Country

Once overall agreement has been reached, the **Accession Treaty** (including accession date, transition measures, etc.) is drafted. The Accession Treaty is subject to approval by the EU Council and has to be ratified by the national parliaments of all EU Member States and by the European Parliament.

- Until accession, the Commission keeps the EU Council and the European Parliament informed about the candidate country's status through regular communications and reports ("Regular Reports" and "Enlargement Strategy"). It monitors fulfillment of benchmark requirements and progress in applying the EU legislation, gives additional guidance about responsibilities of membership, and offers guarantees to the current Member States that the future Member State is meeting the conditions for accession.
- Once the Accession Treaty has been signed, the acceding country is given **observer status** (no speaking or voting rights) in the EU and ESCB Committees to enable it to prepare well for participation.

2.2 EU Accession – How Is It Done at the National Central Bank Level?

By and large, the above road map also represents the accession framework for any NCB. What are the specific tasks conferred upon NCBs in the different accession phases of the road map?

Typically, within the EU screening and negotiation framework, NCBs are either responsible for and/or have the co-competence for negotiating chapters like economic criteria, economic and monetary union, financial services, the free movement of capital, statistics or institutions. Their partners in this are usually the Ministry of Finance (MoF) and/or a special Ministry or Secretariat of European Integration.

We describe a general framework or road map that an acceding NCB (Central Bank of Bosnia and Herzegovina, 2011b) might use to consistently meet the accession criteria and to minimize time constraints once the process of negotiation really starts. Our intention is to present a possible guideline for central bank management to conduct constructive discussions with the European counterparts. Thus, an NCB should be aware of the following instruments of the Commission, the ECB and at the national level that put its institutional and operational capacity of implementation under scrutiny.

2.2.1 Pre-Accession Economic Programme (PEP)

PEPs are important for the candidate countries to develop and communicate consistent economic, monetary, fiscal and structural policies over the medium to long term. They comprise a macroeconomic scenario, a fiscal framework and a structural reform agenda. PEP preparation serves to strengthen the economic planning capacity in a country and to meet the Copenhagen economic criteria for accession, i.e. establishing a functioning market economy and raising competitiveness to a level that allows countries to meet competitive pressure in the EU (European Commission, 2011a).

The Ecofin Council of November 26 to 27, 2000, initiated the so-called Pre-Accession Fiscal Surveillance Procedure, which aims at preparing countries for participation in the multilateral surveillance and economic policy coordination procedures currently in place in Economic and Monetary Union (EMU). The Commission invites candidate countries to submit PEPs.⁸ The PEPs and their assessments are discussed in the framework of the Economic and Financial Committee (EFC) with MoF and NCB representatives⁹ from candidate countries. The process ends with an annual policy dialogue of the Ecofin Council with candidate countries. Eurostat and the ECB present a joint progress report on the Action Plan on Economic, Monetary and Financial Statistics. Also, the ECB contributes a note reviewing in particular monetary and exchange rate policies and financial stability.

How can an NCB make a positive contribution? An NCB can fulfill a useful role by contributing realistic input for its country's PEP, i.e. information about the macro framework, monetary and exchange rate policy, structural reform areas such as the financial sector and statistics; it could also remind the government to

⁸ Potential candidate countries are invited to submit Economic and Fiscal Programmes (EFPs).

⁹ Invitations are usually sent to the Ministries of Finance, which are supposed to transmit them to their NCBs.

adhere to the principles of fiscal soundness enshrined in the EU Treaty. However, NCBs have to refrain from writing the fiscal notifications for their country, as this task will fall strictly on the MoF once the country is in the EU.

2.2.2 National EU Coordination Platform

The EU coordination platform at the national level is usually the common framework for policy dialogue and institutional coordination within a country. It is part of a deep institutional reform process instigated at the level of public institutions. This platform could be used as the main counterpart of the Commission in accession negotiations. Based on our experience, this platform may differ from one country to another with respect to its mandate, size, leadership, composition and operating procedures. We have noted that such platforms have no impact on the independence, formal responsibilities and position of NCBs in relation to the government or/and other political institutions (such as the parliament):

- NCBs' participation in such an institutional platform depends on the tasks a central bank decides to fulfill and the role it decides to play in enlargement in its interaction with other institutions, especially with MoFs. This might be either an advisory role (keeping a low profile among national authorities) or a proactive role (acting as a key player and mover).
- An EU mandate (National Bank of Poland, 2003) should be properly designed and given to an NCB board member to represent the NCB's interest in national and international meetings. Many NCBs in the ESCB have built up and developed a strong relationship with their correspondent MoFs, without prejudice to their independence, for joint or consultative decision-making on chapters of common interest such as EMU, capital movements, financial services, statistics, etc.

2.2.3 Technical Assistance for Reform

NCBs may be involved in technical assistance projects. In its 2007 to 2013 budget, the EU has provided technical assistance for reforms such as the fight against corruption, the development of the public and private sector as well as social development in the form of EUR 11.6 billion of Pre-Accession Assistance (Instrument for Pre-Accession Assistance, IPA). The Commission (2011b) notes that technical assistance for accession in the areas of economic planning, institution and capacity building, and implementation has proven powerful. This promotes cooperation and best practices between Member States and candidate countries. The IMF (Arezki et al., 2012) found that training leads to an increase in structural reforms, through IMF programs, but only when a significant share of civil servants is trained. Moreover, large-scale training provides a tool to reconcile conditionality – also typically associated with Stabilisation and Association Agreements – with higher policy ownership in the candidate countries. A case in point are technical assistance projects conducted by ESCB NCBs and coordinated by the ECB. Technical assistance projects successfully carried out in the last five years for a number of central banks from the Western Balkan countries (e.g. the Republic of Serbia, Montenegro, Bosnia and Herzegovina, and the Former Yugoslav Republic of Macedonia) have covered areas like statistics, EU integration, financial stability, supervision, and economics. NCBs are well advised to use the means put at their disposal by the EU budget (and also the IMF) to continue to build professional and credible institutions.

2.2.4 Formal Bilateral Contacts with the ECB

For former candidate countries, formal bilateral contacts with the ECB started only after accession negotiations had been closed. They took the format of annual high-level meetings at which the ECB contributed an assessment of monetary and exchange rate policies. This institutional dialogue was based on questions and answers on macrofinancial developments and central banking governance, which could be followed up by special topics at the expert level. However, in the last few years, an informal contact with the ECB was initiated earlier through technical assistance programs coordinated by the ECB in various areas. In addition, the International Relations Committee of the ESCB holds a yearly briefing on candidate and potential candidate countries in which, however, candidate countries' NCBs do not participate. For acceding NCBs, the ECB draws up an EU Enlargement Master Plan, which aims at preparing an NCB for participation in the ESCB. The acceding NCB is requested to work alongside the ECB and NCBs of the ESCB on the implementation of master plan activities in the area of monetary policy and instruments, asset management, statistics, accounting, payment systems, introduction to ESCB document management, etc.

In box 2, we present an NCB road map for integration based on NCB experience gained at different stages of accession. The road map focuses on internal decisions to be taken by the NCBs (Mihailovici, 2012).

Box 2

Road Map for Integration of Applicant Countries' NCBs

Defining an Accession Strategy

- *EU integration is defined as a top priority in an NCB's general strategy.*
- *A central bank accession strategy (Banca Națională a României, 2003) that is derived either from the national accession strategy or that is drawn up as an internal independent document should help the bank to strengthen its governance and to implement the requested reforms.*
- *The accession strategy is implemented through an action plan detailing principles as well as short- and medium-term NCB priorities.*
- *To reduce the risk of inertia, an EU Scenario Process is introduced as a management tool.*

Establishing an Internal EU Coordination Mechanism

- *An **EU coordination mechanism at the central bank level** is a body (usually a working group) for policy and institutional coordination on EU matters within the bank. Its members include senior managers and/or some members of the management board representing different departments of the bank involved in the preparation of EU accession. The legal department and the international department (usually the internal EU coordinator) are always represented, as they have to deal with horizontal EU issues throughout preaccession.*
- *This coordination mechanism should meaningfully contribute to screening a vast amount of economic, financial and monetary information for accession preparation and should help build a consensus on EU matters for decision-making in the NCB's management board.*

Establishing an Internal EU Coordinator

- *In general, the tasks and functions of international departments are correlated with a country's relevant phase of EU integration (Central Bank of Bosnia and Herzegovina, 2010).*
- *The framework for conducting international relations in a central bank is quite diverse and can create problems of coordination and leadership, such as unwanted duplication of interactions or overlaps of tasks and activities. To avoid such unwanted duplication, it is best to define clear guidelines for coordination in preaccession (Central Bank of Bosnia and Herzegovina, 2011a), whose implementation is effectively supported by top management.*
- *ESCB best practices suggest appointing a **division as EU coordinator** (either in the governor's office or the international department). Furthermore, the BIS central bank governance group (Bank for International Settlements, 2009) proposes to recognize that international relationships are usually a significant element of the governor's role and should be under his leadership.*
- *The EU coordinator focuses on institutional and interdepartmental interaction, coordinating line departments involved in preparing consolidated versions of key EU-relevant documents, which are then submitted to the NCB management board for approval. This coordinator also acts as a "secretary general" for the internal EU coordination platform.*

3 Developing Central Bank Governance in Accession

3.1 Theoretical Delimitation

The academic literature mainly of the past three decades in the field of political science has unanimously recognized that there is no clear and universally accepted definition of "governance." Many attempts at a definition have been made; however, all have failed to reach a consensus. After a close examination of several authors (Stoker, 1998; Kaufman, 1999; Bell, 2002; Kooiman, 2003; The United Nations Committee of Experts on Public Administration of the United Nations Economic and Social Council, 2006), we chose to use the general definition of the concept of "governance," i.e. a multifaceted conceptualization of the interrelation between the state and society from several perspectives, namely the economic, legal, institutional and operational perspectives. In a next step, for the purpose of our article, we combined this definition with the concept of "good governance" defined as a "number of pillars laying down the legal framework governing a central bank: independence, transparency and accountability" (Amtenbrik, 2005). However, to address larger issues like the impact of the policy of EU coordination on the central bank governance of an NCB in accession, we focus our analysis also on the institutional and operational components of good central bank governance. This "means that the objectives and tasks delegated to an institution are performed effectively and efficiently, thus avoiding misuse of resources, which is crucial for establishing a good track record" (Lybek and Morris, 2004). For this case, we define external and internal governance mechanisms that focus on ensuring that the NCB resources are used efficiently and effectively.

3.2 Good Governance: Economic, Legal and Institutional Requirements

The good governance concept also applies to issues such as the overarching goals of price stability and financial stability. For the candidate country's NCB, it is relatively easy to follow the model laid down in the EU Treaty and the Statutes of the ESCB: independence and accountability combined with a stability-oriented

monetary policy. Conversely, a central bank that is not independent but that operates more or less as a branch of the Treasury tends to be called on to exert functions ancillary to the budgetary process rather than to the monetary management process (Padoa-Schioppa, 2005). Successor states of the former Socialist Federal Republic of Yugoslavia very often had to rebuild their NCBs from scratch. At the outset of the reforms, many SEE countries adopted new central bank laws, giving central banks a high degree of independence at least *de jure*. Therefore, aligning central bank legislation to EU levels remains a top priority for the NCBs of candidate and potential candidate countries during accession. Its correct implementation will also be seen as a measure of institutional maturity for EU membership. The Commission (2012a, 2012b) reported immediately that amendments to the Law on the National Bank of Serbia adopted in August 2012 seriously challenged the NCB's independence, undermining confidence in monetary policy, and that special attention must be paid to such developments. On November 5, 2012, the Serbian parliament adopted amendments to the central bank law which aligned the NBS statute with the provisions of the EU treaties and the Statute of the ESCB and the ECB.

Among the convergence criteria, inflation and exchange rates fall within the scope of responsibility of NCBs. In the past, it was often suggested that a country should not worry too much about fulfilling the Maastricht criteria before entering the EU. However, accession countries might be well advised to pay heed to the guiding role of the Maastricht convergence criteria and to check up on their fulfillment in the framework of their countries' macroeconomic policy (Pöder, 2005).

The Commission encourages enlargement countries to associate to the Europe 2020 strategy, as it provides a useful anchor for reform. The Europe 2020 objectives are reflected in the dialogue on economic policy between the Commission and enlargement countries and in the programming of financial assistance. International financial institutions also take these objectives into account, which can be very relevant once a candidate country is in need of an IMF program. The ongoing debt crisis has underlined the importance of sound public finances, and the Commission already uses the peer review mechanism of the EU for candidate countries. From the NCBs' point of view, early familiarization with the economic governance mechanism of the EU is therefore essential. The OeNB's experience shows that economic, legal and institutional challenges are best met by a consistent longer-term approach (Dvorsky and Lindner, 2005).

NCBs in the various stages of accession and also in the first years as ESCB members tend to be confronted with the need to review and change objectives, tasks and functions. When Croatia began its accession negotiations, the Croatian National Bank had just established an EU Division (as an internal EU coordinator) and had restructured its banking supervision operations; market operations had just been introduced as a new monetary policy instrument. Within the framework of the Stabilisation and Association Agreement, Croatia had been taking further steps to liberalize capital transactions (Matejka, 2005). The NCBs of acceding countries focused on restructuring their internal activities – including their core competences, i.e. monetary and exchange rate policy – closing branches, improving internal communication, adjusting payments systems. New ESCB members usually found it difficult to deal with the additional workload coming from participation in ESCB and EU committees and from coordination in general.

3.3 Policy of Coordination in Accession

Starting from this good governance approach, we would like to emphasize the importance of expanding and deepening the concept of central bank governance in the area of coordination, which functions as a strategic tool of change management during accession. We propose a new type of governance in a central bank in accession, namely a pluralistic and heterarchical dialogue (Jessop, 2000; Lee, 2003). In practice, this new coordination policy has two levels:

- External governance: This refers to the national and EU level, where a set of institutions and actors work together to reach the same goal, i.e. the country's accession to the EU.
- Internal governance: This refers to the central bank level, where communication flows freely among departments and actors and where departments work together across organizational divisions and hierarchies, setting up interorganizational networks, and where the division of labor and responsibilities is clearly organized.

Table 1 gives an overview of governance issues and the main elements relevant for NCBs in accession.

Table 1

Central Bank Governance in Accession – Key Challenges

| Good Governance | External Governance | Internal Governance |
|--|--|---|
| NCB independence, transparency, accountability | Participation in the EU coordination platform EU mandate | Accession as a priority for the NCB's strategy based on road map |
| Price stability and financial stability Convergence criteria Europe 2020 | Participation in various committees under the SAA and during EU negotiations | EU coordination mechanism EU coordinator Guidelines for coordination EU Scenario Process |
| | Coordination | |
| Communication | | |

Source: Authors' compilation.

3.4 External Governance of a Central Bank in Accession

In most of the cases examined by the authors, an EU coordination platform was the common institutional framework under which central banks operated at the national level to participate in the accession process. The design of an EU coordination platform can be quite simple, though different from one country to another. Most of these EU coordination platforms work as a high-level multifunctional framework, with subcommittees very often reflecting the negotiation chapters and the SAA.

As already mentioned in section 2.2, when a central bank in accession is involved in such institutional arrangements, its management board has to decide, even before starting negotiations, what role it would like to play in accession and how it can establish itself as a source of confidence and prestige at the national and international levels (Popa, 2005). Thus, reputational risk plays a key role in EU decision-making processes on EU and ESCB issues. Many NCBs have taken accession as an opportunity to develop more mature and sophisticated policy tools; in particular, we refer to what political science defines today as “soft power” (Nye,

1990, 2004; Babb, 2008), meaning a power which “lies in the ability to attract and persuade” (Nye, 2004) involving more intangible forms of influence through cooperation and dialogue, derived from national cultural dimensions in organizations (Hofstede et al., 2010). The level of engagement of an NCB in consultation, cooperation and coordination with other national or EU institutions can to a certain extent influence the success or failure of e.g. the macroeconomic dialogue with the EU counterparts at different stages of accession. The Government of Romania (2001), for example, used a National Programme for Accession to the EU to monitor the implementation of priorities set by PEPs in combination with an EU Accession Partnership at the national level. A National Action Plan based on the Stabilisation and Association Agreement, setting out short- and medium-term priorities to implement requested reforms, can also serve as an orientation line for the NCB in order to fulfill its specific tasks.

