OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

FOCUS ON EUROPEAN ECONOMIC INTEGRATION

Stability and Security.

Q1/15

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

Publisher and editor	*Oesterreichische Nationalbank* *Otto-Wagner-Platz 3, 1090 Vienna* *PO Box 61, 1011 Vienna, Austria* *www.oenb.at* *oenb.info@oenb.at* *Phone (+43-1) 40420-6666* *Fax (+43-1) 40420-046698*
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Layout and typesetting	*Walter Grosser, Birgit Jank*
Design	*Communications and Publications Division*
Printing and production	*Oesterreichische Nationalbank, 1090 Vienna*

DVR 0031577

ISSN 2310-5259 (print)
ISSN 2310-5291 (online)

Printed according to the Austrian Ecolabel guideline for printed matter.

Please collect used paper for recycling.

EU Ecolabel: AT/28/024

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Call for Entries: Olga Radzyner Award 2015 for Scientific Work on European Economic Integration

In 2000, the Oesterreichische Nationalbank (OeNB) established an award to commemorate Olga Radzyner, former Head of the OeNB's Foreign Research Division, who pioneered the OeNB's CESEE-related research activities. The award is bestowed on young economists for excellent research on topics of European economic integration and is conferred annually. In 2015, 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 co-authored work, each of the co-authors has to fulfill all the entry criteria.

Authors shall send their submissions either by electronic mail to *eva.gehringer-wasserbauer@oenb.at* or by postal mail – with the envelope marked "Olga Radzyner Award 2015" – to the Oesterreichische Nationalbank, Foreign Research Division, POB 61, 1011 Vienna, Austria. Entries for the 2015 award should arrive by September 4, 2015, at the latest. Together with their submissions, applicants shall provide copies of their birth or citizenship certificates and a brief CV.

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

Call for Applications: Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers for participation in a Visiting Research Program established by the OeNB's Economic Analysis and Research Department. The purpose of this program is to enhance cooperation with members of academic and research institutions (preferably postdoc) who work in the fields of macroeconomics, international economics or financial economics and/or pursue 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 three and six 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 2015 should be e-mailed to *eva.gehringer-wasserbauer@oenb.at* by May 1, 2015.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2015.

Studies

Sectoral Deleveraging in Europe and Its Economic Implications

Martin Gächter,
Martin Geiger,
Florentin Glötzl,
Helene Schuberth[1]

We examine net lending/net borrowing and the underlying debt dynamics at the sectoral level in the European Union. Saving and investment patterns indicate that there have been considerable deleveraging efforts since the start of the global financial crisis, particularly in the nonfinancial corporate and household sectors. In many EU countries, however, this decline in credit transactions has not yet led to a significant reduction of sectoral debt-to-GDP ratios. Subdued output growth and low or even negative inflation rates have undermined the deleveraging process and increased real debt burdens in a number of European economies. Since these are often the countries that had experienced strong credit booms prior to the crisis, rebalancing needs are likely to persist and may be a significant drag on the recovery in the near future. Furthermore, most of the ongoing rebalancing – both in terms of debt levels and current account deficits – is based on a sharp decline in investment rather than an increase in saving, which might lead to lower potential growth in the future. Recent developments may even jeopardize the catching-up process of peripheral euro area countries and non-euro area EU Member States in Central, Eastern and Southeastern Europe.

JEL classification: E22, E24, E44, G21, G31
Keywords: balance sheet recession, financial accelerator, credit crunch, investment

The slow recovery after the Great Recession in the United States and the double-dip recession in many European countries turned the spotlight on the role of deleveraging and balance sheet repair, particularly in the private sector among households and businesses. Sectoral deleveraging needs may seriously impair investment and employment, and thus might have long-term effects on potential growth rates. In 2013, the average level of real gross fixed investment in the EU (euro area) was still 17% (18%) below the peak reached in 2008 (European Commission, 2014). The decline in investment has been particularly sharp in stressed economies of the euro area where investment has fallen by up to more than 50%, while the fall has been less severe in Central, Eastern and Southeastern Europe (CESEE). A consensus view seems to emerge that the reasons for this extraordinary decrease in investment activity might be the combined effect of credit constraints and demand factors, and embedded negative feedback loops pushing some of the countries into a balance sheet recession. In such a situation, the companies' (and households') balance sheet positions themselves have an impact on investment decisions, irrespective of credit constraints. When the bubble bursts, asset prices collapse, but liabilities remain in nominal terms, forcing the household and corporate sector to increase savings or pay down debt at low or zero interest rates rather than to invest.

This study focuses on the current sectoral rebalancing challenge in Europe. We look at debt developments from different angles to investigate whether we can identify rebalancing efforts and whether these efforts lead to a reduction of sectoral debt levels. Moreover, we study the gap between saving and investment and draw conclusions for both growth perspectives and the catching-up process. Bakker and

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Zeng (2013) suggest that national economic environments as well as the need to adjust balance sheets are extremely heterogeneous among European economies. While we are able to identify rebalancing efforts in almost all countries, these efforts do not systematically materialize in a reduction of debt levels due to low growth and deflationary pressures in a number of countries. Against the background of prevailing rebalancing needs, deleveraging efforts may continue to drag on the recovery and the catching-up process. Therefore, in the following analysis we aim to give an overview of current sectoral deleveraging efforts and their economic implications across European countries.

The paper proceeds as follows. Section 1 reviews the relevant literature, while section 2 presents our empirical results. Section 2.1 approaches the issue of deleveraging in Europe by simply looking at net lending/net borrowing and sectoral debt-to-GDP ratios so as to identify deleveraging efforts and whether they materialize in decreasing debt levels. Section 2.2 studies the development of debt ratios by decomposing the change in debt levels into contributions from actual transactions, other changes as well as GDP growth and inflation. Section 2.3 examines saving/investment patterns underlying the net lending/net borrowing balances and analyzes how these developments affect current account balances. In section 2.4, we relate our findings on deleveraging to possible implications for growth and the catching-up process both within the euro area and between the CESEE region and the older members of the European Union. Finally, section 3 presents our conclusions.

1 Theoretical Background

Richard Koo (2009, 2011) coined the term balance sheet recession to highlight the crucial role of household and corporate sector balance sheets in Japan's lost decade and the sluggish recovery following the global financial crisis in 2008. Contrary to an ordinary recession, a "lost decade" recession, according to Koo, is characterized by many agents in the private sector minimizing debt instead of maximizing profits following the burst of an asset price bubble: Households and businesses have to increase savings to pay down debt, as liabilities remain high although asset prices have plummeted. This, in turn, reduces aggregate demand. During this special type of recession, people with high debt are reluctant to borrow regardless of the prevailing interest rate. In a balance sheet recession, due to the zero lower bound, the real interest rate cannot decrease sufficiently, and unborrowed funds remain in the economy. As expansionary monetary policy turns out to be ineffective in bringing the economy back to equilibrium, the decline in aggregate demand is equivalent to the saved but unborrowed funds, and the economy is in danger of entering a debt deflation spiral (Koo, 2014).

In a similar vein, Bornhorst and Arranz (2013a, 2013b) highlight the fact that countries in which private sector debt had surged prior to the financial crisis have had worse economic outcomes during the recovery phase. This effect is caused both by the negative impact of household debt on consumption as well as that of corporate debt on investment. Further, Cecchetti et al. (2011) find that the negative impact of debt in one sector (households, nonfinancial corporations, government) on real economic growth is positively linked to the level of indebtedness in other sectors. According to their analysis, simultaneous deleveraging in all sectors is therefore particularly harmful for economic growth. Claessens et al.

(2009) and Jordà et al. (2013) confirm that stronger precrisis credit booms tend to be followed by deeper recessions and slower recoveries, while financial crises further exacerbate those shocks and often lead to pronounced deflationary pressure.

Prior to the Great Recession starting in 2008, standard macroeconomic models mostly relied on the assumption of perfect capital markets, and therefore, financial markets hardly existed in those standard models.[2] While Koo (2009) brought the crucial role of debt and balance sheet positions back on the table, his idea is not entirely new but rather combines various lines of reasoning from the last century: Fisher (1933) already argued that over-indebtedness and deflation following soon after were the two main factors that made the Great Depression different from other recessions. According to his argument, over-investment and over-speculation are often essential for explaining deep recessions, but the two would be far less serious were they not based on borrowed money. Fisher's paper also highlights an adapted form of the Keynesian paradox of thrift, namely the paradox that the more debtors pay (i.e. save), the more they owe because the net present value of their debt increases due to the deflation they cause. He concludes with a crucial insight: When over-indebtedness is so great as to depress prices faster than liquidation, the joint effort to get out of debt pushes the economy into even more debt and may ultimately lead to a *debt deflation* spiral. While Fisher points to deflation as the key driver, Koo (2009) argues that deflation is a result, rather than a cause, of prolonged recessions. In a balance sheet recession, plunging asset prices are the key driver, forcing businesses to shift from profit maximization to debt minimization in order to repair their balance sheets. In the same line of argument, Mishkin (1978) highlights the role of household balance sheets and liquidity in the decline in aggregate demand during the Great Depression. In a similar vein, Mian and Sufi (2011, 2012) highlight the strong link between asset prices and household borrowing, and thus the crucial role of household balance sheets for economic activity. In fact, the findings by Mian and Sufi (2011) even suggest that household balance sheet shocks were a significant cause of the aggregate demand shock and explain almost two-thirds of the jobs lost between 2007 and 2009.