3.5 Internal Governance of a Central Bank in Accession

On the basis of an ambitious strategy, EU accession and the related Action Plan, e.g. about the transposition of legal acts or on training and capacity building, become a top priority of an NCB's multiannual general strategy. We saw that once the accession process approaches, an acceding central bank starts a process of coordination and cooperation inside the bank. The central bank is expected to define and prioritize objectives, tasks and functions and to be sufficiently committed to achieving them. A policy of coordination becomes effective within this context when needs and priorities are correctly identified and addressed and when they are properly managed within an appropriate internal institutional framework as described in box 2.

The bank's management is well advised to carefully consider reputational and business risks arising in the different phases of accession. Also, the “risk of doing nothing” should not be underrated. An EU Scenario Process involving management, the EU coordination mechanism and the EU coordinator reduces the risk that a sluggish adjustment of NCB governance lags behind rapid policy change. The EU accession strategy usually develops a longer-term view of accession preparations, both in considering the dynamics of the process at the national and EU levels, and in looking forward in time to when to adopt which integration decisions. An EU mandate for the management board (or delegated to a management board member) combined with a permanent institutional setting such as an internal EU coordination mechanism represents an effective and durable integration structure. This structure ensures an NCB-wide medium- to long-term permanent implementation of the Action Plan and, eventually, strong internal institutional and operational governance.

The institutional framework for conducting EU affairs and international relations at an NCB can create problems of coordination and leadership, such as unwanted duplications of interactions or overlaps of tasks and activities (see box 2). Drawing up a guideline for EU coordination of an NCB in accession (Central Bank of Bosnia and Herzegovina, 2011a) could help avoid such problems. It is a combination of tools and procedures that could support the governor and board members in managing EU accession on a day-to-day basis. Ideally, the EU coordinator (EU division or department) and a guideline for EU coordination are set up before the screening process starts.

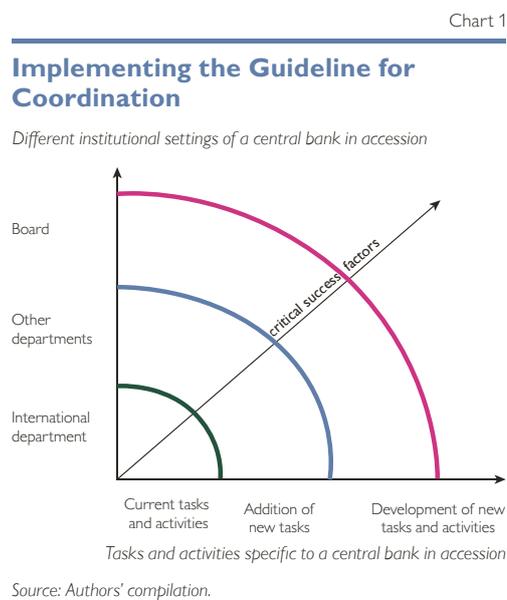
We have identified a set of factors considered to be critical for successful internal management of accession that should be covered by a guideline:

- The NCB should ensure a clear division of labor inside the EU department and vis-à-vis other departments that reflects the position of the EU department as the central coordination point.
- During accession, the EU department serves as a central point of entry for all EU issues from the outside, i.e. the national EU platform, the MoF, etc.
- The NCB should establish a system of regular reporting to and debriefing by NCB management. EU communication inside the NCB is effective when it flows freely across hierarchies and departments.
- The NCB should build and keep track of a network of international and European contacts (also at the technical level) with the European Commission (DG Enlargement and DG ECFIN), the ECB and ESCB central banks.
- Integration work is efficient when tasks are prioritized by management, resources are allocated according to tasks, the EU department's role is acknowledged inside the NCB, there is a good institutional knowledge of the EU/ESCB/Eurosystem and of international financial institutions, there is a suitable IT infrastructure, and when a document management system is in place.

3.6 Coordination and the Ansoff Growth Matrix

To prove that the policy of coordination and its tools have to be at the core of central banking internal governance during the whole accession process, we combine it with the classic diagram of Ansoff's binary choice of old versus new for identifying corporate growth opportunities. This diagram is a strategic management tool developed for a business strategy framework (Ansoff 1957, 2012)¹⁰; it has been moved forward to the macroeconomic level. Basically, we have rethought the policy of coordination in the strategic context of accession, demonstrating that the new tasks and activities specific to a central bank in accession (on the x-axis) and its appropriate institutional settings (on the y-axis) are a matter of degree, and that only an efficient policy of coordination with an NCB leads to effective central banking governance, as illustrated in chart 1, and as a consequence, to growth or development opportunities.

In phase 1 (green line), the international department (i.e. future EU coordinator) is in charge of its regular tasks and activities.



¹⁰ Ansoff (1957) developed the framework for identifying corporate growth opportunities. The Ansoff growth matrix assists organizations in mapping strategic product market growth. Put simply, in Ansoff's matrix, there are always new markets for new products. However, the greater the degree of newness is, the greater the risk assumed is, because both products and markets are new and unknown.

Once the accession process starts in phase 2 (blue line), new tasks are given to both the EU coordinator and line departments, such as (1) coordination of EU issues, namely coordination of positions with external institutions; (2) preparation of documents, reports, analyses on EU/ESCB/Eurosystem issues relevant to the NCB, or preparation of draft documents and consolidated versions of documents related to accession; (3) networking and communication inside and outside the bank; and (4) EU document management. The central bank's management board leads the overall process of coordination, passes on relevant EU documents and takes initiatives in the context of accession.

At all stages of accession and EU membership in phase 3 (red line), management discusses and adopts the NCB's strategic framework (the EU strategy) and supervises its implementation, based on an EU mandate for the management board member in charge of the accession process and on the work of an internal EU working group.

3.7 NCBs' Capacity Building and Training for Accession and EU Membership

The preparations for EU membership create training as well as capacity-building challenges for SEE central banks, as the NCBs are progressively required to perform additional functions during the accession process. Moreover, strengthening the skills, competences and abilities of a critical mass of central bank officials may help foster a collective culture of reform (Arezki et al., 2012) for EU membership and, as mentioned before, NCB "ownership" of reforms.

Analysis and know-how requirements increase because many topics that central bank staff has to deal with are new or at least relatively unknown, i.e. the *acquis communautaire*. During accession, staff and management have to participate in various EU committee meetings and have to present and explain their countries' economic and monetary policy to EU officials on a regular basis. Central bank staff has to prepare issues notes, which are requested by EU officials, to explain legal, monetary or statistical issues. These texts should be well structured and to the point. The need to harmonize numerous national laws with EU requirements within a relatively short time raises questions of quality control, e.g. regarding the translation of legal texts (Dvorsky, 2009). If acceding NCBs do not meet the training requirements, they might not withstand the quality and competitive pressure in the ESCB. For example, the OeNB's cooperation with the ECB and other NCBs in the ESCB has also brought about significant pressure in terms of quality and competition as a result of ongoing changes and adaptation requirements (Dvorsky and Lindner, 2005).

What type of training and skills are necessary to meet the needs for EU accession preparatory work? Horizontal skills to be trained include English language skills, especially for legal staff, negotiation skills, and the ability to write texts of a quality expected in Brussels or Frankfurt. These soft skills, inter alia, will be decisive for the reputation and credibility of a central bank as a future member of the ESCB. International networking is an important feature for successful NCBs. ESCB projects can be turned into useful vehicles, as ECB and ESCB experts work side by side with the beneficiary NCB's staff.

To transfer technical know-how and to introduce EU/ESCB standards progressively to a candidate country's NCB, it is again most effective to work closely together with EU NCBs in the framework of technical assistance projects.

This is an enormous new opportunity granted to SEE central banks in accession, and one that was not yet in place for the former Central and Eastern European candidate countries. However, these countries benefited from large-scale twinning programs: Bulgaria and Romania, for example, received technical assistance in the form of two consecutive two-year twinning programs from a consortium led by the Banque de France and including the Banca d'Italia and De Nederlandsche Bank (European Central Bank, 2008). This sort of technical assistance, starting ideally with an assessment of needs, can come up with solutions tailor-made for the individual central bank. Requirements shift during the phases of accession between general topics of economic policymaking and, for example, human resource development for integration, the application of new statistical methods, or the development of IT tools. Such technical assistance programs have to be well anchored in an NCB's EU preaccession strategy and in its priorities for action. For management, these programs can function as an adjustment tool to continuously and permanently implement EU standards. A separate post-project surveillance can contribute to achieving sustainability.

3.8 NCBs' Communication on EU Issues

Public support plays a key role in a successful accession process, also for popular acceptance of necessary economic and political reforms. In the eyes of the Commission (European Commission, 2011b), the national, regional and local authorities of the enlargement countries have an important role in information and communication. This is a big challenge for NCBs endeavoring to facilitate an informed public debate on EU accession in their field of competence. In general, information provided by NCBs enjoys a good measure of credibility with the public. Therefore, information policy should be viewed as a new and permanent task for an NCB and its public relations department. Setting EU communication as a priority in the EU preaccession strategy and in the action plan of an NCB aims at “translating what is done in Brussels (and Frankfurt) into language which can be used outside Brussels (and Frankfurt)” (Judge and Earnshaw, 2008). Internally, effective EU communication could refer to (1) coordinating, integrating and synchronizing EU communication responsibilities and resources inside the bank and among all departments involved in the process, (2) linking it with the internal EU coordinator and (3) streamlining the operational flow of information to provide for permanent and consistent communication.

4 Conclusions

On average, EU accession will take longer than in earlier accession rounds, and there will not be any “discounted” memberships. Based on past experience, the European Commission has reinforced its process of screening and negotiation, operating with benchmarks and stricter surveillance of the implementation of action plans and the *acquis communautaire*. Current candidate and potential candidate countries have more political and economic hurdles to overcome before they can join the EU than the countries before them: On the one hand, this is due to an increase in the *acquis* that applicant countries have to implement, as the density for example of economic and financial integration has risen. On the other hand, many of the current applicant countries still have political issues of the past to solve (e.g. Serbia and the issue of Kosovo). These countries start out with institutions that in

general need more institution and capacity building. Much of the above description also holds for the NCBs of those countries; they will have to take many reform steps outside the ESCB framework.

The NCBs of candidate countries have to keep working on integration in a sustainable way, even in the face of extended preaccession stages and setbacks in accession outside their power of influence. If NCBs do not pursue a consistent path toward good governance by introducing EU standards and best practice, in the medium to long run, they will put their success at very high risk. Based on practical experience, the following risks can be identified:

- Strategic risk, which deals with the decision-making process on EU matters and ultimately with the EU mandate the NCB management board has defined for itself;
- Operational risk, which relates to the policy of coordination inside an NCB and the capacity of the internal EU coordinator to lead credible accession preparatory work. If the management of the NCB neglects to keep up a sense of urgency about EU accession issues, this inertia could lead to high costs and delays at later stages of accession and even during membership; the continuous implementation of an EU Scenario Process is advisable;
- Economic and institutional risk, which relates to a policy of coordination at the national and at the EU level, where networks, know-how and a good reputation are essential for progress in accession. Early familiarization with EU economic governance and application of good governance can help avoid reform jams and thereby economic and institutional risk.

We advocate the idea of building a risk culture inside the NCB that helps keep the right balance of risks. This can be seen as the sum of individual and institutional values, attitudes, competences and behavior that determine the commitment of an NCB to EU integration and ownership of the EU *acquis* relevant for an NCB. Thus, successful acceding NCBs make EU accession a top priority of their strategy, with a policy of coordination at the core, and install an effective EU coordination mechanism and EU coordinator.

The recent crisis serves to remind us that lasting and sustainable convergence requires unabating policy efforts. In this regard, the ECB (European Central Bank, 2012) advocates that membership of the EU should be seen as a means to an end – namely real convergence, stability and prosperity – rather than as objectives in themselves. The challenge lies in upholding a steady reform pace, so that a country and its NCB can participate as an equal member in the concert of the EU. If this challenge is not met, membership will not be possible.

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The Dynamics of Deposit Euroization in European Post-Transition Countries: Evidence from Threshold VAR

Marina Tkalec¹

This paper investigates the determinants and dynamics of deposit euroization (DE) in 12 European post-transition economies based on threshold models. The results suggest that exchange rates and interest rate differentials are important for explaining DE. The results for the two countries with the highest macroeconomic and institutional credibility and flexible exchange rate regimes, the Czech Republic and Poland, suggest no evidence of threshold effects, while for other countries threshold behavior was found. The threshold VAR results indicate that depreciations have a stronger effect on DE than appreciations, while interest rate spreads widen more after home currency depreciations than after appreciations. Moreover, we found evidence that DE changes more strongly after interest rate differentials increase than after they decrease.

JEL classification: C32, E44, E58, F31, F41

Keywords: Deposit euroization, exchange rate, transition, threshold

1 Introduction

Long after macroeconomic stability had been achieved, due to significant “fear of floating” exchange rate-based monetary regimes persisted as an optimal policy choice for many European post-transition countries still pursuing currency boards, pegs, or fixed, managed or even dirty floating exchange rate regimes. As discussed in Calvo and Reinhart (2002), fear of floating is manifested as central banks’ reluctance to allow the exchange rate to adjust significantly and rapidly, resulting in episodes of central bank interventions aimed at avoiding major devaluation shifts. Economic agents therefore anticipate exchange rate stability and eventually create very high levels of unofficial dollarization² (Levy Yeyati, 2003). Unlike the adoption of the euro as the official currency (known as official euroization), unofficial euroization is a result of voluntarily using foreign currency as either a medium of exchange or a store of value. The latter case, in which residents hold a significant share of assets or liabilities in foreign currency, is defined as financial euroization (FE) (Ize and Levy Yeyati, 2003). The liability side of FE is known as deposit euroization (DE) and reflects the propensity of the private and public sector to hold deposits in foreign currency.

It is argued that a high level of FE limits the choices for monetary policy makers, since large home currency depreciations increase the cost of servicing foreign currency-denominated debt and severely affect probabilities of default (Reinhart et al., 2003). As a result, central banks respond with a myriad of managed exchange rate regimes biased toward depreciation. In line with that, FE indirectly affects the performance of all sectors of the economy, not just monetary policy. Although FE is a relevant economic policy issue, there is still a lack of knowledge about the phenomenon, its determinants, and its influences on the economy. Since an explosion of public debt in some Central and Eastern European

¹ Institute of Economics, Zagreb, mtkalec@eizg.hr. For this paper, originally published in 2012 in *Finance a úvěr-Czech Journal of Economics and Finance* 62(3), the author received the Olga Radzyner Award of the Oesterreichische Nationalbank in 2011.

² Throughout the text, the term euroization will be used instead of dollarization.

(CEE) countries, such as Hungary, precludes euro adoption as an exit strategy for unofficial euroization, in order to ensure financial and economic stability it is important to understand what drives FE and how exactly it affects the economy.

Experiences from European post-transition economies show that FE decreases very slowly in periods of macroeconomic stability but increases swiftly in periods of economic uncertainty. Besides, home currency depreciations seem to affect FE strongly and quickly, while opposite exchange rate changes have a much more moderate impact. This sort of FE development mimics threshold dynamics, in which a variable reacts in one way when above some threshold and in a different manner when below the threshold. One possible explanation for threshold effects is the presence of transaction costs, where changing the currency structure of deposits or loans is time consuming and usually comes at an expense. For example, switching foreign currency deposits to domestic currency deposits might be protracted if it has been agreed that those deposits will not be withdrawn before a certain period of time elapses unless a penalty is paid. Although threshold or nonlinear effects might describe FE dynamics in partially euroized economies, no research regarding this issue has been carried out. In order to fill this gap, we test for the presence of threshold effects of deposit euroization in countries that record high levels of FE. Our model incorporates DE and two monetary variables recognized in the literature as DE drivers: the interest rate differential and the exchange rate.³ We would like to show how DE reacts to changes in these monetary variables and how the responses differ depending on the level of DE and the exchange rate regime in the observed country. We explore the monetary system due to its strong connection to the financial system and therefore financial euroization, which implies that monetary policy is the first to react to increasing FE. For each of these cases and countries we will apply threshold vector autoregression (TVAR) and derive generalized impulse response functions that vary in sign and magnitude and allow regimes to switch after a shock. The goal of this research is to answer two policy questions. What kind of threshold effects characterize an economy with a high level of DE? And if they exist, how do these nonlinearities differ with respect to the prevailing exchange rate regime and/or the DE level?

The analysis will contribute to the existing field of knowledge in several ways. First, it will provide new insights into the dynamics, characteristics, and consequences of DE in European post-transition economies. In order to depict the relationships between euroization and the monetary system, we model the monetary determinants of DE. We pay special attention to the influence of the prevailing exchange rate regime on the level of DE, since we feel there is a strong link between the two. Second, there are no studies on FE determinants that use TVAR methodology. To the best of our knowledge, there is only one paper – by Ivanov et al. (2011) – that tests for nonlinear or threshold effects of FE in Croatia. And finally, unlike the existing literature, in this paper we allow for diverse DE responses depending on the direction of the exchange rate changes. We directly model the responses of DE boosted by either home currency depreciations or

³ In general, we use nominal exchange rates, but for countries that have a fixed exchange rate regime we use real effective exchange rates. The reason for that can be found in Ize and Levy Yeyati (2005), who claim that high inflation rates, which cause real exchange rate instability, encourage investors to save in foreign currency. In that case, saving in foreign currency provides more stable purchasing power. Therefore, higher inflation differentials followed by greater real exchange rate volatility lead to higher FE.

appreciations and allow for diverse DE feedback effects. This property enables us to test the hypothesis that home currency depreciations have an adverse impact on DE and that DE reacts more strongly to home currency depreciations than to appreciations.

The remainder of the paper is organized as follows. The next section presents an overview of the existing empirical literature with an emphasis on the results for FE in European post-transition countries rather than financial dollarization in Latin America. Sections 3 and 4 describe the data and methodology. The results of the empirical analysis are given in section 5, while the last section concludes the paper.

2 Literature

In the 1980s and early 1990s, unofficial euroization was considered to be a consequence of high inflation rates and low credibility of monetary authorities, as discussed in Levy Yeyati (2003). However, even after inflation had moderated and the economy had stabilized, euroization persisted (Kokenyne et al., 2010). In much of the recent literature on FE, the focus lies on detecting the determinants of euroization and the effects it has on the conduct of monetary policy. The existing literature offers several explanations for the observed FE persistence phenomenon, with the most common ones being the market failure view and the institutional view (Levy Yeyati, 2006). The market failure view points out that the level of FE increases when market participants freely borrow and lend in foreign currency without considering major exchange rate risks. This behavior is facilitated by central banks' commitment to maintain a stable exchange rate, which creates a lower risk of borrowing and lending in foreign currency and hence increases moral hazard and asymmetric information in the system. The institutional view explains how FE rises when economic policy makers build their credibility on a stable exchange rate rather than on a strong institutional framework or regulations that favor the domestic currency. Such institutional imperfections increase not only FE, but also the cost of home currency depreciation, which in turn leads to an even stronger commitment by policy makers (Reinhart et al., 2003; De Nicoló et al., 2005).

The literature typically deals with dollarization in Latin America and determinants characteristic of that region, but in the last few years we have witnessed a growing body of research on euroization in European post-transition countries. Therefore, a number of more recent studies on post-transition economies identify exchange rates, especially exchange rate volatility, and interest rate differentials as determinants of FE. Most of the research studies a pool of countries by using panel data analysis and interprets the results for the region as a whole, sometimes without considering country-specific features. For example, Kokenyne et al. (2010) find a positive link between the real exchange rate and DE and a negative effect of increasing exchange rate volatility on both foreign exchange deposits and loans. Basso et al. (2011) show that the interest rate differential has a negative effect on DE, contradicting Luca and Petrova's (2008) findings, since they empirically show a positive relationship between interest rate differentials and DE and a negative relationship between exchange rate volatility and DE. In a panel of more than a hundred countries, Carranza et al. (2009) confirm that large depreciations have a negative effect on the pass-through coefficient, with the

impact being higher the greater the level of euroization. They also show that the exchange rate regime is important, since countries with fixed exchange rates suffer larger balance sheet effects after depreciations. Moreover, they argue that large home currency depreciations can trigger a nonlinear effect on the balance sheet.

Nevertheless, within the vast literature on euroization and related topics, these relationships are usually analyzed as part of a linear model. Although the persistence of FE and the “fear of floating” observed in many post-transition economies imply a nonlinear relationship between the level of FE and the exchange rate, to the best of our knowledge there are only two studies that model FE by using a nonlinear framework, but neither of them models the responses of FE to exchange rate changes and FE feedback effects. These two studies are Heimonen (2001) and Ivanov et al. (2011). Heimonen (2001) analyzes euroization in Estonia and uses threshold cointegration to estimate portfolio shifts between two substitute currencies, i.e. the euro and the U.S. dollar. However, his study does not deal with FE determinants, nor does it consider substitution between foreign and domestic currency. Ivanov et al. (2011) explore FE in Croatia, using single-equation threshold cointegration. They build different models, using a great number of variables, and find that nominal exchange rate changes have a strong effect on DE. They find threshold effects for DE but do not consider the possibility of diverse FE responses to home currency appreciations/depreciations, nor do they consider interest rate differentials as a determinant of euroization.

Additionally, the importance of nonlinear FE behavior is clearly recognized by several studies applying a linear modeling framework within which limited nonlinear FE features are incorporated. Thus, both Rennhack and Nozaki (2006) and Neanidis and Savva (2009) use an index of asymmetry of exchange rate movements. The latter study finds that the positive short-run effects of home currency depreciations decrease with the level of euroization because depreciations induce depositors to change their currency compositions in favor of foreign currencies.

3 The Data

We model DE with three variables, using threshold VAR (i.e. TVAR) methodology, with DE defined as the share of deposits in foreign currency (or linked to foreign currency, where available) in total deposits (Levy Yeyati, 2003; Neanidis and Savva, 2009).⁴ We include only three variables simply for pragmatic reasons. As the number of coefficients in TVAR rises with the number of variables, the test size and power decrease. There is a long list of euroization drivers, but we are interested in those variables which capture the influence of monetary policy on DE. Monetary policy is the first to fight against rising FE, since it is closest to the financial system and as such to unofficial euroization. The most important variables that seem to affect deposit euroization and derive from the monetary system are the exchange rate and the interest rate differential. The exchange rate influences deposits when confidence in the domestic currency is low. If investors expect the home currency to depreciate, they will save in foreign rather than in domestic

⁴ It would be more appropriate to use a variable constructed as the share of euro deposits in total deposits, but due to data limitations that was not possible. However, the OeNB Euro Survey, which is conducted among households in ten Central and Eastern European countries, found that more than 80% of foreign currency deposits are denominated in euro. It is important to note, however, that the survey gathers information on the incidence of deposits but not on amounts, which is why a comparison with aggregate data is not straightforward.

Table 1

| ADF Test for First Differences | | Lags (AIC) | t-value (ADF) | t-value (lag) | AIC |
|--------------------------------|-----|------------|---------------|---------------|--------|
| Belarus | DE | 0 | -6.053*** | – | -9.005 |
| | NER | 1 | -5.965*** | 0.009 | -8.637 |
| | IRD | 1 | -3.163** | 0.095 | -11.86 |
| Bulgaria | DE | 2 | -3.853*** | 0.043 | -10.52 |
| | RER | 4 | -4.052** | 0.035 | -2.915 |
| | IRD | 4 | -4.073** | 0.033 | -13.81 |
| Croatia | DE | 3 | -3.559*** | 0.071 | -11.69 |
| | NER | 1 | -9.669*** | 0.038 | -11.69 |
| | IRD | 2 | -7.737*** | 0.067 | -0.511 |
| Czech Republic | DE | 1 | -10.480*** | 0.036 | -8.244 |
| | NER | 6 | -4.710*** | 0.001 | -10.22 |
| | IRD | 1 | -6.338*** | 0.077 | -3.99 |
| Hungary | DE | 0 | -13.730*** | – | -8.342 |
| | NER | 1 | -7.747*** | 0.042 | -9.675 |
| | IRD | 0 | -8.626*** | – | -1.028 |
| Latvia | DE | 8 | -3.543*** | 0.038 | -11.35 |
| | RER | 2 | -3.134** | 0.028 | -10.97 |
| | IRD | 11 | -3.557*** | 0.528 | 0.919 |
| Lithuania | DE | 2 | -4.491*** | 0.002 | -8.765 |
| | RER | 1 | -7.503*** | 0.008 | -11.02 |
| | IRD | 0 | -6.439*** | – | -2.055 |
| FYR Macedonia | DE | 0 | -4.408*** | – | -10.52 |
| | RER | 0 | -6.704*** | – | -11.58 |
| | IRD | 0 | -3.372** | – | -2.438 |
| Poland | DE | 1 | -9.438*** | 0.094 | -8.979 |
| | NER | 0 | -7.502*** | – | -9.249 |
| | IRD | 0 | -6.106*** | – | -2.78 |
| Romania | DE | 2 | -3.000** | 0.039 | -9.179 |
| | NER | 0 | -4.998*** | – | -9.633 |
| | IRD | 4 | -2.975** | 0.554 | 0.285 |
| Serbia | DE | 0 | -10.260*** | – | -10.36 |
| | NER | 0 | -5.120** | – | -10.1 |
| | IRD | 0 | -7.997*** | – | -2.23 |
| Turkey | DE | 0 | -8.245*** | – | -9.406 |
| | NER | 1 | -6.359*** | 0.112 | -8.57 |
| | IRD | 1 | -7.444*** | 0.001 | -0.672 |

Source: Author's calculations.

Note: ADF = Augmented Dickey-Fuller; DE = deposit euroization; NER = nominal exchange rate; RER = real exchange rate; IRD = interest rate differential; constant included; maximum number of lags used = 18; optimal time lag chosen according to AIC (Akaike Information Criterion); all series are seasonally adjusted and in logarithms (except for the interest rate differential). *** = the null hypothesis about the existence of a unit root is rejected at the 1% level of significance; ** = the hypothesis about the existence of a unit root is rejected at the 5% level of significance.

currency. On the other hand, the interest rate differential reflects a number of possible situations, from arbitrage opportunities and foreign capital inflow to perceived country risk and even high inflation rates.⁵ In addition to these two explanatory variables, we need a threshold variable in order to distinguish between regimes in the nonlinear specification. In our case, this is an endogenous variable – deposit euroization. Since post-transition economies vary in their DE level, it seems plausible to take that variable as a reliable threshold in order to control for the level of euroization. The data are compiled from central bank statistics and Eurostat, with a detailed description presented in the annex.

We investigate 12 post-transition European countries, with their samples varied across countries. The countries are: Belarus, Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, FYR Macedonia,⁶ Poland, Romania, Serbia, and Turkey. The longest data span is available for Croatia (1995:07 to 2010:11, or 185 observations) and the shortest for FYR Macedonia (2005:01 to 2010:12, or 72 observations). To indicate how important a role DE plays among the countries explored, the DE levels and figures together with a short description of the prevailing exchange rate regimes can be found for each country in the annex. All data are seasonally adjusted, and deposit euroization together with the exchange rate is in

logarithms. In order to achieve stationarity, we take the first differences and test the series, using the Augmented Dickey-Fuller unit root test. The results (table 1) show that all the series are stationary in first differences.

⁵ We tested for multicollinearity between the exchange rate and the interest rate differential, using a number of methods. In the case of no multicollinearity between the variables, the Klein criterion suggests that the correlation coefficients should be smaller than R (root of R^2). For all 12 countries that we explore, that is the case. We checked for multicollinearity, using alternative indicators as well. We found that all 12 variance inflation factors are smaller than 5 and that the indicators of tolerance are larger than 0.2, which suggests that there is no multicollinearity between the exchange rate and the interest rate differential.

⁶ The Former Yugoslav Republic of Macedonia.

4 Methodology

4.1 The Threshold VAR Model

Although STAR (Smooth Transition AutoRegression) models are usually applied in the context of exchange rates, in some cases a threshold is more appropriate than a smooth transition because a smooth transition (when there actually is no smooth transition) would lead to misspecification of the model. When observing the variables from our sample, it is obvious they show threshold behavior, with two distinct states easily noticeable. Deposit euroization in the period before the financial crisis decreased very steadily and gradually in the majority of the countries we explore. After Lehman Brothers had gone bankrupt, home currencies depreciated and interest rate differentials widened in many European transition countries, while deposit euroization swiftly increased.⁷ Therefore, we observe one state in which the exchange rate is stable and deposit euroization decreases steadily and another state in which the home currency depreciates or there is perceived risk of a possible home currency depreciation combined with a rise in deposit euroization. TVAR is a simple way of capturing the nonlinearities suggested in a number of economic and monetary policy models, such as Teräsvirta and Anderson (1992), Holmes and Wang (2000) and Balke (2000). The nonlinear character of TVAR models comes from a transition variable that separates the baseline VAR into different regimes (Hansen, 1996 and 1997; Tsay, 1998). Each regime is then given a different autoregressive matrix and described as a linear model, but taken together those regime-based linear models describe a nonlinear process. The VAR model adjusted for the threshold specification then becomes:

$$y_t = \Gamma_1 X_t + \Gamma_2 X_t I[z_{t-d} \geq z^*] + u_t \quad (1)$$

where $X_t = (1, y_{t-p}, \dots, y_{t-j})'$. As usual, gamma matrices are coefficient matrices and u_t is the error matrix. The threshold variable is denoted by z_{t-d} , with d being a possible time lag. In order to separate regimes, an indicator function I equals 1 if the threshold variable z_{t-d} is above the chosen threshold value z^* and 0 otherwise. Both the threshold value z^* and the delay lag d are unknown parameters and have to be determined together with other parameters.

Before TVAR estimation, the threshold model needs to be tested for linearity by using the Hansen test (Hansen, 1996 and 1997). If linearity is rejected, then the endogenously chosen threshold value separates the observations of the transition variable into different regimes that are described by a linear model. The Hansen linearity test requires the transition variable z to be stationary with a continuous distribution $-\infty = z_0 < z_1 < \dots < z_{s-1} < \infty$ that is restricted to a bounded set $Z = [z, \bar{z}]$, with Z being an interval on the full sample range of the transition variable. The interval on the transition variable is chosen to provide a minimum number of observations in each subsample and therefore ensures that the model is well identified for all possible values of z^* . Before the threshold can be tested, the lag order j and the threshold delay lag d need to be determined.