The work by Minsky (1986) is also connected to the idea of balance sheet recessions. He argues that the financial system itself is unstable and procyclical, as companies (and households) accumulate debt in boom phases, which leads to speculative bubbles. When the bubble bursts, the companies are unable to repay their debts from incoming cash flows, and a financial crisis emerges – the so-called Minsky moment. At the same time, lenders tighten their lending standards, even solvent companies are unable to get credit, and the economy moves into recession.

Also closely related, Bernanke (1983) was the first to argue that in a financial crisis, the real costs of intermediation are likely to increase due to incomplete financial markets, and therefore, the financial sector was one of the reasons for the rapid decline in output during the Great Depression. This idea was further devel-

[2] *There are a few exceptions in the literature. For instance, the models put forward in Bernanke and Gertler (1989) and Kiyotaki and Moore (1997) explicitly consider credit and financial aspects. For a recent review, see Gertler and Kiyotaki (2010).*

oped in Bernanke and Gertler (1989), who argue that information asymmetries make the Modigliani-Miller theorem (1958) inapplicable, which means there are significant interactions between real and financial factors in the economy. The decline in agency costs during booms and their rise during recessions, which is due to the procyclicality of borrower net worth, leads to an accelerator effect on investment. Those kinds of interdependencies are commonly referred to as the *financial accelerator,* a term introduced by Bernanke et al. (1996).

Eggertsson and Krugman (2012) explicitly consider the theoretical arguments put forward by Fisher (1933), Minsky (1986) and Koo (2009) and present a corresponding New Keynesian model which includes debt constraints for some agents. Those constraints lead to forced deleveraging and a rapid decline in aggregate demand. A shock to the debt limit (e.g. a plunge in asset prices) forces borrowers to save more and cut spending. As a result, the real interest rate needs to decline due to lower demand for borrowed funds. If the deleveraging shock is relatively small, the decline in the interest rate will pick up the slack and the output level will still be at its potential. In the case of a large shock, however, the economy is at the zero lower bound, and output falls below potential. The larger the shock, the larger is the decline in both output and prices, possibly resulting in Fisherian debt deflation. The paradox of thrift as well as the paradox of toil, as described in Eggertsson (2010), are crucial in this context, as both effects reinforce the output contraction and the debt deflation spiral. Besides the crucial role of inflation expectations, Eggertsson and Krugman (2012) propose (temporary) government spending as the solution, because the government is not (severely) debt constrained and because expansionary fiscal policy (i) does not lead to crowding-out effects and (ii) has a higher multiplier given the liquidity-constrained debtors and the effect on prices.[3]

From a historical perspective, empirical research suggests that accelerated financial sector growth is often followed by financial contractions (Aizenman et al., 2013) and that the increase in the nonfinancial private sector's debt during boom periods tends to be reversed (see Tang and Upper, 2010). Given that the reduction of private debt levels relative to GDP has been quite limited in the euro area, further deleveraging seems likely, which may severely affect the real economy (Aizenman et al., 2013). Additionally, most debt reductions after past crisis episodes were passive, i.e. firms and households did not actively pay down debt. Instead, the real value of their debt was eroded by inflation and income growth. In light of the currently low inflation rate and the very sluggish recovery associated with low real GDP growth, the contribution to debt reduction from those two factors will be limited indeed (Bornhorst and Arranz, 2013a). The deleveraging process will therefore rely more on people paying down debt, which is likely to put additional stress on the private sector.

[3] *From a long-run perspective, the concept of balance sheet recessions is also closely related to the idea of secular stagnation, as originally proposed by Hansen (1939) and recently revisited by many leading economists, including Summers (2013) and Krugman (2013). One possible implication of secular stagnation is that negative real interest rates are required to equate saving and investment with full employment (Teulings and Baldwin, 2014). Furthermore, low inflation and monetary policy stuck at the zero lower bound make it much harder to achieve full employment.*

2 Empirical Results

The dataset used for the following analysis is the quarterly euro area accounts, as available through the ECB's Statistical Data Warehouse. It consists of a system of interlinked accounts and records all nonfinancial and financial transactions, other changes and balance sheets for the institutional sectors of EU countries (for a more detailed description, see Eurostat and ECB, 2007; Eurostat 2009). The data cover the time period from 1999 (Q1) to 2013 (Q3).[4] In addition, we also use annual data from the AMECO database for some variables where the information is not available for all countries in the former database.

Earlier papers have shown that accelerating credit growth increases the probability of financial crisis (Jordà et al., 2011) and leads to deeper recessions in the bust phase of the business cycle (Jordà et al., 2013). For the global financial crisis starting in 2008, the same pattern can be observed in our sample of European economies: The more countries had increased their total debt levels, the lower their GDP growth was during the recession and the stronger the increase in unemployment during the crisis.

In this respect, many European economies are currently facing a dilemma: On the one hand, deleveraging of highly indebted economic sectors seems necessary to correct for both internal and external imbalances and to get a sustainable recovery off the ground. Advocates of this approach commonly argue that debt-related problems in stressed economies cannot be solved by building up even more debt. On the other hand, however, the deleveraging process across sectors dampens economic activity, which may also prove harmful for debt sustainability. Additionally, falling prices (or very low inflation rates) lead to a further increase in the real burden of debt and have the potential of bringing Europe to the brink of a debt deflation spiral. In a first step, we therefore aim at tracing the weakness of aggregate demand currently observed in many countries to deleveraging pressures at the sectoral level.

2.1 Changes in Net Lending/Net Borrowing Balances across Sectors

Chart 1 shows net-lending/net-borrowing (NLNB) balances and the corresponding debt ratios in percent of GDP by institutional sectors in the euro area, while chart 2 shows some results for individual countries. While debt ratios relative to GDP are a rough indicator of debt sustainability,[5] they have also been studied with respect to their possible implications for consumption and investment behavior. The NLNB balance, on the other hand, essentially reflects the balance between saving and investment by institutional sectors.[6] If the NLNB balance is negative, this should be reflected either in increasing (gross) debt levels (i.e. if the financing

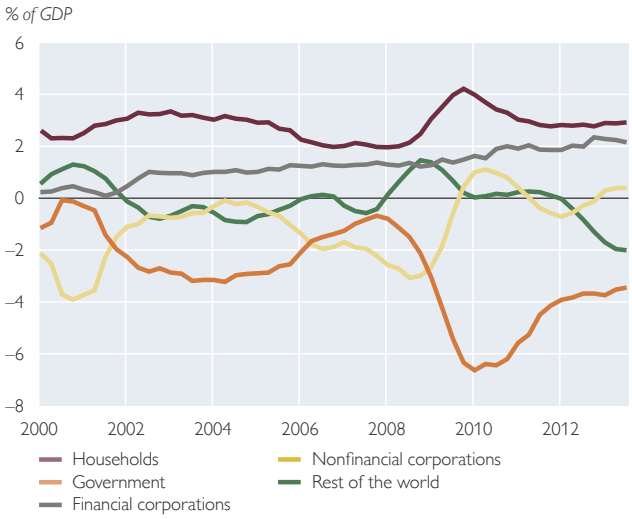
[4] *Given the recent switch in reporting standards from the European System of Accounts (ESA) 1995 to the new ESA 2010 standards, some time series in this study may have changed considerably. While this is clearly a limitation of our study, it is currently impossible to use data under ESA 2010, as many time series are not yet available. Furthermore, while some level changes could be remarkable, the overall analysis and conclusions should not be severely influenced by those classification changes.*

[5] *In chart 2 (right panel) financial corporations are not included in total (sectoral) debt levels, as we want to focus on the real economy. Furthermore, (most of) the financial corporations' debt would simply be the other side of the coin, i.e. the debt levels of the other sectors would simply show up in the financial sector.*

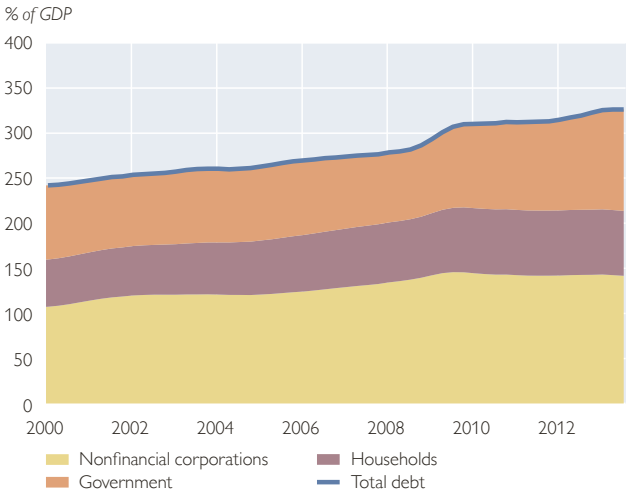
[6] *NLNB is derived by comparing gross capital formation plus the net acquisition of nonproduced, nonfinancial assets with gross saving plus net capital transfers. If saving plus net capital transfers received exceed nonfinancial investment, a sector has a surplus of funds and becomes a net lender to other sectors and/or the rest of the world (see www.ecb.europa.eu/stats/pdf/eaa/Background_note.pdf, p. 3).*

Chart 1

Euro Area: Sectoral Net Lending/Net Borrowing



Euro Area: Sectoral Debt Ratios



Source: ECB (euro area accounts).

gap is funded externally) or decreasing (financial) assets in the same sector. It is important to note, however, that financial accounts data do not provide insights into ex ante saving decisions as they always measure ex post outcomes. If some deleveraging efforts can be observed for one sector (or, alternatively, if a sector is forced to reduce its debts), this should materialize in positive NLNB balances or at least in an increasing trend.

In the run-up to the crisis, the euro area's total debt ratio was rising significantly. Contrary to general perception, the euro area is still leveraging up, mainly because of the rising public debt-to-GDP ratio (the private sector debt ratio has remained roughly constant since 2009).

The NLNB position, however, reveals significant adjustment in the saving and investment behavior of households and nonfinancial corporations. Until 2010, the latter had persistently negative NLNB balances (i.e. an excess of investment over saving), which since then have shifted to positive or zero values. This adjustment in the euro area was associated with a sharp decline in the (total) investment ratio from 22.0% of GDP in 2008 (Q2) to 18.1% in 2013 (Q2). More than half of this decline was due to lower investment of the nonfinancial corporate sector.

The household sector, on the other hand, exhibited positive NLNB balances prior to the crisis, although the surplus decreased in the boom phase before 2008. The reaction to the crisis was rather similar to that of the corporate sector: Households increased their NLNB balance between 2008 and 2010, but then started to decrease it again.

The public sector exhibited negative NLNB balances, reflecting budget deficits that increased sharply in 2008. In 2010, however, the public sector started to consolidate and to increase its NLNB balance. While the NLNB balance of the private sector has remained in positive territory in recent years, we have observed both a considerable adjustment in public sector NLNB to less borrowing (lower public deficits) and a decrease in the balance to the rest of the world, i.e. an

Chart 2

Δ NLNB: Public and Private Sector (2007 v. 2013)

Public sector (percentage points of GDP)

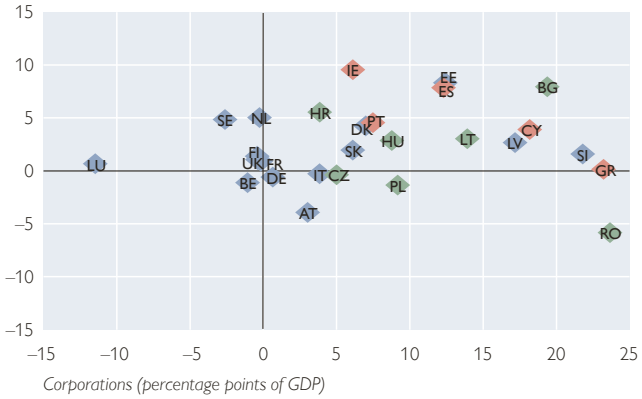
Private sector (corporations and households, percentage points of GDP)

Source: European Commission (AMECO database).

Note: (Post-)program euro area countries are colored in red, non-euro area CESEE countries in green.

Δ NLNB: Households and Corporations (2007 v. 2013)

Households (percentage points of GDP)



Corporations (percentage points of GDP)

Source: European Commission (AMECO database).

increase in the euro area current account surplus. Interestingly, despite the saving efforts of the private and the public sector, total debt ratios across sectors still increased considerably (from 280% to 326% of GDP) during the first five years after the crisis (ending in Q2/2013), as depicted in chart 2 (right panel).

Charts 2 takes a look at the changes in NLNB between 2007 and 2013 across sectors at the individual country level. In all countries except Luxembourg, Belgium and Austria, the *private sectors* (defined as corporations[7] plus households) increased savings[8] considerably as a reaction to the global crisis, with Bulgaria (27 percentage points) and Slovenia (23 percentage points) showing the strongest increase in NLNB balances, followed by Greece (23 percentage points), Cyprus (22 percentage points), Estonia (21 percentage points) and Spain (20 percentage points). In other words, over a period of just six years, private sector demand declined considerably in the (post-)program euro area countries (red diamonds), some of the non-euro area EU countries (green diamonds) and the Baltic countries. Those adjustments appear even stronger when we consider the slow recovery path in the euro area, where many of the economies mentioned above have still not achieved their precrisis peaks in terms of GDP.

Deleveraging efforts were particularly strong in the corporate sector, while the public sector was leveraging up in almost all countries. Still, chart 2 (left panel) also shows that the NLNB balances of private sectors remained more or less unchanged in some large countries (including Germany, France and the United

[7] *In the AMECO database, the corporate sector covers both nonfinancial and financial corporations. While the euro area accounts would allow a distinction between financial and nonfinancial corporations, the country coverage would be significantly lower. And even though there are differences in some details, the overall outcome is quite similar.*

[8] *A rise of the NLNB balance indicates an increase of saving (i.e. the difference between disposable income and consumption expenditure) and/or a decrease of investment by institutional sector. Please note that in the context of NLNB, an increase of the balance can always indicate either a change in saving or investment behavior, or both.*

Kingdom), highlighting once again the considerable heterogeneity of the impact of the crisis across Europe. In fact, based on individual country data in the euro area accounts, *nonfinancial corporate sectors* have exhibited a positive NLNB balance since the start of the crisis in most European countries, i.e. they are now net lenders to the rest of the economy and the world (two important exceptions are France and Italy). Further, almost all economies record a rising NLNB balance of the non-financial corporate sector, indicating that nonfinancial corporations have increased saving and/or reduced their investment. In addition, in some countries, including Germany, the United Kingdom and Sweden, the corporate balance was already positive prior to the crisis. This means that even in the boom phase prior to the crisis, the corporate sector in those countries invested less than its earnings. NLNB balances of the public sector are characterized by a sharp deterioration in 2008 in all countries, both because of automatic stabilizers and due to various stimulus and bank stabilization packages. After this initial shock, the pattern is quite heterogeneous, although public NLNB balances increased (i.e. governments reduced their deficits) between 2010 and 2012 during the European debt crisis.

Despite the consolidation efforts, public debt ratios rise towards the end of the sample.[9] Similarly, deleveraging also proceeds very slowly in the household and nonfinancial sectors across Europe (see section 2.2). Mainly because of public debt dynamics, most countries still increased their overall debt-to-GDP ratios in recent years, but there are also some exceptions, including Germany, Sweden, Denmark, Romania, Hungary and the Baltic states, which were all able to reduce their total debt ratios.[10]

Overall, NLNB patterns in Europe broadly confirm that many economies in Europe are in a process of adjusting their balance sheets. The intensity of these efforts varies widely across countries, though. Some countries that were strongly affected by increasing NLNB balances report considerable progress, as indicated by decreasing sectoral debt-to-GDP ratios (e.g. Spain, Portugal and Ireland). In other countries, however, deleveraging efforts (or forced deleveraging) have not yet led to a decline in private sector debt ratios due to unfavorable economic circumstances (e.g. in Cyprus and Greece). While we are not able to say with certainty whether further deleveraging is necessary (because we do not estimate "equilibrium" debt ratios or levels), historical evidence suggests that after large booms, more or less the entire household debt accumulated before the crisis and approximately two-thirds of the increase in corporate debt are reduced in the post-crisis period (see Bornhorst and Arranz, 2013a; Tang and Upper, 2010). Given the limited progress in the reduction of sectoral debt ratios, it therefore seems likely that further deleveraging pressures in the private sector will continue to drag on the recovery across Europe.

[9] *Another reason for this is that bank stabilization measures are mainly reflected in debt levels but not in budget deficits.*

[10] *For a comprehensive study on private sector debt levels in the CESEE EU Member States, see Lahnsteiner (2013). He shows that the household debt-to-GDP ratio surged before 2008 and has only retreated slightly since then in most CESEE countries. The debt ratios of nonfinancial corporations also increased sharply until 2008. In contrast to the household sector, debt of this sector has already reached or exceeded the euro area figure in several CESEE EU Member States.*

2.2 A Simple Decomposition of Sectoral Debt-to-GDP Changes

In a next step, we investigate why the widespread increase of NLNB in the private sector has not yet led to a systematic reduction in gross debt ratios. For that purpose, we decompose the change in sectoral debt ratios (in percent of GDP) into contributions of the numerator, i.e. transactions and other changes, and the denominator, i.e. real GDP growth and inflation (for a similar approach, see Cuerpo et al., 2013). An increase in the denominator reduces the real debt burden. In contrast, an increase in the numerator (actual transactions, i.e. credit flows, and other changes, such as write-downs, write-offs as well as revaluation and reclassification effects) raise the real burden of debt.[11] These contributions as well as the corresponding debt ratios for the euro area are shown in chart 3, which focuses on nonfinancial corporations, households and the public sector.