If we rewrite the equation for TVAR we get the following specification:

$$y_t = X_t(z)\delta + u_t \quad (2)$$

⁷ For example, it had taken more than 12 years to reduce deposit euroization in Croatia by 21 percentage points (from 87% to 66%), and within only two years (2008–2009) it went back up to 80%.

with $X_t(z) = (X_t' X_t' D)'$ and $\delta = (\Gamma_1' \Gamma_2')'$. Following Weise (1999), we employ a general specification and allow all coefficients in the lag polynomials to change across regimes. For each possible threshold value z , the equation is estimated by using Least Squares (LS) with the relevant estimation of δ equal to:

$$\hat{\delta}(z) = \left(\sum_{t=1}^T X_t(z) X_t(z)' \right)^{-1} \left(\sum_{t=1}^T X_t(z) y_t \right) \quad (3)$$

The related residuals are then defined as $\hat{u}_t = y_t - X_t(z)' \hat{\delta}(z)$ and the residual variance as $\hat{\sigma}_T^2 = 1/T \sum_{t=1}^T \hat{u}_t^2$. For our threshold to be efficient we need the estimate of δ that minimizes the residual variance. Since the minimal variance itself does not guarantee nonlinearity, Hansen developed an additional test. A pointwise F -statistic is a profound linearity test specified as:

$$F_T = \sup_{z \in Z} F_T(z) \quad (4)$$

$$F_T = T \left(\frac{\hat{\sigma}_T^2 - \hat{\sigma}_T^2(z)}{\hat{\sigma}_T^2(z)} \right) \quad (5)$$

where the estimated residual variance of the corresponding linear model is denoted by $\hat{\sigma}_T^2$. A problem arises with the distribution of the derived F -statistic, which is not standard or chi-square (Hansen, 1996), since the threshold value is not identified under the null of linearity. Therefore, it is necessary to approximate the asymptotic distribution by using a bootstrap procedure. In order to obtain the bootstrap F -statistics F_T^* , we need the bootstrap residual variances $\hat{\sigma}_T^{*2}$ and $\hat{\sigma}_T^{*2}(z)$. To get these variances, we take y_t^* iid $N(0,1)$ random draws and regress them on X_t and $X_t(z)$. It is then possible to approximate the asymptotic null distribution of F_T . Having in mind that the distribution of F_T^* converges weakly in probability to the null distribution of F_T under the alternative, the asymptotic bootstrap p -value can be derived. The percentage of bootstrap samples for which $F_T^* > F_T$ gives the bootstrap p -value.

We test the null hypothesis of linearity against threshold nonlinearity, allowing heteroscedasticity in the error terms. Our selection of the threshold value is conditional on the choice of a minimal variance-covariance matrix of the residuals. We generate 1,000 realizations of the F -statistics for each grid point and construct the empirical distribution for the Hansen test (Hansen, 1996).

4.2 Generalized Impulse Response

In order to understand the relationship between the level of DE, the exchange rate, and the interest rate differential, we need to construct impulse responses for shocks in the two variables. To obtain meaningful impulse responses, a structural identification is needed. The TVAR equation reveals Γ_1 and Γ_2 as “structural” contemporaneous relationships in the two regimes. Relying on Christiano et al. (1999), we also assume that Γ_1 and Γ_2 have a recursive structure with causal ordering of DE, the exchange rate, and the interest rate differential. The recursiveness assumption is usually used to identify structural shocks in VAR models, especially for monetary and financial variables (Leeper et al., 1996; Bernanke et al., 1997). We use this recursive identification because of its simplicity; using

more complicated identification schemes would protract the estimation considerably.

With a structural identification applied to the nonlinear model, we can construct impulse responses (IR) that account for the nonlinearity of the system. First, the shock must depend on the entire history of the system before the point at which the shock occurs (Gallant et al., 1993; Koop et al., 1996). Moreover, linear IR functions are inappropriate since they are history-independent, symmetric (i.e., negative shocks are exactly the opposite of positive shocks), and proportional to the size of a shock. In a nonlinear specification, we expect that the effect of a shock is not proportional to its size or direction and that it is history-dependent. To fulfill these three conditions, we use generalized impulse response functions (GIRFs).⁸

Koop et al. (1996) define the GIRF as the difference between two conditional expectations with a single exogenous shock ε_t :

$$\begin{aligned} GIRF = & E[X_{t+m} | \varepsilon_t, \varepsilon_{t+1} = 0, \dots, \varepsilon_{t+m} = 0, \Omega_{t-1}] - \\ & E[X_{t+m} | \varepsilon_t = 0, \varepsilon_{t+1} = 0, \dots, \varepsilon_{t+m} = 0, \Omega_{t-1}] \end{aligned} \quad (6)$$

where m is the forecasting horizon and Ω_{t-1} the history at time $t-1$. In our case, the GIRF allows the shocks in the low euroization regime to differ from shocks in a high euroization regime. Since the computation of the GIRF is not trivial, we describe the algorithm step by step in the annex.

5 Estimation Results

According to the theory developed in section 2, we use three variables to create the linear baseline reduced-form VAR model. These variables are deposit euroization, the exchange rate (*ER*), and the interest rate differential (*IRD*). The most important DE determinant, the exchange rate, is recognized in Levy Yeyati (2006) and explained under the theory of market failure. Another significant and empirically tested DE driver is the interest rate differential, theoretically modeled in Basso et al. (2011). Using this baseline model, we determine the optimal lag length, using different criteria, and choose the number of lags for the estimation of the nonlinear model equal to three.⁹ As in Galbraith and Tkacz (2000), we set the threshold variable z_{t-d} to be a moving average of its past values, or $z_{k,t-d}(d,k) = 1/k-d+1 \sum_{i=d}^k DE_{t-i}$ for different values of d and k . Based on the minimum residual variance and maximum likelihood, we choose d equal to one and k equal to three.

Bootstrapped p -values for the Hansen test and for the corresponding baseline linear model together with the estimated coefficient for the threshold parameter can be found in the fourth and fifth columns of table 2. The trimming percentage for the threshold variable is 30% and the number of bootstrap replications is 1,000. It turns out that the chi-square test statistic is significant for all countries at the 1% level. However, the bootstrap test rejects linearity for Bulgaria, Croatia, Lithuania, and Turkey at the 1% level, and for Hungary, Latvia, Romania, and Serbia at the 5% level. It is interesting that both the Czech Republic and Poland

⁸ Many empirical studies that describe nonlinearities use GIRFs, e.g. Balke (2000), Atanasova (2003), and Calza and Sousa (2006).

⁹ Optimal lag length results are not presented in the paper to save space, but can be obtained from the author upon request.

Table 2

Estimation of TVAR and Test of Nonlinearity

| Country | Estimated threshold | Sup F | Bootstrapped | Chi-square | Corre- |
|----------------|---------------------|--------|--------------|------------|-------------|
| | | | | | sponding DE |
| | | | | p-value | % |
| Belarus | -0.287 | 41.365 | 0.174 | 0 | – |
| Bulgaria | -0.252 | 46.860 | 0.008*** | 0 | 56.1 |
| Croatia | -0.125 | 51.810 | 0.007*** | 0 | 74.4 |
| Czech Republic | -1.011 | 45.567 | 0.054 | 0 | – |
| Hungary | -0.718 | 47.817 | 0.018** | 0 | 18.8 |
| Latvia | -0.086 | 45.306 | 0.033** | 0 | 81.5 |
| Lithuania | -0.426 | 53.530 | 0.002*** | 0 | 37.2 |
| FYR Macedonia | -0.266 | 37.269 | 0.335 | 0 | – |
| Poland | -0.685 | 40.837 | 0.240 | 0 | – |
| Romania | -0.433 | 41.733 | 0.034** | 0 | 37 |
| Serbia | -0.171 | 43.864 | 0.040** | 0 | 67.7 |
| Turkey | -0.383 | 59.926 | 0.000*** | 0 | 41.9 |

Source: Author's calculations.

Note: *** = the null hypothesis about linearity is rejected at the 1% level of significance; ** = the hypothesis about linearity is rejected at the 5% level of significance.

show no sign of nonlinearity. Among the post-transition countries in our sample, those two have the lowest level of unofficial euroization, both have flexible exchange rates and inflation targeting regimes, and both implement policy measures to curtail FE.

The estimated threshold values are given in the second column of table 2. As these values are in logarithms and moving averages, we report the corresponding original DE values in the last column. We observe that the threshold values are country specific and vary between 18.8% in Hungary and 81.5% in Latvia.

Charts 1 to 3 directly compare positive and negative shocks with the linear impulse response functions. For an easier

comparison of positive and negative shocks, we transformed the sign in front of the simulated impulse response after a negativeshock.¹⁰ Although linear responses are misspecified when the tests confirm nonlinearity, we leave them as a reference.¹¹ We find clear differences between linear and nonlinear GIRFs and between positive and negative shocks in all countries. Furthermore, since the differences between regimes are almost negligible, due to space considerations we present the GIRFs for the low regime only. It is important to note that regime differences are observable when there is a natural explanation for two states of the endogenous variable. Where the endogenous variable is the output gap or perhaps the credit growth rate, there is reasoning for the existence of a low (negative or contractionary) and a high (positive or expansionary) regime. Since DE does not have a negative and a positive state (DE is always positive), we simply use it as a threshold variable.

Chart 1 presents the reaction of DE to exchange rate shocks. The results for Bulgaria, Latvia, and Romania are in line with economic intuition and indicate DE rises with home currency depreciation. Moreover, depreciation effects in Bulgaria are stronger than appreciation effects in both regimes. Lithuania and Turkey also show stronger responses to depreciation in both low and high regimes. DE in Hungary, Lithuania, Serbia, and Turkey also reacts as one would expect, with a hike preceded by home currency depreciation. To summarize, from the countries witnessing nonlinear behavior, only Croatia does not corroborate our hypothesis that home currency depreciation drives DE.

When depreciation pressures arise, central banks that experience “fear of floating” usually react with a liquidity squeeze that eventually manifests itself in a

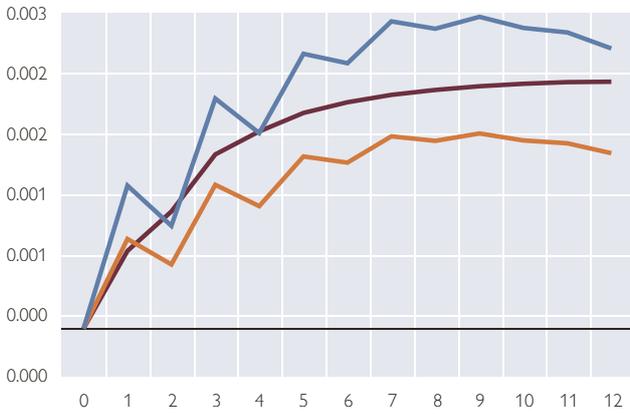
¹⁰ We do not present confidence intervals around the impulse responses since there is no consensus on how to compute them for nonlinear models that allow regimes to switch (Kilian, 1998).

¹¹ Since DE shows persistence, i.e. a long-run relationship, we previously tested the model for cointegration and found a cointegrating relationship in some cases. However, those results were misspecified in cases in which we confirmed a nonlinear relationship.

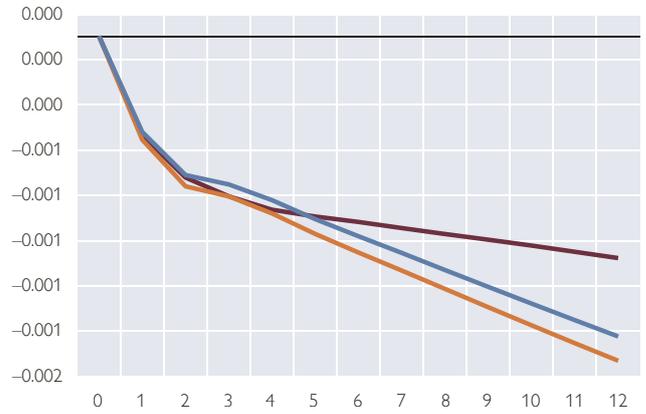
Chart 1

Effect of Positive and Negative (One-Standard Deviation) Exchange Rate Shocks on Deposit Euroization

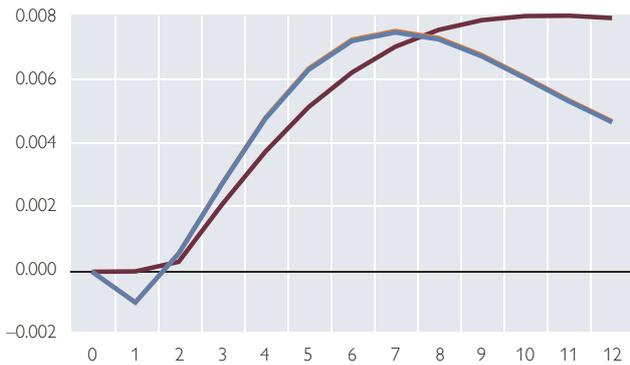
Bulgaria



Croatia



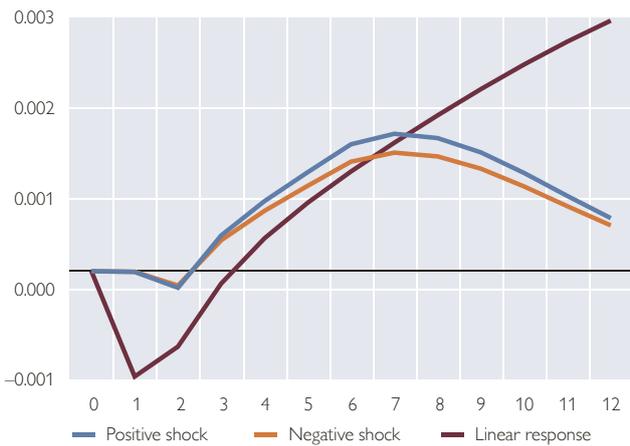
Hungary



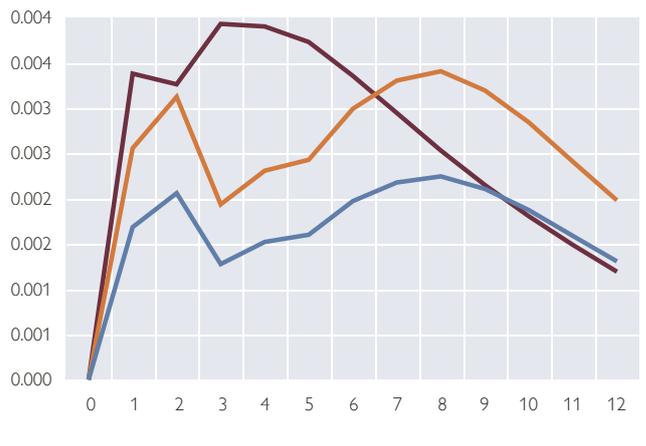
Latvia



Lithuania



Romania

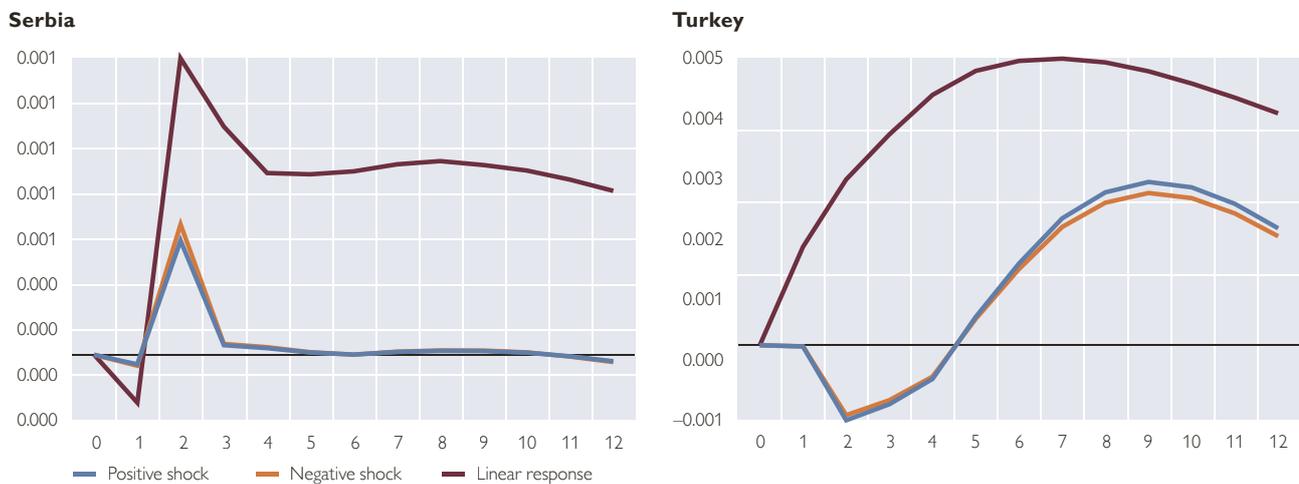


— Positive shock — Negative shock — Linear response

Source: Author's calculations.