For the euro area as a whole, the debt ratios of households and nonfinancial corporations increased significantly during the boom period until 2009 and have been more or less stagnant ever since. In both sectors, transactions have still been positive (i.e. sectors have increased their nominal gross debt levels) during the last years, but borrowing has been quite subdued as compared to precrisis levels. In addition, except for 2011, real GDP growth has been low (or even negative) and therefore hardly contributed to decreasing debt-to-GDP ratios. While borrowing of the public sector has increased significantly since the crisis, public debt ratios also suffer from low real GDP growth, leading to unfavorable debt dynamics.

An analysis of debt ratio changes at the country level[12] reveals quite heterogenous patterns across the EU. While inflation helped dampen debt-to-GDP ratios in most countries (particularly in Germany and the United Kingdom, but also in e.g. France, Sweden, Italy and Poland), such an effect was not present in Spain and other peripheral countries, such as Greece and Ireland, where (partly) negative inflation rates increased the real debt burden. The same pattern is visible for the contributions of real GDP growth: While real GDP growth contributed considerably to decreasing debt ratios in most countries, stressed economies such as Spain, Italy, Greece, Ireland or Portugal suffered from prolonged recessions with negative GDP growth, which further increased real debt burdens.

Although public sectors increased their deficits in response to the external shock, those stimulus policies did not increase aggregate demand sufficiently in many countries, leading to unfavorable debt dynamics both for the private and the public sector. In other words, subdued output growth associated with low (or even negative) inflation rates in stressed economies undermined deleveraging efforts, particularly in the private sector. That is why in many countries, deleveraging efforts are currently not associated with a reduction in debt ratios. This conundrum is reminiscent of the Keynesian *paradox of thrift* in that the attempt of businesses and households to save more actually leads to lower total savings due to lower consumption, investment and aggregate demand.

[11] *Note that, by construction, this simple method of decomposition yields a small and positive difference between the sum of contributions and the absolute change in the debt level, which is negligible in magnitude for our calculations. This difference is assigned to other changes.*

[12] *Individual country results are not shown for the sake of brevity, but the respective figures are available upon request.*

2.3 External Rebalancing and the Saving-Investment Ratio

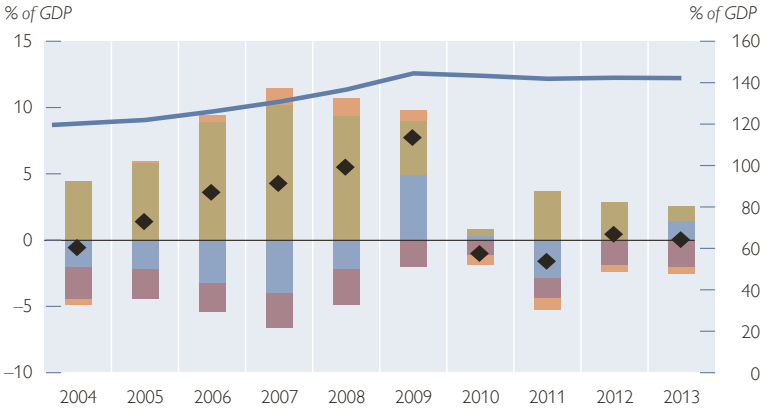
The increase of sectoral debt ratios during the precrisis boom was accompanied by a sharp rise in capital inflows, cross-border credit and external imbalances, particularly in peripheral economies of the euro area. Massive capital inflows, not least from core countries of the euro area, led to a significant reduction in interest rates. Consequently, corporate and also household debt ratios increased markedly, especially in housing boom countries. While the current account of the euro area as a whole was more or less balanced in the years prior to the crisis, imbalances within the euro area widened considerably. Increasing current account surpluses in some countries were accompanied by rising current account deficits in other countries, also reflected in financial account surpluses due to massive capital inflows. Starting in 2009, however, the deficit countries reduced their current account deficits, and by 2013 more or less all precrisis deficit countries had (almost) balanced or positive external balances. This process was, however, not accompanied by a decline in the current account balances of surplus countries, and thus resulted in a pronounced increase in the current account balance of the euro area as a whole. In most of the peripheral countries, rebalancing was mainly driven by low import demand rather than rising exports. Furthermore, the improvement of the euro area current account balance was associated with significant changes in sectoral saving and investment ratios across countries, which will be analyzed in depth below.

Let us recall some of the basics of macroeconomics: The current account balance can basically be defined in three different ways. First, a current account surplus is defined as a positive

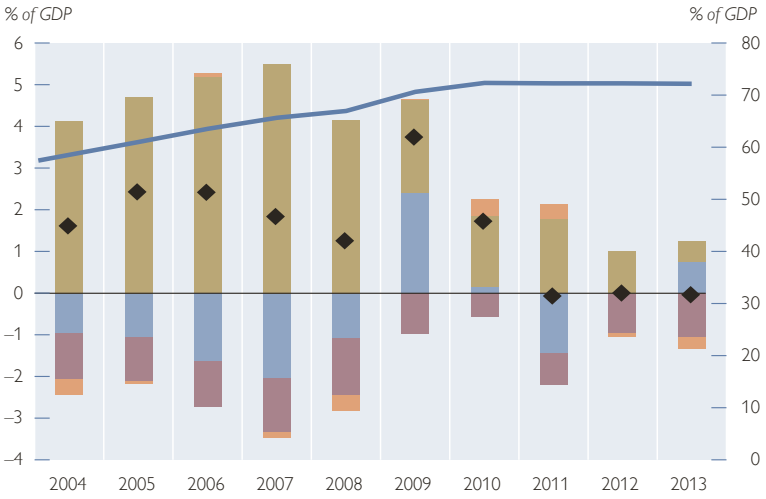
Chart 3

Changes in Debt-to-GDP Ratios

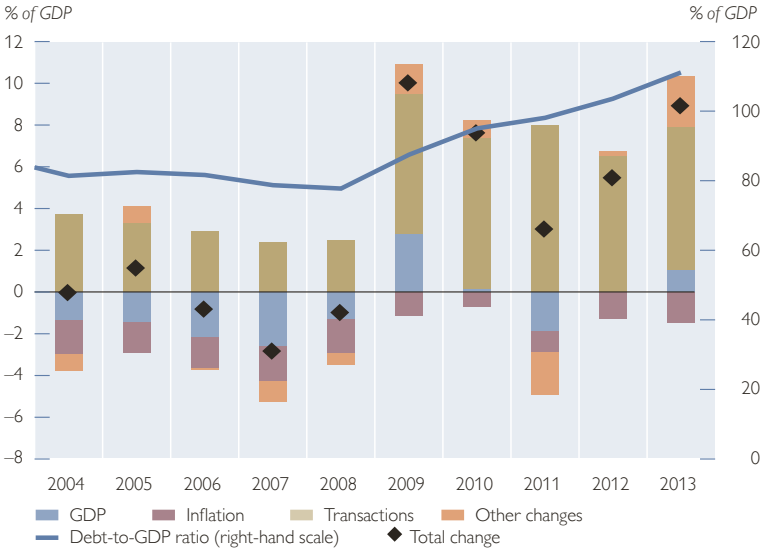
Euro Area Nonfinancial Corporations



Euro Area Households



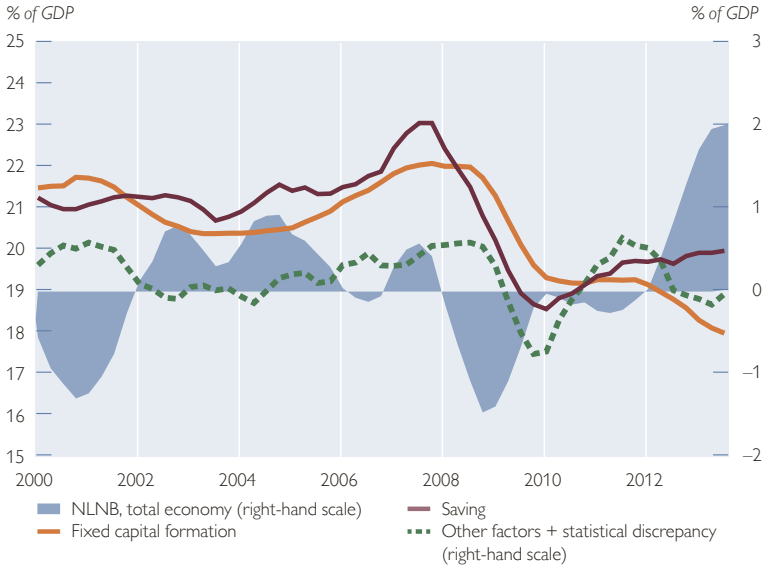
Euro Area Governments



Source: ECB (euro area accounts), authors' own calculations.