Chart 1 continued

Effect of Positive and Negative (One-Standard Deviation) Exchange Rate Shocks on Deposit Euroization

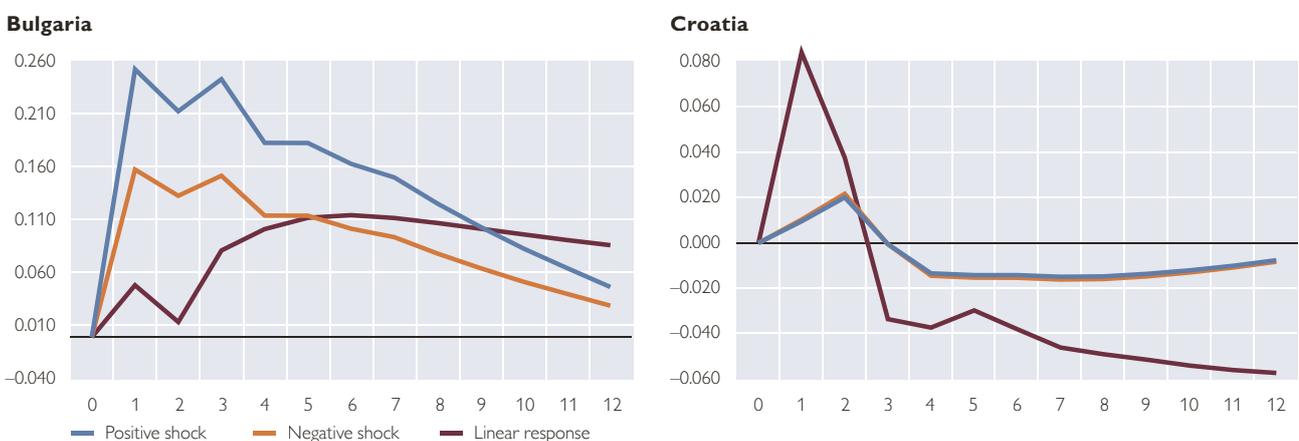


Source: Author's calculations.

domestic interest rate increase. If this theory held, we would observe a positive response of the interest rate differential to a positive exchange rate shock or home currency depreciation. Interest rate differential responses to exchange rate shocks are displayed in chart 2. We find evidence of the described effect in all countries except Lithuania. The linear and nonlinear responses are very similar in shape, but in six out of the eight countries the nonlinear responses are stronger. The only indication of regime differences is found in Romania, where appreciation is much stronger in the low regime. The only other case where negative exchange rate shocks appear to be stronger is Serbia, while in Bulgaria, Lithuania, and Turkey we find clear evidence of stronger depreciation effects.

Chart 2

Effect of Positive and Negative (One-Standard Deviation) Exchange Rate Shocks on the Interest Rate Differential



Source: Author's calculations.

Chart 2 continued

Effect of Positive and Negative (One-Standard Deviation) Exchange Rate Shocks on the Interest Rate Differential

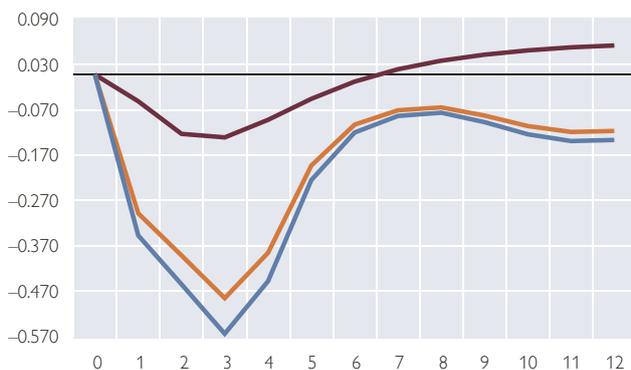
Hungary



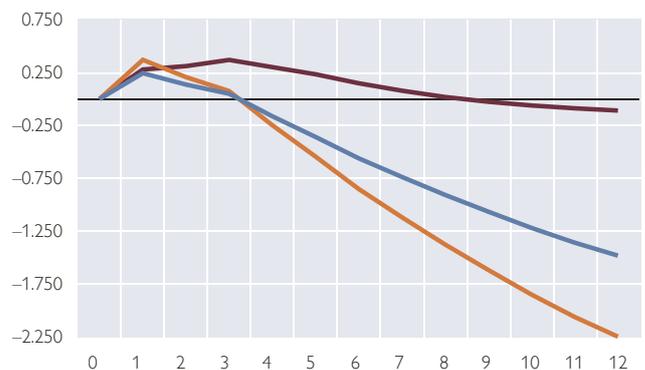
Latvia



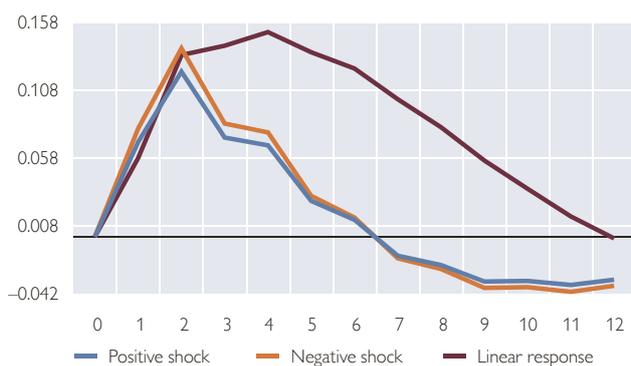
Lithuania



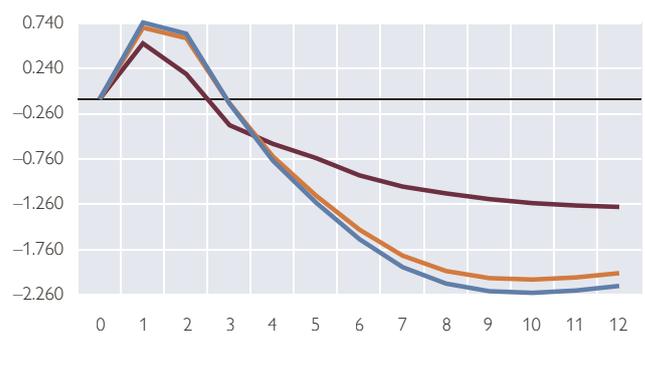
Romania



Serbia



Turkey

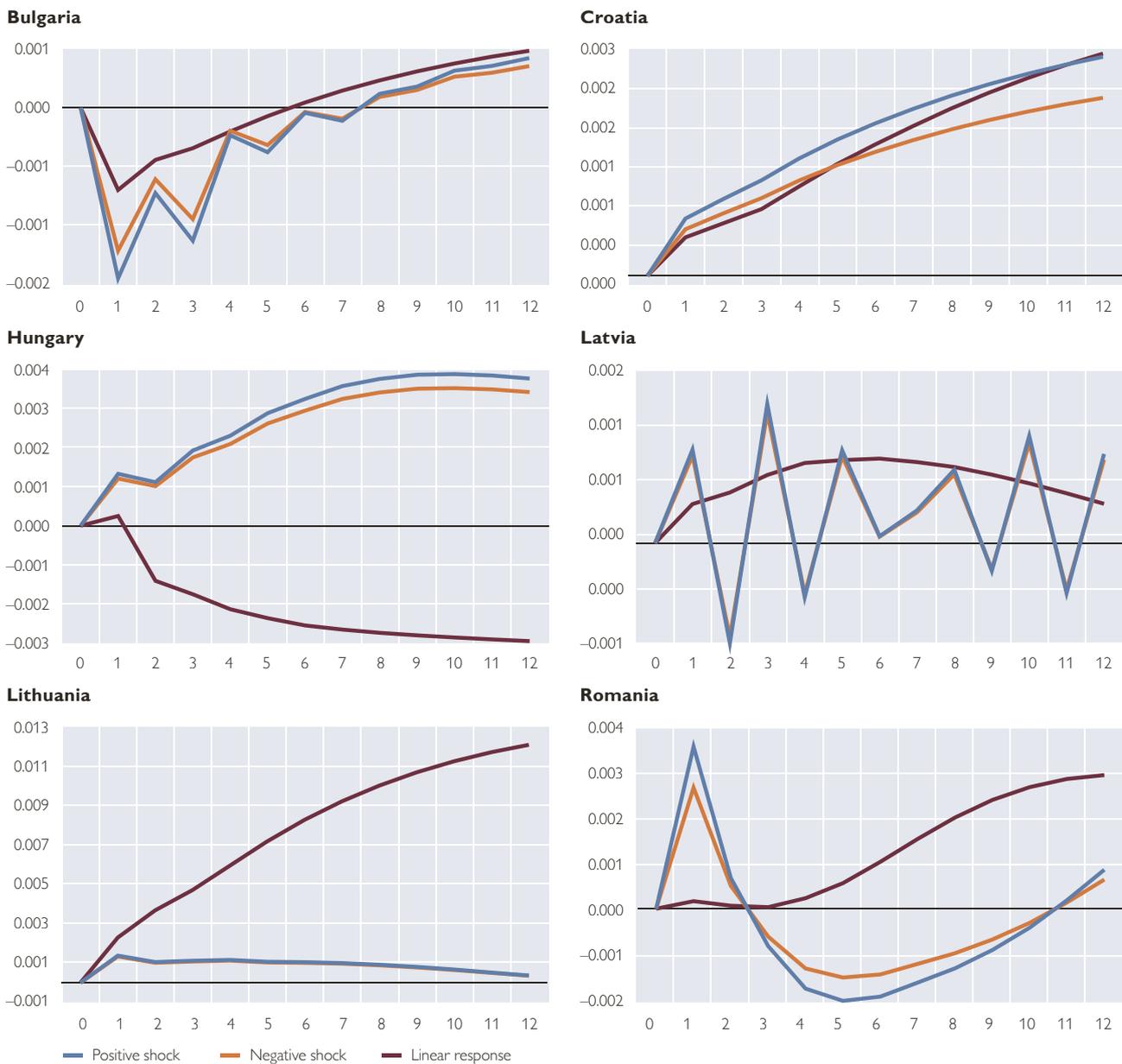


— Positive shock — Negative shock — Linear response

Source: Author's calculations.

Chart 3 displays the DE responses to shocks in the interest rate differential. Although these shocks are not the primary goal of our research, a few interesting findings can be noted. As in Luca and Petrova (2008), we show that DE increases after a positive shock in the interest rate differential in six out of the eight countries, and in five countries positive shocks have stronger effects on DE than negative ones.

Effect of Positive and Negative (One-Standard Deviation) Interest Rate Differential Shocks on Deposit Euroization



Source: Author's calculations.

Only Bulgaria manifests an opposite response, while for Latvia it is impossible to detect the direction of the responses.¹² These results are corroborated by Rosenberg and Tirpák (2009), who find that the level of euroization in new EU Member States increases as interest rate differentials rise.

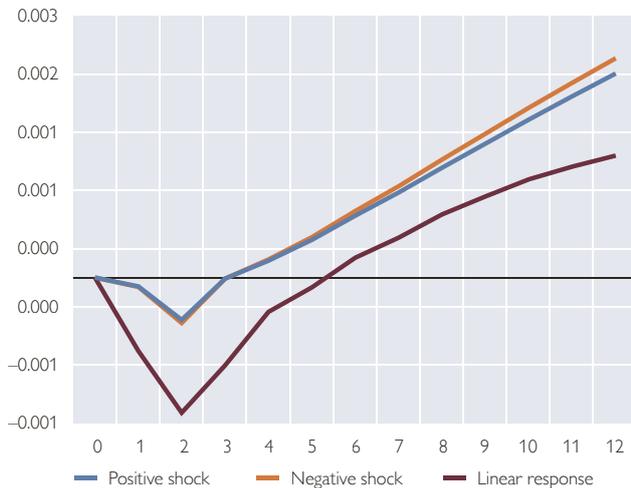
The above results imply that exchange rate and interest rate shocks affect deposit euroization and play an important role in DE dynamics. Differences in

¹² We found no evidence of threshold behavior for Belarus, the Czech Republic, FYR Macedonia, and Poland.

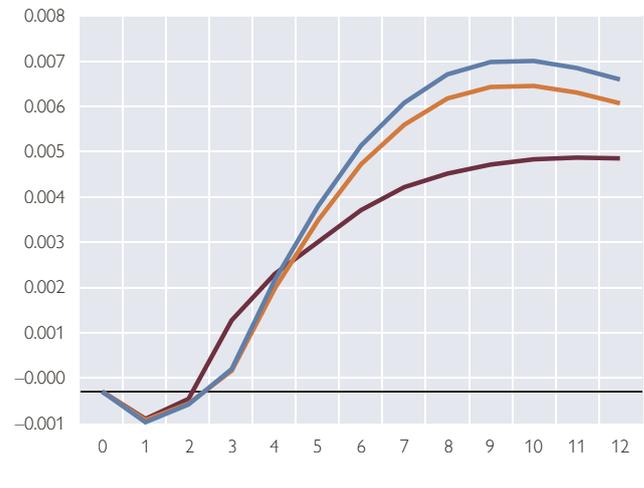
Chart 3 continued

Effect of Positive and Negative (One-Standard Deviation) Interest Rate Differential Shocks on Deposit Euroization

Serbia



Turkey



Source: Author's calculations.

positive and negative shocks were evident and in line with the observed deposit euroization behavior in our post-transition economies sample.

6 Conclusions

This study gives new insights into the relationship between DE and the monetary system and shows that exchange rates and interest rate differentials have an important influence on DE in emerging Europe. The results explain the nonlinear dynamics of DE and show that home currency depreciations have a stronger effect on DE than appreciations. In order to tackle DE and possible adverse effects after home currency depreciations, it would be justifiable to introduce insurance measures for investors saving in the domestic currency. In practice, that implies allowing investors to hedge against domestic currency interest rate risk and developing and deepening domestic money and capital markets. Some kind of preferential treatment for domestic currency savings is also a possible solution for encouraging savings in local currency. One must bear in mind that such market development measures are plausible only in countries with strong institutional frameworks. This indicates that country-specific characteristics should be taken into account when designing de-euroization strategies.

The results of this study offer suggestions for an optimal set of policy recommendations aimed at curbing DE in post-transition Europe. The most simple exit strategy would be to adopt the euro, but that scenario is becoming less and less likely for some countries due to difficulties in fulfilling the Maastricht criteria. For countries that have already fixed their exchange rate, such as Latvia, Lithuania, and Bulgaria, this seems to be the most possible scenario. The path these countries are supposed to follow is to achieve convergence (by fiscal consolidation and structural reforms) and eventually adopt the euro as their official currency. Countries that are too far from adopting the euro and have already exhausted a

great deal of regulatory measures in fighting DE, such as Croatia, Hungary, and Romania, but to some extent also Serbia and Turkey, will probably have to rely on nonregulatory measures because managing euroization risks is already becoming unsustainable. Their only alternative is to decrease DE by using different types of measures. Zettelmeyer et al. (2010) suggest that countries should go through a reform of macroeconomic regimes and institutions in order to increase macroeconomic and institutional credibility. Experience from Latin American countries shows that such policies are usually based on inflation targeting and floating exchange rate regimes. A contribution to that argument is made by countries like the Czech Republic and Poland that already have a tradition of such policies and as a result exhibit the lowest DE levels.

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Annex

Table A1

Data Sources and Transformations

| Variable | Source | Description |
|--|--|--|
| Deposit euroization index | National authorities (central banks) and author's calculations | Share of foreign currency deposits (where possible, we added deposits linked to the foreign currency as well) in total deposits |
| Nominal and real effective exchange rate | National authorities (central banks) and Eurostat | Average monthly nominal or real effective exchange rate of the domestic currency to the euro |
| Interest rate differential | National authorities (central banks), Eurostat and author's calculations | Calculated as the difference between interest rates for the respective country and the euro rate; for the euro rate and for some of the national interest rates, interbank three-month money market interest rates were used; where not possible, average short-term interest rates on deposits were used; measured in percentage points |

Source: Author's compilation.