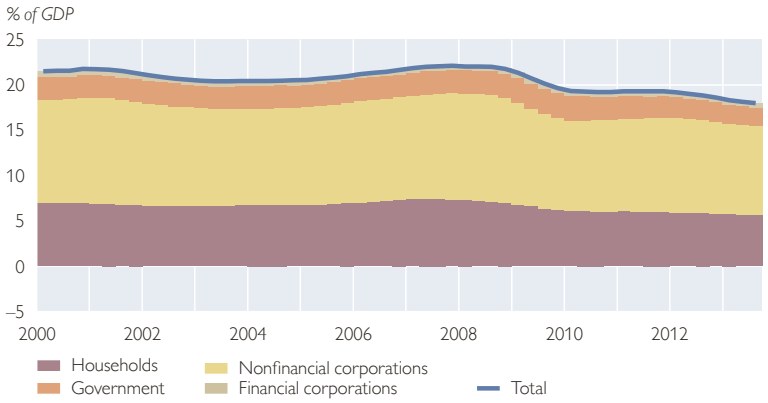
Chart 4

Euro Area: Saving, Investment and External Balance



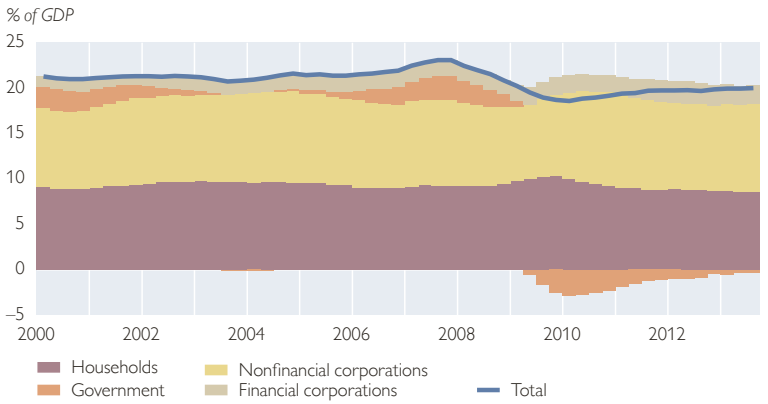
Source: ECB (euro area accounts).

Euro Area: Sectoral Investment Ratios



Source: ECB (euro area accounts).

Euro Area: Sectoral Saving Ratios



Source: ECB (euro area accounts).

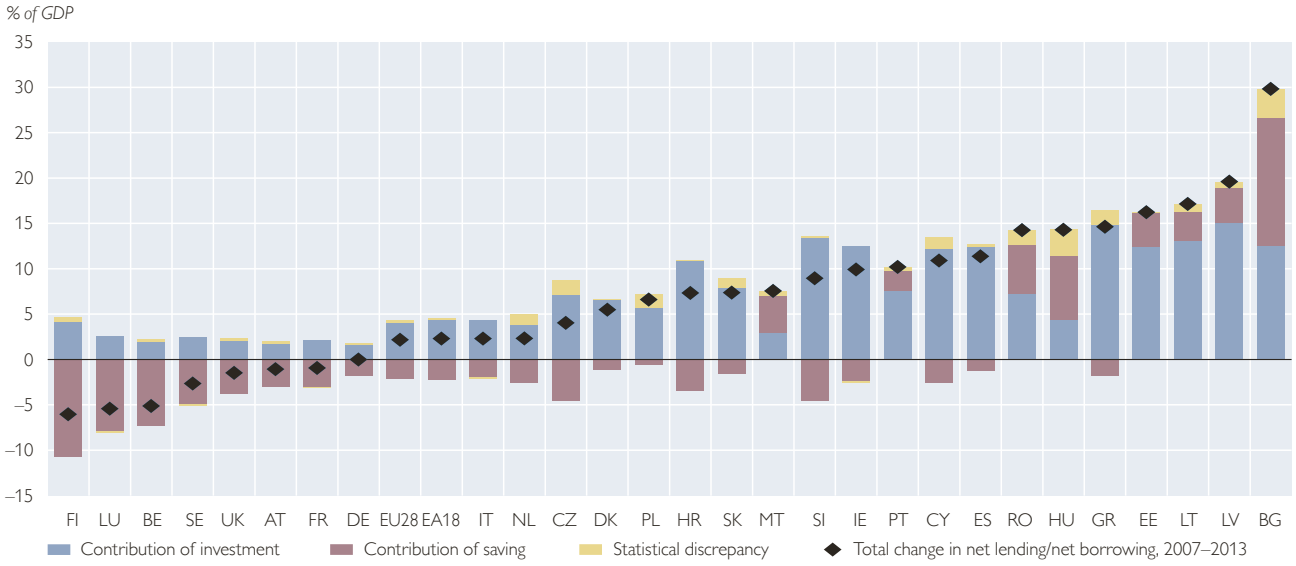
balance of exports minus imports (and taking into consideration factor income and current transfers), which is probably the most common definition. Secondly, it can be seen as a financial account deficit, i.e. the current account surplus is mirrored by capital outflows of the same amount (when assuming a flexible exchange rate without any exchange rate interventions by the central bank). Finally, a current account surplus can also be interpreted as an excess of saving over investment across sectors within a country. The three perspectives on the current account must hold empirically by definition, whereas a causal effect in one direction cannot be identified.

Chart 4 (upper panel) shows the ratio of (overall) saving and fixed investment relative to GDP, as well as the external balance in percent of GDP for the euro area. The two lower panels of chart 4 show a decomposition of gross fixed capital formation (investment) and saving by institutional sector. While current account balances of the euro area fluctuated around zero between 2008 and 2012, the GDP shares of saving and investment show a completely different pattern. Between 2008 and 2010, both saving and investment ratios decreased considerably by about 4 percentage points of GDP. Since then, overall saving ratios have recovered marginally, while investment has dropped even further since 2012. This means that the current account surplus of the euro area does not result from higher savings but rather from lower investment.

Chart 4 (middle panel) indicates that the decline in investment mainly took place in the nonfinancial corporate sector and, to a lesser extent, in the household sector. Saving dynamics were dominated by public saving ratios, which turned significantly negative at

Chart 5

External Rebalancing: Change in Net Lending/Net Borrowing (Total Economy), 2007–2013



Source: European Commission (AMECO database).

the peak of the crisis (Chart 10). Similarly, the recent increase in (overall) saving ratios is also mostly due to government efforts to reduce budget deficits in various countries. This alternative perspective – namely that external rebalancing is hardly due to increased saving, but rather a phenomenon associated with a dramatic decline in investment ratios – raises important policy questions about the optimal speed of adjustment in stressed economies.

Chart 5 shows a decomposition of the total change in NLNB (total economy)[13] between 2007 and 2013 into contributions from saving, investment and other factors. This simple decomposition reveals some interesting patterns.

First, since 2007, investment ratios have been decreasing in all economies (as shown by positive contributions to the total change in NLNB), although the magnitude of the decline differs strongly across countries.

Second, in countries which exhibited significantly negative current account balances prior to the crisis, external rebalancing was consistently associated with a sharp decline in investment rather than an increase in saving ratios (with the exception of Bulgaria, Hungary and Romania, where increased savings also contributed substantially to the ongoing rebalancing). In fact, overall saving ratios even decreased in most stressed economies (Cyprus, Spain and Greece), so that external rebalancing was driven by a stronger decline in investment as compared to saving. Remarkably, in Germany, the decline in investment relative to GDP took place considerably earlier, actually starting in 2001. During the boom phase, the saving ratio rose sharply in Germany (driven by increased saving of both the nonfinancial corporate and the public sector), which was completely contrary to

[13] *The NLNB balance of the total economy corresponds to the current account balance plus net capital transactions with the rest of the world. As the latter factor is typically small, NLNB (total economy) is roughly equal to the current account balance.*

all other countries except Sweden. In France, the decline in investment has been comparatively small, resulting in virtually no external rebalancing since 2008. In Italy, both saving and investment remained more stable, although the recent external rebalancing is also mainly due to lower investment in the corporate sector.

Third, in countries affected by sharp declines in house prices, such as Spain and the United Kingdom, households (and, in the case of Spain, also businesses) increased their saving ratios as their net worth plummeted. The decline in household investment in those countries is likely to be part of a necessary rebalancing in the housing market. At the same time, however, corporate investment ratios have also declined, particularly in Spain.

Finally, investment and saving ratios differ considerably across countries. In 2014, overall gross capital formation as a share of the countries' GDP ranges from 11% in Cyprus and Greece to 26% in Estonia, whereas saving ratios are between 10% in Cyprus and approximately 29% in Sweden.

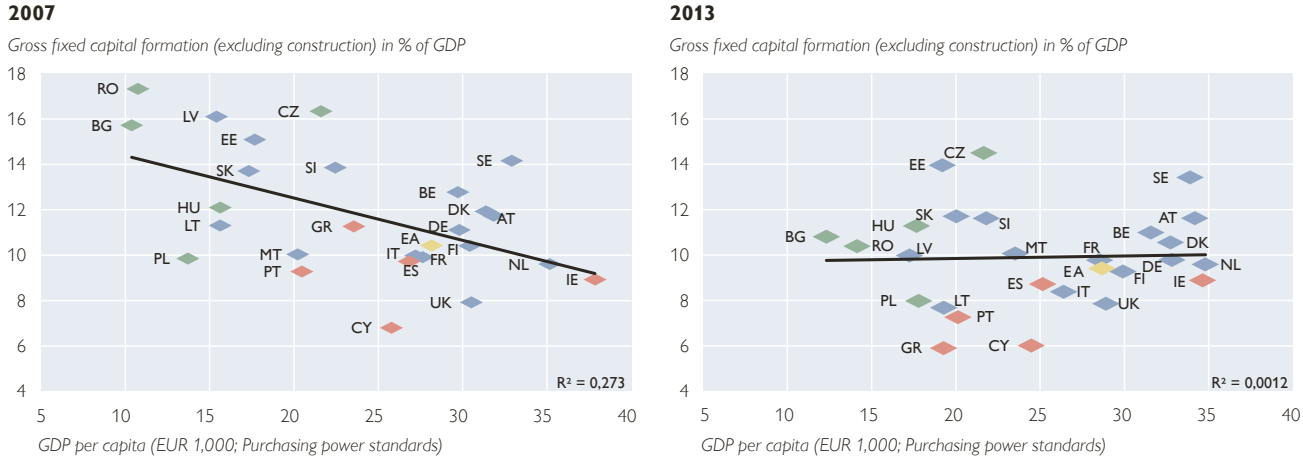
2.4 Long-Run Implications for the Catching-Up Process

Uncertainty since the start of the crisis has led to considerable capital outflows from stressed economies, which have been forced (at least partly) to rein in their current account deficits. Furthermore, recent studies point to a marked slowdown in income convergence across the EU since the global financial crisis (see e.g. Gächter et al., 2013). While the growth differential between the euro area and the CESEE EU Member States was 3–4 percentage points prior to 2008, it narrowed considerably in the aftermath of the crisis. Even though the large precrisis growth differential was partly cyclical, empirical evidence suggests that the differential in potential growth rates is likely to have decreased as well (Gächter et al., 2013).

In this context, recent developments indicate that the slowdown of the European catching-up process might indeed be structural, both for new EU Member States (in CESEE) and for peripheral euro area members. Chart 6 shows the relationship between the share of gross fixed capital formation in a country's

Chart 6

GDP Per Capita and Gross Fixed Capital Formation Excluding Construction



Source: European Commission (AMECO database), authors' own calculations. (Post-)program euro area countries are colored in red, non-euro area CESEE countries in green.

GDP (excluding the construction sector to control for precrisis housing booms) and the corresponding GDP per capita (in purchasing power standards, PPS). While there was a strong negative link between the two variables before the crisis, i.e. poorer countries had a higher share of (productive) investment, this relationship essentially broke down after the crisis. Besides the fact that the investment share has decreased in virtually all economies, it is also alarming that countries with lower per-capita GDP (and typically lower capital stocks) no longer invest disproportionately. Lower investment ratios, however, are likely to have a dampening effect on output growth in the future and may thus lead to a significant slowdown in income convergence across Europe.

While the decline in economic activity is not really surprising in countries with comparatively strong credit and housing booms, as suggested by e.g. Claessens et al. (2009), the broken link between investment ratios and per-capita GDP should be a cause for concern for policymakers.

3 Conclusions and Policy Implications

Despite marked differences across European economies, net lending/net borrowing patterns show considerable similarities in the deleveraging efforts of the corporate and household sectors. Interestingly, the decline in credit transactions has not led to a significant reduction of sectoral debt-to-GDP levels in many countries, because subdued output growth and low or even negative inflation rates have undermined the deleveraging process and contributed to an increase in real debt burdens in a number of European economies. Furthermore, this effect could even be reinforced in the medium term, as most of the ongoing rebalancing – both in terms of debt levels and current account deficits – is based on a sharp decline in investment (both in the private and public sector) rather than an increase in saving, which might lead to considerably lower potential growth in the future.

From an economic policy perspective, our findings raise questions about the optimal speed of fiscal consolidation after a financial crisis. Recently, the view has emerged that the European approach to solving the sovereign debt crisis – including austerity packages and measures to sharply reduce external imbalances – might have been suboptimal, and that stressed economies need more time to ensure an orderly adjustment, as simultaneous deleveraging across sectors and trading partners might be associated with high costs in terms of real GDP growth and deflation. Blanchard and Leigh (2013) argue that, in an environment where monetary policy is stuck at the zero lower bound, credit constraints exist in the financial sector and the economy exhibits a negative output gap, fiscal multipliers are likely to be larger than they would be at a later date in the future when things have gone back to normal. In combination with the dangers of low growth and pronounced hysteresis effects, these arguments would suggest back-loaded fiscal consolidation. Severe debt overhang and the risk of multiple equilibria, on the contrary, would rather speak for front-loaded consolidation. So when bank deleveraging is ongoing and credit demand by the private sector is low, public debt consolidation should be gradual and conditioned on the strength of private demand.

Clearly, the reasonableness of fiscal consolidation also depends on the specific type of consolidation measures. In particular, growth-enhancing public investment should not be cut in a situation when private investment is already subdued, as long-run growth prospects could be severely impaired in an environment of

declining capital stocks. Moreover, the commonly praised rebalancing of current account deficits in recent years appears in a different light when it is decomposed into its components, domestic saving and investment. That is, rebalancing has been mainly based on a strong decline of investment expenditures, which in turn is likely to hamper future growth prospects.

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A Local or a Foreign Currency Loan? Evidence on the Role of Loan Characteristics, Preferences of Households and the Effect of Foreign Banks

Elisabeth Beckmann, Anita Roitner, Helmut Stix[1]

Using data from the OeNB Euro Survey in CESEE, which covers both EU Member States and (potential) candidate countries, we analyze how the currency of existing loans to households relates to (1) loan characteristics (loan maturity and purpose), (2) households' preferences regarding the loan currency and (3) bank ownership (domestic or foreign). Our findings support the existing literature's view that both demand- and supply-side factors have an influence on foreign currency lending. In the period under investigation, foreign currency loans were sought after by households in particular for long-term borrowing. Likewise, banks were more likely to grant large and long-term loans in foreign currency. On a descriptive level, we find that in Croatia and Hungary, foreign-owned banks had a higher share of foreign currency loans than local currency loans – in the remaining seven countries, however, the share of foreign currency loans is similar to or lower than that of local currency loans. In regression models we account for the possibility that foreign-owned and domestically-owned banks may differ in that they have issued loans with different characteristics and in that they have customers with different credit ratings and different preferences. Holding these factors constant reveals that, on average, foreign-owned banks did not issue more foreign currency loans – neither consumption loans nor mortgages – than domestically-owned banks.

JEL Classification: D14, G21, F34
Keywords: foreign currency debt, household credit, bank ownership, Central, Eastern, Southeastern Europe

Household debt in Central, Eastern and Southeastern Europe (CESEE) increased sharply before the crisis, but debt amounts and participation have remained low compared to levels seen in euro area countries. A particular feature of debt in CESEE is that in many countries, a significant percentage of loans are denominated in foreign currencies (chart 1).