Table A2

DE Levels and Exchange Rate Regimes

| Country | Exchange rate regime | Average DE level in the sample period % | DE development |
|----------------|-------------------------------------|--|---|
| Belarus | Pegged within horizontal bands | 57.20 | For the individual charts, see Finance a úvěr-Czech Journal of Economics and Finance 62(3), 2012, p. 292ff. |
| Bulgaria | Currency board | 55.45 | |
| Croatia | Stabilized arrangement ¹ | 80.00 | |
| Czech Republic | Free floating | 11.06 | |
| Hungary | Managed float | 21.65 | |
| Latvia | Pegged to euro | 77.63 | |
| Lithuania | Currency board | 31.00 | |
| FYR Macedonia | Stabilized arrangement | 51.21 | |
| Poland | Free float | 20.48 | |
| Romania | Managed floating | 37.42 | |
| Serbia | Managed float | 67.41 | |
| Turkey | Free float | 40.39 | |

Source: Author's compilation.

¹ As defined in Habermeier et al. (2009), stabilized arrangement is a non-floating exchange rate regime in which the exchange rate is kept stable by official central bank action but without policy commitment.

GIRF Algorithm

This method of calculating impulse response functions for nonlinear models follows Koop et al. (1996). The GIRF is defined as the response of a specific variable after a one-time shock hits the forecast of the variables in the model. To measure the response of the variable, we must compare it against the case in which no shocks occur. Mathematically, this formulation can be expressed as:

$$GIRF_y(m, \varepsilon_t, \Omega_{t-1}) = E[y_{t+m} | \varepsilon_t, \Omega_{t-1}] - E[y_{t+m} | \Omega_{t-1}]$$

with m the forecast horizon, ε_t the shock, and Ω_{t-1} the initial values of the variables included in the model. The procedure assumes that the nonlinear k -dimensional model is known and requires the GIRF to be computed by simulating the model. A shock of one standard deviation occurs to the i -th variable ($i=1, \dots, k$) of y_t (defined earlier as $y_t = (y_{1t}, \dots, y_{kt})'$) in period 0, with responses calculated for p periods thereafter. The algorithm is as follows:

1. Pick a history Ω_{t-1}^r (where $r=1, \dots, R$ denotes the number of iterations) that refers to an actual value of the lagged endogenous variable at a particular date. Since the values correspond to only one of the regimes, the algorithm has to be carried out twice, for both lower and upper regimes. The number of these histories is equal to the number of observations in the regime for which we calculate the impulse responses. The regimes are identified by using the results of the TVAR estimation. We draw B times from the distribution of shocks at each history to produce B realizations of the shock for each Ω_{t-1}^r .
2. Pick a sequence of k -dimensional shocks ε_{t+m}^b , with $m = 0, \dots, p$ and $b = 1, \dots, B$. These shocks are generated by taking bootstrap samples from the estimated residuals of the TVAR model.
3. Using Ω_{t-1}^r and ε_{t+m}^b simulate the evolution of y_{t+m} over $p+1$ periods. The resulting baseline path is given by $y_{t+m}(\Omega_{t-1}^r, \varepsilon_{t+m}^b)$.
4. Substitute ε_{i_0} for the i_0 element of ε_{t+m}^b and simulate the evolution of y_{t+m} over $p+1$ periods. In this manner you modify the path of y and by simulating over m periods you get the shocked path $y_{t+m}(\Omega_{t-1}^r, \varepsilon_{t+m}^b)$ for $m = 0, 1, \dots, p$.
5. Repeat steps 2 to 4 B times to get B estimates of the baseline and the shocked path.
6. Take the average over the difference of the B estimates of the baseline and the shocked path. This average will give you an estimate of the expectation y for a given history Ω_{t-1}^r .
7. Repeat steps 1 to 6 R times.
8. Calculate the average GIRF for a given regime with R observations by using the following equation:

$$y_{t+m}(\varepsilon_{i_0}) = \frac{[y_{t+m}(\varepsilon_{i_0}, \Omega_{t-1}^r, \varepsilon_{t+m}^b) - y_{t+m}(\Omega_{t-1}^r, \varepsilon_{t+m}^b)]}{BR}$$

As in Koop et al. (1996), B was set to 100 and R to 500.

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 for the full-length versions of these studies.

Clustering Austrian Banks' Business Models and Peer Groups in the European Banking Sector

Robert Ferstl,
David Seres

As the European banking sector is becoming increasingly intertwined, the degree of interdependence is also rising. Consequently, it is key to conduct comparisons for a timely identification of emerging patterns of this development. Furthermore, the product range of banks has expanded so that heterogeneity across the banking sector has also been growing rapidly. This rising heterogeneity makes it increasingly impractical to carry out comparisons on an aggregate level. A more efficient approach is identifying one or more “common denominators” of similar banks and establishing groups of banks which share this (these) common denominator(s). In this paper, we consider the business models of banks as one such common denominator, which can be described by a set of variables. These variables span a high-dimensional space where each bank represents a point, which can be measured by a statistical distance. Points close to each other may constitute a group, while points distant from these points will not belong to that group. Therefore, the objective of this study is, on the one hand, to define an efficient set of variables correctly reflecting the business models of banks and, on the other hand, to find subsets of high similarity. By applying statistical clustering techniques we aim to understand banks' business models, thereby gaining new insights into the design of the European banking sector and, in particular, identifying peer groups relevant to the top Austrian banks. Assessing the distribution of risk and identifying certain business patterns within those groups allows a meaningful ranking of Austrian banks in comparison to their European competitors. The analysis in this paper is conducted on the basis of a purely quantitative methodology and the results should be interpreted accordingly.

Published in *Financial Stability Report 24*.

The Cross-Border Movement of Euro Banknotes and Austria's TARGET2 Liabilities

Clemens Jobst,
Martin Handig,
Doris Schneeberger

In the public and academic discussion on the payment system TARGET2, the high claims and liabilities of some euro area countries have mostly been associated with the financial crisis. The implicit assumption that TARGET2 balances would be close to zero without the financial crisis is both theoretically and empirically wrong, though. This study looks into the payment mechanisms that have caused the TARGET2 liabilities of the Oesterreichische Nationalbank (OeNB) to rise to a substantial level over the past ten years. The increase can be attributed to a structurally induced inflow of banknotes to the OeNB, which is partly due to tourism but above all to the physical shipment of euro cash from countries outside monetary union into Austria. This central bank money, which comes to Austria as cash, leaves the country in cashless form, causing an equivalent increase in the OeNB's TARGET2 liabilities. Structurally induced in- and outflows of central bank money (in cashless form or as banknotes) can be observed in other euro area countries, too. Understanding these flows is essential for a correct interpretation of TARGET2 balances during and after the current crisis.

To be published in *Monetary Policy & the Economy Q4/12*.

Event Wrap-Ups

Conference on European Economic Integration 2012: Achieving Balanced Growth in the CESEE Countries

Compiled by
Susanne Steinacher
and
Katharina Steiner¹

For the second year in a row, the Oesterreichische Nationalbank (OeNB) organized its Conference on European Economic Integration (CEEI) in cooperation with Suomen Pankki – Finlands Bank, and for the first time in its history, the CEEI went abroad: Hosted by the Finnish central bank, the CEEI 2012 on “Achieving Balanced Growth in the CESEE Countries”² took place in Helsinki on November 26 and 27, 2012. Achieving sustainable economic growth was, in general, seen as being of utmost importance in solving the current economic problems. Conference topics thus ranged from the most recent challenges for the banking sector to the unwinding of large external imbalances.

In his welcoming address, *Erkki Liikanen*, Governor of *Suomen Pankki – Finlands Bank*, focused on financial market stability, listing strongly interconnected and complex global financial institutions, deregulation, the development of a large shadow banking sector and the implicit public guarantee for banks that were “too big to fail” as the forces behind the harmful developments that had eventually triggered the financial crisis. At the same time, regulatory and supervisory restraints had proved ineffective. Therefore, it is important to implement the necessary reforms now. For this purpose, Liikanen explained, the High-level Expert Group on reforming the structure of the EU banking sector proposed a mandatory separation of certain trading-related activities and, in addition, a more comprehensive separation of activities conditional on banks’ recovery and resolution plans. Further measures would include the use of bail-in instruments for particular debt instruments and a review of capital requirements on trading assets and real estate-related instruments.

In his opening remarks, *OeNB* Governor *Ewald Nowotny* went on to stress the need to find a new growth model for the Central, Eastern and Southeastern European (CESEE) countries, which were hit hard by the financial and economic crisis of 2008 and 2009. He pointed out that their foreign capital inflow-based growth model had proved unsustainable in the long run since it led to the buildup of substantial vulnerabilities. The resulting boom-bust cycles caused significant economic costs, harmed the countries’ long-run growth potential and seriously delayed the CESEE region’s convergence toward the euro area. A slowdown of the catching-up process poses serious challenges to the still pending economic and institutional reforms in CESEE and to further economic integration. Nowotny concluded that a new growth model has to be found that promotes both balanced growth and the convergence process.

Balancing European Transition and Growth in a Shifting World Economy

Danny Quah, professor of economics at the *London School of Economics*, started his keynote lecture by providing a bird’s eye view of the global economy, whose

¹ *Oesterreichische Nationalbank, Foreign Research Division. Compiled on the basis of notes taken by Peter Backé, Martin Gächter, Isabella Moder, Tomáš Slačik and Katharina Steiner.*

² *The conference proceedings will be published by Edward Elgar Publishing Ltd. in the course of 2013. Presentations and papers, information about the speakers and the conference program are available at www.suomenpankki.fi/CEEI2012.*

gravity center – while still located along the transatlantic axis – has been moving eastward. Given the rise of the emerging economies in East Asia, this shift is set to continue well into the distant future. Quah pointed out, however, that such projections are not undisputed as many opponents argue that this unsustainable Asian growth model cannot continue for three main reasons:

1. underconsumption and excessive dependence on exports to advanced economies;
 2. adverse demographic developments contrasting with the stylized fact derived from economic history suggesting that it is typically young people who drive economic growth;
 3. political institutions largely considered incompatible with sustainable growth.
- Quah went on to refute this widespread narrative. The argument that the lion's share of Asia's economic success is driven by foreign demand in advanced economies has not been substantiated in the current crisis. Moreover, the still rather large share of poor people in Asian populations holds a huge potential for future domestic demand. Similarly, societies in Asia – while greying – are also becoming richer and will thus increasingly invest in old-age care. Finally, Quah noted that while ballot box democracy has worked well in some parts of the world, it is not a blueprint for all. According to Quah, it is rather political legitimacy that is conducive for economic growth.

Restarting Growth in Europe after the Great Recession

In the second keynote lecture, *Seppo Honkapohja*, Member of the Board of *Suomen Pankki – Finland's Bank*, took a comparative view of Central and Eastern Europe (CEE) versus the euro area and presented various stylized facts on the developments in CEE over the last two decades. After 1995, the CEE countries that went on to join the EU in 2004 and 2007 started a remarkable convergence process, which further accelerated with EU membership. Starting in 2008, the Great Recession, by contrast, was marked by nonconvergence in most cases, with some countries even experiencing divergence during the crisis. After the crisis in 2008 and 2009, however, the CEE countries recovered relatively faster than the rest of the EU.

In the pre-crisis boom phase, current account deficits widened in most CEE countries (except e.g. in Poland and the Czech Republic). During the crisis, a strong rebalancing set in, partly caused by sudden stops or reversals of capital inflows. At the same time, unemployment rates remained relatively low compared to those in some other EU countries. The comforting conclusion Honkapohja drew was that some CEE countries managed to resume growth after the Great Recession. He traced their quite pronounced crisis resilience back to lower public and private sector debt levels and to flexible labor and product markets, which facilitated economic adjustment during the crisis. At the same time, however, competitiveness and success in foreign trade remain critical factors for the CEE region, which largely depends on growth prospects in Western Europe.

Stop and Go of Capital Flows and Deleveraging

The first session of the CEEI 2012 was dedicated to the volatility of capital flows to emerging market economies and related challenges for policymakers, with a particular focus on the CESEE region. *Klaas Knot*, President of *De Nederlandsche*

Bank, gave a brief introduction into the issue of highly volatile capital flows to emerging market economies (EMEs), characterizing the “dark side of globalization.”

Karolina Ekholm, Deputy Governor of *Sveriges Riksbank*, pointed out that while emerging Europe had not been the destination of large net capital inflows (in absolute terms) compared with Latin America and developing Asia before the crisis, the ongoing deleveraging by foreign banks might play a crucial role for the region’s current growth prospects. However, the reduction of net capital inflows and bank lending in CEE mostly seem to be an adjustment toward fundamentals. While the CEE countries gained rather than lost competitiveness during the crisis, the reduction of FDI inflows owing to the poor performance of the rest of Europe may hamper their long-run growth potential.

Andrew Filardo, Head of Monetary Policy at the *Bank for International Settlements (BIS)*, reported on the experience of emerging market economies in Asia and how they were able to manage “stop-and-go” capital flows during the last decade. On the one hand, he referred to their “good luck,” namely the fact that the “wave of liquidity” from U.S. capital outflows never fully materialized, and therefore, capital inflows remained manageable. On the other hand, the resilience of emerging Asia was also attributable to “good policies” which moderated capital flows in the short run and reduced vulnerabilities during the crisis period. Related policy measures included the stress testing of policy frameworks, the smoothing of foreign exchange movements and asymmetric monetary policy responses, which served to prevent spillovers. The Chiang Mai Initiative also strengthened international cooperation across countries and offered a “multilateral backstop” to adverse developments. Nevertheless, destabilizing capital flows may remain an important concern for policymakers, while shifts in global risk aversion play a major role for capital flows and should therefore be monitored carefully.

Marek Dabrowski from the *Center for Social and Economic Research* criticized the use of traditional balance of payments analysis for assessing global imbalances. While he pointed out that net capital inflows indeed lead to an accumulation of external liabilities which cannot grow indefinitely and must be repaid at some stage, he also explained that a country may be a net capital exporter or importer for a long period of time. Therefore, in a world of free capital mobility, countries’ current account balances might follow changes in their financial accounts. Hence, national macroeconomic policies have only limited control over national current account balances and real exchange rates, even when floating exchange rates or inflation targeting are in place, as domestic money supply is largely driven exogenously by capital flows. This perspective calls for a stronger coordination of global monetary policies to avoid adverse feedback loops across countries.

Debora Revoltella, Director at the *European Investment Bank (EIB)*, discussed the ongoing bank deleveraging in CESEE. From a macro perspective, the external positions of BIS reporting banks in CESEE have fallen considerably since mid-2011. While stalling credit growth seems to be a development toward an increasingly self-funded banking system, the deterioration in credit quality as measured by the rate of nonperforming loans (NPLs) is still a major cause for concern. From a micro perspective, preliminary results of the EIB Bank Lending Survey show that the current deleveraging is both domestically (demand-side) and internationally (supply-side) driven. On the one hand, most banks are going through some sort of strategic restructuring, with further deleveraging expected in the near

future. On the other hand, given the local market outlook and local regulation frameworks, credit demand is currently weak as well. The survey results signal a shift toward a more self-sustainable banking model, although this rebalancing might lead to strongly binding constraints as soon as credit demand recovers. From a policy perspective, the current restructuring and rebalancing of the CESEE banking model is a positive development, but it takes time and affects growth.

Growth, Institutions and Human Capital

In the third keynote lecture, *Florencio López-de-Silanes*, professor of finance at the *EDHEC Business School*, focused on the importance of human capital not only for economic development and growth, but also for the development of sound institutions. He argued that most indicators of institutional quality, except those measuring regulatory frameworks, are often inappropriate and cannot clearly explain differences in economic development across regions and countries for two reasons: They are subjective, and they rather follow than lead growth. Therefore, López-de-Silanes conducted in-depth research on the ultimate determinants of growth, i.e. geography, infrastructure, population, human capital and culture, for a sample of regions covering 110 countries. The results show that human capital (measured by years of education) proved to be the key driver of regional variation in income and labor productivity. At the firm level, the impact of managers' educational level on productivity turned out to be four to five times higher than that of workers' educational level.