The risks to financial stability that arise from foreign currency (FX) loans – e.g. because of a currency mismatch on banks' balance sheets, aggregate refinancing problems of banks, the threat of sudden stops – were well understood even before the crisis (Fernandéz-Arias, 2006; Levy Yeyati, 2006); they became highly visible during the crisis, as the currencies of several countries substantially lost in value against the Swiss franc, which has been an important currency in FX lending. Given the high share of foreign-owned banks in several CESEE countries,[2] the rise of the Swiss franc against local currencies became a concern not only for domestic policymakers. Some countries had taken measures to reduce foreign currency lending already prior to the crisis. For example, the Polish Financial Supervision Authority's "Recommendation S" in 2006 encouraged banks to enhance borrowers' risk awareness. In the aftermath of the crisis, the European Systemic Risk Board

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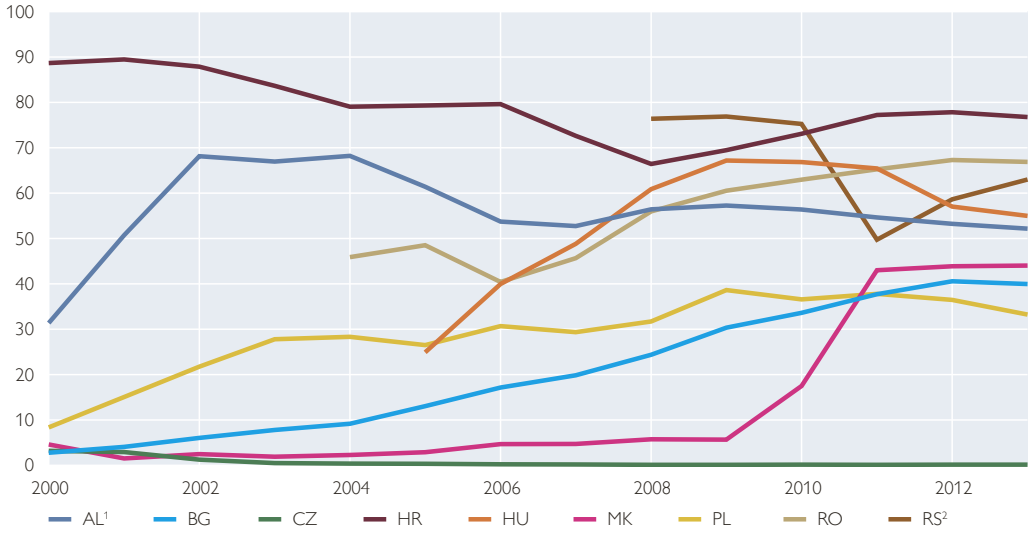
[2] *For the countries covered by this analysis, it ranges between 70% and 95%. (Source: EBRD Banking Survey http://www.ebrd.com/downloads/research/economics/macrodata/Share_of_foreign_banks.xlsx last accessed on November 21, 2014.)*

Chart 1

FX Lending in CESEE before and after the Crisis

% of total loans to households and nonprofit institutions serving households (NPISH)



Source: NCBs.

[1] Claims on households and NPISH.

[2] Claims on households and NPISH. No reporting before July 2008 because of the exclusion of claims indexed to foreign currencies. The value for 2008 is the average from July to December 2008.

Note: We do not present data for Bosnia and Herzegovina as reported foreign currency loan data do not include loans indexed to foreign currency.

issued recommendations on lending in foreign currencies (ESRB, 2011), whose implementation it assessed in November 2013.

A large and growing literature seeks to identify the drivers and consequences of FX borrowing to provide the background for policy measures. Macro data-based studies analyzing the role of the inflation rate, the real exchange rate and the respective volatility of both (Ize and Levy-Yeyati, 2003; Basso et al., 2011; Neanidis and Savva, 2009; Neanidis, 2010) as well as the interest differential (Crespo Cuaresma et al., 2011; Rosenberg and Tirpák, 2009; Luca and Petrova, 2008) yielded mixed results. Macro data-based studies argue that the high market share of foreign-owned banks plays an important role (Basso et al., 2011) and that banks seek currency-matched portfolios; hence, it is argued that credit euroization is closely linked to deposit euroization (Luca and Petrova, 2008). However it is difficult to separate demand from supply effects on the basis of macro data. It is this separation, however, which is particularly important for designing and implementing targeted policy measures. Supply-side effects can be addressed by regulation; but policy responses have to be different if FX borrowing is demand driven (Jeanne, 2005; Nagy et al., 2011).

Thus, empirical research began to use micro data to explore these issues further. Employing bank survey data covering 193 banks in 20 emerging European countries from 2005, Brown and De Haas (2012) conclude that foreign banks' easier access to foreign wholesale funding is not a driver of FX lending. Studying firms also on the basis of survey data, Brown et al. (2011) show that firms' FX revenues are more important than interest rate differentials; they conclude that FX loans are taken out by customers who are hedged or are equipped

to bear the exchange rate risk. Brown et al. (2014) demonstrate that FX lending may partially be driven by banks. Analyzing a dataset of firm loans between 2003 and 2007 from one Bulgarian bank, which includes information on both requested and granted loan currencies, they find that this bank sought to match the currency structure of their assets with that of their liabilities.

The present paper contributes to the existing literature by focusing on FX borrowing by households rather than by firms. Previous research suggests that results obtained for firms are not necessarily directly transferable to households. For example, Basso et al. (2011) show that a country's openness has an impact on firm loan dollarization but not on household loan dollarization. Furthermore, households' financial decisions constitute a special case because households have been found to be particularly prone to choosing "sub-optimal loans," i.e. making borrowing mistakes (see e.g. Disney and Gathergood, 2013). And Campbell (2006) argues that many households seek advice from financial experts, which may further indicate that the role of demand and supply effects may be different in lending to households and in lending to companies.

We use survey information to investigate whether (1) loan characteristics (e.g. loan maturity and purpose) and (2) socioeconomic characteristics of households as well as the requested versus the granted loan currency determine the currency of borrowing and lending. This allows us to draw conclusions on the importance of demand and supply effects.

Additionally, we provide (3) evidence on whether foreign-owned banks issued more foreign currency loans than domestically-owned banks in the period under review. It has been argued that foreign banks' easier access to foreign wholesale funding could be a determinant of FX lending (Basso et al., 2011; Brown and de Haas, 2012; Beck and Brown, 2014). Also, foreign-owned banks may have tried to gain market share by pursuing more aggressive lending policies (in foreign currency) than domestically-owned banks. We are able to analyze this question because Euro Survey data provide harmonized information from nine countries.

1 Loans: Data Source and Descriptive Evidence

1.1 OeNB Euro Survey

The data source we use is the OeNB Euro Survey, a survey on the use of the euro by households in nine CESEE countries (5 EU Member States – Bulgaria, Croatia, Hungary, Poland and Romania – and 4 (potential) EU candidate countries – Albania, Bosnia and Herzegovina, FYR Macedonia and Serbia).[3] In each country, the target population comprises residents aged 15 years or older. Interviews are carried out face-to-face at respondents' homes. For each country, the final sample of about 1,000 respondents is selected via a multi-stage stratified random sampling procedure. It is representative of the country's population with regard to age, gender and region. In the following analysis we look only at respondents aged 19 years or over. The OeNB Euro Survey collects information about the role of the euro in households' portfolios, covering respondents' assessment and expectations of current and future economic conditions, their personal experience of banking and currency crises, and their saving and borrowing behavior. In addition, the survey

[3] *The survey is also conducted in the Czech Republic, but as foreign currency loans do not play a major role there, the questions we use for this analysis are not part of the Czech survey.*

collects socioeconomic information on respondents. While the questions are posed at the individual level, the questionnaire accounts for the fact that loans will typically be taken out by households by asking whether the respondent has the loan either alone or together with his/her partner.

We analyze the two survey waves of fall 2012 and fall 2013, which included questions on loan applications and rejections, requested and granted loan currencies, loan characteristics as well as information about the bank to which the household owes the loan. In general, the survey collects information on the incidence of loans, but it does not cover loan amounts. Detailed variable definitions are available in table A1 in the annex. Further details on the survey are summarized by Brown and Stix (2015), and selected results can be found at http://www.oenb.at/en/Monetary-Policy/Surveys/OeNB-Euro-Survey.html.

It is evident that survey data contain much fewer details about loan characteristics than loan-level data. This implies that our analysis has to be less detailed than previous studies on this topic and, moreover, relies on a relatively small number of observations. However, loan-level data are often confined to a specific bank (e.g. Brown et al., 2014); the Euro Survey, by contrast, provides information on loan decisions at a number of banks in different countries – which we see as the distinctive advantage of our data.

1.2 Data Validity – Loan Participation and Loan Currency

Survey respondents are often hesitant to reveal details about their personal financial situation. In order to check the plausibility of our data, we present evidence on loan participation and loan currency, which to some extent can be benchmarked against macro data and also other survey data.

Table 1 shows that there is substantial heterogeneity among countries regarding loan participation, loan purpose and loan currency: On average 21% of all respondents have a loan; but percentages range from below 10% in Albania to above 30% in Croatia. Compared to the euro area, where 44% of the population are debt holders, the levels are significantly lower in CESEE (ECB, 2013). This matches the picture provided by macro data showing higher debt-to-income ratios in the euro area compared to CESEE. The highest number of mortgage holders, around 15%, can be found in Hungary and Croatia. Those two countries also report the highest shares of loans – both consumption loans and mortgages – denominated in foreign currency.

While in most countries, the majority of FX loans are denominated in euro, significant shares of Swiss franc loans can be found in Croatia and Hungary (results on individual foreign currencies not shown), which again is in line with aggregate data.[4]

To assess the plausibility of our survey results we compare them with survey data from the Life in Transition Survey (EBRD, 2010), which, however, only contains information on mortgages. Furthermore, the data from the Life in

[4] *In previous studies based on Euro Survey data, the share of FX loans is significantly higher. This is due to the fact that previous studies employed results from a question about all loans the respondents hold, also counting loans which are partially denominated in foreign currency as FX loans. In this analysis, we employ information from a question on the largest (most important) loan, and only loans which are fully denominated in foreign currency are counted as FX loans. We select this approach for consistency reasons as subsequent survey questions, e.g. on the requested currency, also refer to the most important loan.*

Transition Survey are only available from one survey wave in 2010, causing a time mismatch with our data of 2012 and 2013 and implying also a smaller number of observations. Still, for 6 out of 9 countries, the results on mortgages yielded by the two surveys match rather well. With regard to the percentage of mortgages held in foreign currency, the results match well only for two countries; but given that the Euro Survey results have been fairly stable over altogether six survey waves, we are confident that the results are valid.