In addition, López-de-Silanes raised the issue of productivity at the government level. What is the impact of human capital on government efficiency? Measures of government efficiency often take into account corruption and policy views. To generate a new indicator of government efficiency, his research team conducted an experiment testing the performance of the postal systems of 159 countries by mailing letters to fake addresses in the respective countries and waiting for them to be returned to sender. The share of letters returned and the time it took until they were returned served to measure a country's postal efficiency. Cross-country regression analysis applied to the data showed that human capital was a main determinant of efficiency in postal services. With this experiment, López-de-Silanes suggests that education matters for economic development as it fosters the development of sound institutions.

Growth Strategies of EU Neighboring Countries: Russia and Turkey

Session 2 centered on the growth strategies of Russia and Turkey, with *Ahmet Faruk Aysan*, Member of the Board of *The Central Bank of the Republic of Turkey (CBRT)*, providing an overview of recent economic developments in his country. After implementing various institutional and economic reforms, Turkey grew at a quick and rather stable rate as from 2001. After 2008, in response to the collapse of Lehman Brothers, monetary policy actions were taken to stimulate the economy. However, recovery in 2009 went hand in hand with rapidly rising credit growth rates and substantial current account deficits, which threatened financial stability and the country's sustainable growth. Against this backdrop, the CBRT introduced a set of – partly unconventional – monetary and macroprudential policy measures that pushed the economy toward greater balance and enabled a “soft landing.”

As Professor *Konstantin Sonin* from the *New Economic School, Moscow*, pointed out, Russia was among the countries in the region that were hit hardest by the financial crisis. Although the short-term outlook suggests a recovery of growth at rates of 3% to 4% within the next few years, in the longer run Russia will face serious challenges. According to Sonin, the previous growth drivers, namely human as well as physical capital and the high oil price, have been exhausted. Therefore, institutional reforms to achieve productivity growth are indispensable. Suggested key reforms are the privatization of state-owned companies, deregulation, the improvement of the business climate, pension reform as well as a clear shift of monetary policy to inflation targeting.

Dinner Speech

In his dinner speech, Governor *Klaas Knot* (*De Nederlandsche Bank*) focused on the euro area crisis and the role of competitiveness patterns and capital flows during the crisis period. He pointed out particular country-specific aspects that played an important role for the diverging developments within the euro area. Knot concluded by suggesting ways of going forward and highlighted the necessity for comprehensive solutions.

Small-Country Experiences in Economic Adjustment

The second day of the CEEI 2012 started with a session chaired by Deputy Governor *Pentti Hakkarainen* (*Suomen Pankki – Finlands Bank*). *Doris Ritzberger-Grünwald*, Head of the *OeNB's* Foreign Research Division, shed some light on income and business cycle convergence in the CESEE region. She provided evidence that on the one hand, the region became more heterogeneous during the crisis while decoupling from the euro area on the other, particularly on account of developments in small countries. Moreover, while trend growth rates declined both in the euro area and in CESEE in the wake of the crisis, the trend growth differential between these two regions halved against the pre-crisis period, causing the catching-up process to slow down significantly.

Against the background of economic developments in Southeastern Europe before the crisis, Governor *Dimitar Bogov* of the *National Bank of the Republic of Macedonia* discussed the impact of the crisis in the SEE-6 (Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia) and the resulting challenges lying ahead. Prior to the crisis, economic growth in the region was above potential given excessive domestic demand, which was, in turn, fueled by massive capital inflows. Despite attempts to contain the latter by means of pioneering macroprudential measures, mounting external imbalances could not be avoided. The sudden reversal of capital flows and the economic slowdown had a sharp impact on the economy in the SEE-6, including noticeable deleveraging, a dramatic increase in nonperforming loans and significantly higher fiscal deficits. Nevertheless, the banking system in the region remained rather stable and, along with due structural reforms, it should be able to catalyze the region's attempted shift to a sounder and more sustainable growth model.

The final contribution to the session was delivered by *Ardo Hansson*, Governor of *Eesti Pank*, who concentrated on developments in the Baltic countries. He started out by benchmarking their recent rapid and severe economic correction against past crises as well as against the current rather gradual and protracted

adjustment process in the peripheral euro area countries. Compared to previous crisis episodes, the Baltic countries stand out in terms of their unusually high degree of volatility in most economic variables, the significant changes in domestic demand and high external and financial vulnerabilities. In contrast to the euro area periphery, the sharp V-shaped adjustment process in the Baltics was characterized by a sudden stop in capital inflows. Moreover, unlike in the EU-IMF program countries of the euro area, public debt increased only very moderately in the Baltics and private sector indebtedness even declined. Hansson concluded by weighing up the pros and cons of the different adjustment patterns.

A Practitioner's View

This year's CEEI concluded with a panel of high-level management representatives from European commercial banks operating in CESEE markets. Their brief presentations of their banks' strategies in the region served as an introduction to a discussion on challenges for banking in CESEE. The panel was chaired by *OeNB* Executive Director *Andreas Ittner*, who outlined the importance of renewing sustainability in banking market developments in the region. Numerous initiatives support this goal e.g. the Vienna Initiatives I and II, and the Austrian Sustainability Package, which was introduced at the CEEI 2012. *Ilkka Korhonen*, Head of BOFIT at *Suomen Pankki – Finlands Bank*, outlined the important role of foreign banks in the CESEE region. Among the main challenges identified by the panelists remains the relatively weak credit quality, with high nonperforming loan ratios in many CESEE countries. However, *Gianfranco Bisagni* (Head of Corporate and Investment Banking CEE and Deputy Head of CEE Division at *UniCredit Bank Austria AG*) pointed to the heterogeneous developments in CESEE during the financial and economic crisis. Future loan growth, he stated, is likely to be more and more closely tied to growth in deposits – not least due to the loans-to-local funding ratio of 110% implemented by the Austrian authorities. Together with *Radovan Jelašić* (Chief Executive Officer of *Erste Bank Hungary*), Bisagni referred to the increasing supervisory challenges and regulatory pressures on banks. Jelašić consequently called for intensified cooperation between supervisors, international institutions and banks – particularly in an environment of heightened uncertainty. *Esa Tuomi* (Senior Vice President and Head of Corporate and Institutional Banking, Poland and Baltic Countries at *Nordea*) contributed to the debate by calling attention to the microeconomic level, in particular to the relationship between banks and customers, which is crucial for the quality of banks' loan portfolio. Overall, the panelists highlighted that banks need to reassess their strategies in an environment of heightened economic uncertainty.

In his concluding remarks, Director Ittner emphasized the significance of conferences such as the CEEI as they provide an opportunity for representatives of international institutions, academics and practitioners to exchange views and discuss future challenges. In an environment of raised uncertainty and diverging interests, mutual understanding of diverging interests is particularly important. He closed by inviting all participants to attend the CEEI 2013, which will take place in Vienna on November 18 and 19, 2013.

Olga Radzyner Award Winners 2012

The Olga Radzyner Award has been bestowed on young economists from Central, Eastern and Southeastern Europe (CESEE) for excellent scientific work on European economic integration since the year 2000. The OeNB established this award to commemorate Olga Radzyner, the former head of the OeNB's Foreign Research Division, who died in a tragic accident in August 1999.

In 2012, the OeNB received 20 submissions from young economists from 11 countries. The submitted papers covered a wide range of topics related to the economic crisis and policy responses at the European and the national level. Besides effects of institutional deepening within the EU, many papers also focused on integration steps and opportunities for non-members, in particular in the Western Balkans. Further prominent topics covered convergence and inequality in Europe, effects of fiscal and monetary policy, foreign exchange lending, trade and banking.

Out of the pool of promising young CESEE economists competing for the award in 2012, a panel of OeNB reviewers selected four papers, which were considered outstanding in terms of originality, overall presentation of the research question and analysis, and the use of state-of-the-art methods. On November 26, 2012, at the OeNB's Conference on European Economic Integration (CEEI), Governor Ewald Nowotny conferred the award upon:¹

- *Selena Begovic* (Bosnia and Herzegovina), School of Economics and Business in Sarajevo, examined whether currency board arrangements in European countries have had a dampening effect on inflation. She applies a novel estimation approach – combining a static and a dynamic approach with the so-called fixed-effect vector decomposition estimator – to a panel of 25 countries over the period from 1998 to 2009 and finds that countries with a strong currency board regime have lower inflation than countries with other monetary frameworks.
- *Jane Bogoev* (FYR Macedonia²), National Bank of the Republic of Macedonia, investigates in his paper the bank lending channel for FYR Macedonia based on bank balance sheet data, distinguishing between domestic and foreign currency loans. Based on a quarterly dataset comprising 20 banks over the period from 2000 to 2008, he finds that the bank lending channel is mainly relevant for foreign currency loans, which react to changes in the foreign reference rate. This leads him to conclude that the increasing trend of foreign currency lending in FYR Macedonia may reduce the effectiveness of monetary policy.
- *Rilind Kabashi* (FYR Macedonia), PhD student at Staffordshire University (U.K.) and analyst at the National Bank of the Republic of Macedonia, examined the response of the primary budget balance to a set of macroeconomic and institutional variables in the 27 EU Member States and 6 Western Balkan countries. This very careful econometric analysis is among the first to provide respective empirical evidence for the Western Balkans. His estimations of a fiscal reaction function show that there are considerable differences in the cyclical character and determinants of fiscal policy between old EU Member States and transition countries. Most notably, discretionary policy in transition countries is procyclical,

¹ *Winners in alphabetical order.*

² *The former Yugoslav Republic of Macedonia.*

thus aggravating economic fluctuations, a result which is robust to various extensions and checks.

- *Krisztina Orbán* (Hungary), Central European University, explored the relationship between trade links and banking relationships, using a newly established firm-level dataset which she constructed from officially available national data sources. She finds evidence of significant differences between banking characteristics of exporting and non-exporting firms as well as a significant relationship between exporting and banking with the same country. While the analysis cannot answer the question of causality between banking and exporting, it shows that financial flows can help and might increase trade flows.

EBRD Transition Report 2012: Integration across Borders

Compiled by
Mariya Hake

On January 30, 2012, the Oesterreichische Nationalbank (OeNB) and the Austrian Ministry of Finance (BMF) for the first time jointly organized the presentation of the EBRD¹ Transition Report showcasing findings of the 2012 Transition Report and the January 2013 update of the EBRD's growth forecasts for Central, Eastern and Southeastern Europe (CESEE). The event took place at the premises of BMF and was opened by *Harald Waiglein*, Head of the BMF's Directorate General Economic Policy and Financial Markets, and OeNB Governor *Ewald Nowotny*.

In their opening remarks, both Waiglein and Nowotny underlined the importance of the EBRD Transition Report as a flagship publication for the analysis of the CESEE countries. In addition, they emphasized the strong relevance of the CESEE region for the Austrian economy, given the deep common historical roots, the geographical proximity of the CESEE region to Austria and the manifold economic and financial interlinkages. Moreover, both speakers stressed the strong CESEE commitment of both Austria and the EBRD within the framework of the Vienna initiative and its follow-up, the Vienna 2.0 initiative, with the aim of crisis management as well as crisis prevention after the outbreak of the 2008/2009 economic and financial crisis.

At the press conference, *Jeromin Zettelmeyer*, the EBRD's Deputy Chief Economist and Director of Research, summarized the EBRD's new growth forecasts for the countries in which it operates (the EBRD region)² and outlined the most important findings of the EBRD Transition Report 2012 "Integration across borders." The main contributions of the 2012 Transition Report are to provide a critical analysis of the European Union's plans for a banking union and possible modes of integration of the non-euro area and non-EU emerging European countries; moreover, the report presents an assessment of the recently established customs union between Russia, Belarus and Kazakhstan.

Part I: Economic Prospects in the EBRD Region – The Impact of the Euro Area Crisis on the Transition Region

The EBRD expects that GDP growth in the transition countries (including the SEMED countries) will rise moderately from about 2.6% in 2012 to 3.1% in 2013, though growth will remain slower than in the recovery year 2011. At the same time, only Hungary and Slovenia are expected to post negative growth for the second consecutive year in 2013. The general deceleration of the economic expansion in 2012, especially in many of the most exposed CESEE countries, can be attributed largely to the continued external pressures from the euro area countries. However, signs of bottoming out could be observed, as exports have started to recover and as net capital flows have slowly returned to some CESEE countries, most notably the Baltic countries. In addition, on the back of progress in key policy areas in the euro area, such as the establishment of a banking union and of medium-term fiscal frameworks, the pressure on the region's parent banks has eased. This in turn has lowered the speed of cross-border deleveraging, improving

¹ European Bank for Reconstruction and Development.

² The EBRD recently expanded its coverage to include 30 countries ("the EBRD region") ranging from Central and Eastern Europe to Central Asia, which includes Turkey. Recently, the EBRD expanded the scope of its operations to include Egypt, Morocco and Tunisia, i.e. the southern and eastern Mediterranean countries (SEMED). Effective from 2008, the Czech Republic was the first country to graduate from the EBRD.

funding conditions for the region's banks. However, credit growth remains negative in most new EU member countries on the back of tightened supply conditions alongside weak local demand.

Nevertheless, growth prospects in the EBRD region are still overshadowed by external and domestic macrofinancial downside risks, such as negative spillovers through both real and financial channels from a possible deepening of the euro area crisis. In particular, an analysis based on EBRD vulnerability to the euro area shows that countries in CEE (Central and Eastern Europe; in particular Hungary and the Baltic states) and SEE (Southeastern Europe; in particular Bulgaria, Romania and Croatia) are most exposed, while the most vulnerable CIS (Commonwealth of Independent States) and SEMED countries are Ukraine and to a lesser extent Russia, Morocco and Tunisia. Their vulnerability is elevated because they have high shares of nonperforming loans, a significant share of foreign currency debt, high external debt, falling capital inflows and high and rising unemployment.

Part II: The Eurasian Customs Union: An Early Empirical Assessment

In the second part of his presentation, Zettelmeyer elaborated on the benefits and challenges of the Eurasian customs union (among Russia, Kazakhstan and Belarus) effective since January 2011. The customs union could potentially have multiple benefits: (1) it might help Russia to diversify its export structure; (2) it could benefit producers within a regional integration grouping through increased market size; and (3) it could serve as a first step toward the expansion of exports from a regional area to a worldwide base. On the downside, however, one can expect trade diversion effects vis-à-vis nonmembers; this aspect must be evaluated in greater depth. Moreover, given the dominance of the Russian economy, asymmetries on account of the size of the economies in the customs union could become an obstacle to reaping benefits. Finally, it was stressed that outward-oriented commodity exporters face substantial challenges, not least due to the effort to harmonize taxation of commodity exports.

The EBRD pinpoints the following key challenges to the customs union: lowering nontariff barriers to trade, improving the cross-border infrastructure, limiting the use of tariff barriers with other countries, and extending liberalized market access to the service sector. So far, the tariff-related impact on trade has been assessed to be small, with only Russia experiencing trade creation effects, and Belarus and Kazakhstan mainly facing trade diversion effects because they have higher trade barriers to China and the EU. Zettelmeyer also outlined that in spite of the low quality of national institutions within the Eurasian Economic Community (which the participants share as a common feature), the customs union creates the potential for improvement through the strong demonstration effect of supranational institutions with good governance.

Part III: A Banking Union for the Euro Area and Beyond: Implications for Emerging Europe

In the third part of his presentation, Zettelmeyer turned his attention to possible solutions of cross-border supervision problems within the framework of the euro area banking union and outlined a practical approach to the integration in the banking union of both non-euro area EU member countries and non-EU emerging European countries. In particular, focusing on counterbalancing a "host-country"

and a “home-country” view (e.g. due to fiscal burden sharing for cross-border banks as well as supervisory responsibility problems), the report recommends that the euro area countries establish governance structures that give small euro area countries a sufficient voice. Additionally, the creation of a loss-sharing rule to mitigate moral hazard was proposed; its purpose is to ensure that the European Stability Mechanism is primarily about catastrophic loss insurance. Despite the progress made in December 2012,³ challenges remain; they consist in finding approaches to incorporate the financially integrated non-EU countries. Possible solutions could be to confer an “associate member” status on the euro-area banking union, whereby the ECB should commit itself to providing euro liquidity for every period in return for information-sharing. Accordingly, Zettelmeyer outlined that the coordination problem should be mitigated by defining a regime in which the host country authorities and the ECB would share responsibility for subsidiaries and parent banks operating in the host countries.

The discussion that ensued after the presentation reiterated the observation that besides adverse external shocks, country-specific policy challenges remain in some CESEE and CIS countries (e.g. Hungary and Ukraine). In addition, it was pointed out that Ukraine was also under institutional reform pressure from the European Union. Finally, Zettelmeyer noted that despite the wealth of reforms implemented in the CESEE countries and their calming effect on the credit market, downside risks still prevail, not least because demand-side challenges remain.

³ *Agreement between the European Parliament, the ECB Council and the European Commission was reached on December 12, 2012, to establish a single supervisory mechanism (SSM) within the ECB that would be open to non-euro area members.*

72nd East Jour Fixe: External Imbalances and Adjustment to the Crisis in CESEE¹

Introduction

The 72nd East Jour Fixe, hosted by the OeNB on February 18, 2013, discussed the evolution of macroeconomic imbalances in Central, Eastern and Southeastern Europe (CESEE) before and after the 2008–09 crisis and their underlying drivers. The topic was approached from different viewpoints, as the individual speakers touched on a great number of aspects related to both trade and financial flows as well as external debt. Apart from highlighting the role that such imbalances played in aggravating the region's downturn during the global crisis, the workshop also took a forward-looking view and provided for a discussion of whether external and internal adjustment processes have been sufficient to date and whether individual policy responses have proven to be appropriate and effective.

In her introductory remarks, *Doris Ritzberger-Grünwald*, head of the Foreign Research Division at the OeNB, pointed out that external imbalances have become a prominent topic in the euro area in recent years and a range of additional tools to monitor macroeconomic developments have been developed as a response to the crisis developments in some euro area countries. However, the topic is also of great relevance for the emerging economies in CESEE. In this respect, Ritzberger-Grünwald particularly emphasized the heterogeneity in the region in terms of both the buildup of external imbalances prior to the crisis and the reactions in individual countries during the crisis.

Keynote on “Imbalances in CESEE: Past and Future”

In his keynote address, *Boštjan Jazbec* from the University of Ljubljana reviewed the transition process from its very onset and analyzed factors which had supported the buildup of large imbalances, and hence vulnerability to the crisis, in the CESEE region. He pointed out that in many CESEE countries capital mobility had largely preceded trade liberalization, thus creating distortions in the financial and real sectors of these countries. He also postulated that capital flows had often been wasteful rather than useful as banks mostly invested in collateralizable sectors given weak institutions in the recipient countries. Thus, instead of fostering investment to build repayable capacities, capital flows were primarily directed toward consumption, construction and the trade sector and therefore did not sufficiently support new ventures and greenfield investment. Despite past and current institutional weaknesses, Jazbec identified clear progress in investor protection and contract enforcement in the region. In addition to improvements in the institutional setting, he outlined the following policy options to unlock the region's growth potential: fiscal consolidation, internal devaluation (while cautioning that the initial cost advantage has largely been taken away by competition from Asia), structural policies aimed at increasing productivity, stricter prudential standards and supervisory cooperation and coordination between home and host countries. Jazbec concluded with the observation that the countries are moving in the right direction but that it will take longer to reach convergence than expected at the outset of the transition process.

Compiled by
Mathias Lahnsteiner
and Julia Wörz

¹ The presentations and the workshop program are available at <http://ceec.oenb.at> (Events).

In the discussion, Jazbec agreed that his analysis referred particularly to the situation in the countries of former Yugoslavia and other Southeastern European countries and stressed the example of Slovenia, where institutional weakness has been painfully revealed recently despite the economy's comparatively advanced stage according to per capita income levels.

Determinants of Crisis Severity in CESEE

The first session provided an overview of pre- versus post-crisis imbalances in CESEE, focusing in particular on external imbalances and related external and internal adjustment processes. Furthermore, determinants of vulnerability and their explanatory power for the severity of the downturn in individual countries were analyzed.

Martin Feldkircher, economist in the OeNB's Foreign Research Division, presented evidence on macrofinancial determinants that indicate vulnerability to the global financial crisis based on a country sample of 63 emerging and advanced economies. The main results revealed that pre-crisis growth in domestic credit had amplified the real downturn. This holds true for several measures of crisis severity including those that assess the impact of the crisis on the growth cycle (long-term perspective) as well as on the business cycle (short-run perspective). Feldkircher furthermore stressed the detrimental effect of funding from foreign banks given excessive domestic credit growth in the years preceding the crisis. In other words, the simultaneous risk of overheating in the credit market and dependence on foreign funding makes a country particularly vulnerable to a global shock.

Irina Bunda, economist at the Joint Vienna Institute, supported the view that a credit-fueled pre-crisis boom had led to a more severe crisis reaction. Hence, external indebtedness and gross external financing needs were high in countries hit hard by the crisis. She guided the audience through a detailed presentation of the most important elements of the IMF's External Debt Sustainability Analysis, which identified, on a country-by-country basis, different factors as the most important drivers of the increase in external debt during the crisis. While the sudden growth reversal played a major role in the Baltic countries, price and exchange rate developments exerted a strong influence in Poland, Romania, Russia and Ukraine. In turn, persistent current account deficits had a substantial impact in many Balkan countries. Although adjustments are under way, vulnerabilities remain and external financing needs continue to hover around their 2007 levels. Further current account adjustments and the projected pickup in growth should, however, put the high external debt on a declining path.

The third speaker in this session, *Ettore Dorrucci*, Head of the Convergence and Structural Analysis Unit in the ECB's EU Countries Division, focused on rebalancing in the non-euro area CESEE EU countries. He started by analyzing current account drivers from an exchange rate-regime perspective and illustrated the cushioning effects of a flexible exchange rate, which were, however, not without pain: Exchange rate adjustments also led to currency mismatches in the balance sheets (particularly in Hungary). In contrast, countries with a fixed exchange rate achieved substantial internal devaluation during the crisis, which was supported further by fiscal consolidation, external factors (such as commodity price developments) and the fact that all CESEE countries are small and highly

open economies and hence price takers. Turning to debt drivers in the region, Dorrucchi analyzed them from a (de)leveraging perspective. In line with the previous speakers, he also noted the role of pre-crisis credit growth financed by external borrowing in creating a demand boom. He pointed out strong deleveraging in Latvia, Lithuania, Hungary and Bulgaria during the crisis and added that in the two Baltic countries, high net savings in the private sector had driven the correction of imbalances. Exchange rate targeters had pursued more prudent fiscal policies prior to the crisis compared with inflation targeters. According to Dorrucchi's analysis, the question whether rebalancing has been temporary or permanent is still open. There have been gains in export market shares for most countries in the region (except Hungary), but the debt levels are persistent. The high debt burden of the private sector and vis-à-vis nonresidents implies a need for balance sheet repair with negative consequences for the growth outlook. Despite improvements in flow variables, there is still a legacy of debt overhang in some countries. He concluded by alluding to persistent bottlenecks in labor markets and lacking flexibility in product markets in the region and stressed the need for structural reforms to enhance competitiveness.

The subsequent discussion centered on the particular experience of the Baltic countries, the type of structural reforms necessary and the role of economic policy in the adjustment process. Feldkircher pointed out that his results are robust to excluding the Baltic countries from the sample. With respect to structural reforms, Dorrucchi emphasized the need for implementing improvements in the judicial system, cutting red tape further and fighting corruption. He also pointed out the policy leverage inherent in EU accession and ERM II entry but at the same time stressed the importance of national ownership of reforms.

Policy Responses to the Crisis – Case Studies

The second session, chaired by *Peter Backé*, Deputy Head of the OeNB's Foreign Research Division, started with insights into country experiences, namely those of Latvia and Slovakia.

Uldis Rutkaste, Head of the Monetary Policy Department at Latvijas Banka, gave a comprehensive presentation on Latvia's road to recovery. He explained that Latvia was more successful in overcoming the crisis than in preventing imbalances before the crisis. As a starting point, he recalled the fact that Latvia had entered the crisis as the EU's most overheated economy. Moreover, he argued that policy mistakes (procyclical fiscal policy, shortcomings in financial sector regulation) contributed to the economy's vulnerability. As a reaction to the strong impact of the crisis, Latvia implemented a large and frontloaded fiscal consolidation package, which was underpinned by structural reforms. The implementation of fiscal consolidation measures was followed by the resumption of growth, as confidence in the Latvian financial markets and in the real economy was restored. Growth has also been supported by regained competitiveness. In particular, Latvia's quality-adjusted relative export prices have declined notably in recent years, which helped regain external sustainability, as shown by a small current account deficit. Rutkaste concluded by stating that Latvia aimed to adopt the euro in 2014 and went on to outline the progress with respect to convergence from this angle.

Ján Tóth, Deputy Governor of Národná banka Slovenska, focused his presentation on the Slovak experience in comparison with five other Central European

economies. Tóth pointed out that Slovakia underwent the biggest structural reforms during the 2003–2006 period. These reforms helped Slovakia attract considerable volumes of FDI. Moreover, the overall impact of the reforms on the economy helped dampen the effects of the crisis in Slovakia. The adoption of the euro, according to Tóth, was “the only big thing” happening in the Slovak economy since 2006. He emphasized that the crisis reached Slovakia mainly through a trade shock. Even though exports from the Czech Republic, Poland and Hungary benefited from depreciating currencies, Slovakia – as a euro area country – nevertheless managed to keep pace with the export recovery of the countries with floating exchange rates and to regain the initial loss in export market shares relatively quickly. The crisis had, however, a larger impact on employment and total hours worked in the manufacturing sector in Slovakia than in countries with floating exchange rate regimes.

Questions coming from the audience in the ensuing discussion addressed the role of EU funds in Latvia and the partial dilution of reforms in Slovakia over the last year. Rutkaste explained that Latvia improved the absorption and use of such funds during the crisis and that these funds have played an important role in financing the needed adjustment in several areas. Tóth called for measures to increase the flexibility of the Slovak economy and for more fiscal space in order to decrease the vulnerability to future shocks.

Policy Lessons Learned?

In the second part of session 2, *Gillian Edgeworth*, Chief EEMEA Economist at UniCredit Research, dealt with policy lessons learned and challenges that lie ahead in CESEE. As a way of introduction, she argued that the crisis has improved policymakers’ understanding of fiscal and external risks. She then took a closer look at capital flow dynamics before and during the crisis. Edgeworth underscored that the composition of pre-crisis capital flows to CESEE was “better” than that of flows to other regions (for example the euro area periphery), “but not perfect.” According to Edgeworth, the new EU Member States saw strong net FDI inflows, a considerable part of which went to the tradable sector. She also argued that the high share of foreign ownership in the banking sector helped smooth output in CESEE in 2008–09. Turning to the most recent years, Edgeworth expressed concerns about the changing composition of capital flows to CESEE. In this respect, she pointed to a higher share of portfolio inflows and the generally shorter-term nature of capital inflows. Risks would also stem from the still-high level of external debt and low global interest rates. Against this background, she questioned whether all CESEE countries were prepared in case another shock hit the region. In her concluding statement, Edgeworth called for a more ambitious approach to integrating the newer EU states into the European banking union that is currently being set up.

Subsequently, the floor was taken over by *João Nogueira Martins* from the European Commission, who heads the DG ECFIN unit that coordinates the implementation of the EU’s Macroeconomic Imbalances Procedure (MIP), a new component in the toolbox of European economic governance. As Nogueira Martins highlighted, the MIP aims at identifying elements that could lead to boom-bust cycles. The analytical part of the MIP relies on an alert system that uses a scoreboard of indicators that are benchmarked against threshold values as well as

in-depth country studies. He stressed that the scoreboard is not designed to be applied mechanically. Instead, it has an indicative function, and Nogueira Martins pointed out that there is clearly a need to take a holistic look when assessing indicators that exceed threshold values. Asked whether country-specific thresholds in the scoreboard would be more appropriate, he argued that such an approach would be too complex to implement. Reflecting on the situation in the EU, he admitted that the Commission's concerns are currently more in the west than in the east. This year, the Commission is carrying out an in-depth review for 14 EU Member States, of which only three are located in the CESEE region. In general, Nogueira Martins mentioned three fields of major concern: high private sector debt, losses in competitiveness and external imbalances, both with respect to the current account and/or the net international investment position of several Member States.

Notes

Studies Published in Focus on European Economic Integration in 2012

For more information, see www.oenb.at.

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Residential Property Markets in CESEE EU Member States
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Spillovers of the Greek Crisis to Southeastern Europe:
Manageable or a Cause for Concern?
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Not So Trustworthy Anymore? The Euro as a Safe Haven Asset in Central,
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Selected CESEE Countries from a Stochastic Debt Sustainability Analysis
Markus Eller, Jarmila Urvová

The Impact of Memories of High Inflation on Households' Trust in Currencies
Elisabeth Beckmann, Thomas Scheiber

Periodical Publications

See www.oenb.at for further details.

Geschäftsbericht (Nachhaltigkeitsbericht) Annual Report (Sustainability Report)

German
English

This report reviews the OeNB's mandate, responsibilities and organization as well as the monetary policy of the Eurosystem, economic conditions and developments both in the financial markets and in financial market supervision during the reporting year. Furthermore, it contains the OeNB's financial statements, Intellectual Capital Report and Environmental Statement.

Konjunktur aktuell

German

This online report provides a concise assessment of the current state of the global economy and the economic situation in the euro area, Central, Eastern and Southeastern Europe (CESEE) and Austria. Furthermore, it analyzes major developments in financial markets and the performance of Austrian banks. The report is published in January, March, April, June, September, October and December; issues published at the end of a quarter additionally contain brief analyses of special economic and monetary policy topics.

Geldpolitik & Wirtschaft Monetary Policy & the Economy

German
English

Monetary Policy & the Economy provides analyses and studies on central banking and economic policy topics and is published at quarterly intervals.

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

German
English

This semiannual publication provides a snapshot of Austria's economy based on a range of real and financial variables, which are also put into an international perspective.

Financial Stability Report

English

This semiannual report contains analyses of Austrian and international developments with an impact on financial stability and studies designed to offer in-depth insights into specific financial stability-related topics.

Focus on European Economic Integration

English

This quarterly publication presents peer-reviewed studies on macrofinancial 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.

Statistiken – Daten & Analysen

German, English summaries

This quarterly publication contains analyses of Austrian financial institutions, cross-border transactions and positions as well as financial flows. 14 tables provide information about macroeconomic, financial and monetary indicators. In addition, this series includes special issues on selected statistics topics published at irregular intervals.

Research Update

English

This quarterly newsletter is published online (www.oenb.at/research-update) and informs readers about selected findings, research topics and activities of the OeNB's Economic Analysis and Research Department.

Proceedings of OeNB Workshops

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These proceedings contain papers presented at OeNB workshops at which national and international experts discuss monetary and economic policy issues.

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This online series provides a platform for the publication of studies by OeNB economists or external authors on particular monetary policy topics.

Conference Proceedings of the OeNB's Economics Conference

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These proceedings contain contributions to the OeNB's annual Economics Conference, an international platform for exchanging views and information on monetary and economic policy as well as financial market issues.

Conference Proceedings of the OeNB's Conference on European Economic Integration

English

These proceedings contain contributions to the OeNB's annual Conference on European Economic Integration (CEEI), which focuses on Central, Eastern and Southeastern European issues and the ongoing EU enlargement process.

Publications on Banking Supervision

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Addresses

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

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