In addition, we can compare survey results with aggregate data. The percentages of loan amounts held in foreign currency are consistently higher than the percentages of the incidence of FX loans. This is plausible due to the high share of mortgages denominated in foreign currency. If we weigh the data of loan incidence in foreign currency based on an estimated ratio of the average amount of consumption versus mortgage loans, our results are within 10 percentage points for all countries except Albania, FYR Macedonia and Romania.[5] In summary, the

Table 1

Loan Participation, Loan Purpose and Currency

	Euro Survey (2012–2013): Respondents with a…							Life in Transition Survey (2010): Respondents with a...			Data from monetary statistics (2012–2013): Loan amounts…
	loan	FX loan	consumption loan	FX consumption loan	mortgage	FX mortgage	N*	mortgage	FX mortgage	N*	denominated in a foreign currency
	% of all respondents	*% of respondents with a loan*	*% of respondents with a loan*	*% of respondents with a consumption loan*	*% of respondents with a loan*	*% of respondents with a mortgage*	*respondents with a loan*	*% of all respondents*	*% of respondents with a mortgage*	*respondents with a mortgage*	*% of total loans to households and NPISH*
Bulgaria	24	13	18	16	6	43	464	4	30	37	40
Croatia	33	65	16	76	17	83	668	7	85	65	77
Hungary	26	47	12	58	14	66	537	16	55	168	56
Poland	21	9	16	11	5	35	390	4	37	63	35
Romania	16	22	11	27	5	53	342	5	73	47	67
Albania	9	9	5	14	3	22	214	2	39	24	53
Bosnia and Herzegovina	27	3	18	5	9	10	501	4	16	39	0
FYR Macedonia	22	9	13	15	7	23	431	2	11	16	44
Serbia	21	36	17	39	3	89	374	4	75	52	61
Euro Survey weighted country average	21	22	14	27	6	55	3,921				

Source: OeNB Euro Survey, EBRD, ECB, NCBs.

** Number of observations.*

Note: Individual country values are weighted by sampling weights which account for at least age, gender and region. The weighted country average is additionally weighted by each country's population size.

[5] *We estimate the average value of consumption and mortgage loans based on the limited available aggregate data on loan purposes and our information on loan incidence. Of course, this is only a very rough approximation.*

survey results provide a reasonably accurate and informative picture of households' loan positions.

1.3 Loan Characteristics

Information from the survey which is not available from macro data is loan maturity by loan currency. The average loan maturity of FX loans is seven years longer than that of local currency loans (table 2). This is in line with results regarding the loan purpose and currency presented in table 1, which shows that the share of mortgages denominated in foreign currency is 28 percentage points higher than that of consumption loans denominated in foreign currency. In addition, the percentage of respondents who say they have fixed interest loans is higher among local currency loan holders (results not shown).[6]

Table 2

Loan Maturity – Comparison between Local Currency and FX Loans

	Local currency loans				FX loans			
	Mean	Median	Max.	N*	Mean	Median	Max.	N*
	Loan maturity in years							
Weighted country average	6.84	5	36		14.19	10	35	
Bulgaria	7.35	6	30	363	11.72	10	30	51
Croatia	7.33	6	30	213	12.29	10	35	422
Hungary	10.13	9	30	259	15.16	15	30	224
Poland	6.76	4	36	335	17.84	20	30	33
Romania	6.90	5	35	225	16.58	16	30	59
Albania	4.43	4	15	192	6.89	5	18	20
Bosnia and Herzegovina	4.96	5	30	404	8.75	6	25	15
FYR Macedonia	4.86	4	20	337	6.69	5	15	39
Serbia	4.02	3	30	200	8.90	5	30	122

Source: OeNB Euro Survey.

** Number of observations.*

Notes: Respondents answering "Don't know" and "No answer" are excluded. Individual country values are weighted by sampling weights which account for at least age, gender and region. The weighted country average is additionally weighted by each country's population size.

2 Loan Demand versus Supply – Descriptive Evidence

In order to get an impression of supply and demand effects in FX borrowing and lending, we now present descriptive evidence on loan demand in general and potential supply-side effects as well as evidence on loan currency demand compared to loan currency supply.

2.1 Changes in Loan Plans, Applications and Rejections before and in the Wake of the Financial Crisis

We interpret two questions in the survey as indicators of loan demand: (1) plans to take out a loan and (2) loan applications. The former are based on the question "Do you plan to take out a loan within the next year and if so in what currency?", which has been included in each wave of the Euro Survey since fall 2007. The evidence presented in table 3 is based on this time series. Data on loan applications are

[6] *This may also partially be due to perception, i.e. FX borrowers hit by exchange rate depreciation may perceive this as a variable interest rate.*

based on the question "Since the year 2000, have you or any other member of your household ever contacted a bank with a view to obtaining a loan?", which was included in the fall 2012 and fall 2013 survey waves only; hence, it is a backward-looking question the answer to which depends on the accurate memory of the respondent.

As table 3 shows, loan demand declined in the aftermath of the financial crisis: After 2009, in all countries the percentages of households planning to take out a loan within the next 12 months decreased substantially. This is in line with the results for actual loan applications, which dropped in all countries except Albania. This decline is not surprising given the impact of the crisis on the economic situation of households (see, e.g., Corti and Scheiber, 2014). In addition, loan demand may also have been influenced by regulation, in particular with regard to foreign currency lending. For example, we observe that the percentage of planned FX loans in total planned loans in Hungary dropped from 44% in 2007 to 0 in fall 2011 after measures introduced in 2010 effectively prohibited the issuance of new FX loans to households.

Turning to indicators of supply-side effects, we present evidence on the percentages of loan cases in which borrowers did not receive the full amount they

Table 3

Loan Plans, Applications and Rejections

	Planned loans		Loan applications		Restricted loans	Rejected loan applications		Once rejected application	
	% of respondents who planned to take out a loan within the next 12 months		*% of respondents who applied for a loan at a bank*		*% of respondents who were not granted the amount they requested in full*	*% of respondents who applied for a loan but were rejected or discouraged*		*% of respondents whose loan application was rejected once but who now have a loan*	
	Before 2009	2009 or later	Before 2009	2009 or later		Before 2009	2009 or later		N*
Bulgaria	14	6	23	11	7	11	6	58	103
Croatia	11	6	37	14	11	17	5	63	235
Hungary	6	4	27	11	8	10	7	50	114
Poland	15	11	23	17	6	8	4	43	70
Romania	16	5	17	7	9	10	3	56	50
Albania	12	9	7	10	10	9	6	35	43
Bosnia and Herzegovina	15	7	20	14	2	5	4	56	50
FYR Macedonia	13	11	16	13	6	8	7	60	89
Serbia	13	11	25	14	10	13	4	46	109
Euro Survey weighted country average	14	8	22	13	8	9	4	51	863

Source: OeNB Euro Survey.

** Number of observations.*

Note: Values for planned loans are the average of the results stemming from the semi-annual surveys conducted between fall 2007 and fall 2008 and between spring 2009 and spring 2014; for the exact phrasing of the question see table A1 "plan loan." The remaining information is based on the Euro Survey results of fall 2012 and fall 2013 and the retrospective questions contained in these surveys; see table A1 for the exact phrasing: for loan applications, see "applied"; for restricted loans, see "amount granted in part," for rejected loan applications and once rejected applications, see "loan refused." We only report N for the last column, as this is the only variable for which it is rather low in some cases. Individual country values are weighted by sampling weights which account for at least age, gender and region. The weighted country average is additionally weighted by each country's population size.

requested (table 3, column 3). On average, this applies to 7% of loans in all countries taken together (8% before 2009 and 6.5% after 2009). A further indicator of possible supply-side effects is the number of loan applications that were rejected or discouraged by banks (table 3, column 4). In all countries, the percentage of rejected loan applications in total loan applications declined in the period under review. These results do not reveal the reasons for this decline. It could be due to the overall decrease in applications, with banks granting a constant percentage of loan applications; it could also be due to a decline in applications that are deemed to be risky; finally, it could also indicate a change in banks' lending policy. Put differently, these results should not be overinterpreted as they do not control for the credit risk profile of applicants.

The percentage of respondents whose loan application was once rejected but who now have a loan might indicate that also risky applicants were granted loans (table 3, column 5). Again, caution against overinterpreting these results is warranted as we do not know whether the credit risk profile of the applicant changed between the initial, rejected application and the successful loan application.

2.2 Loan Currency Demand versus Perceived Supply

A particular asset of our data is that they contain information on both requested and granted loan currencies, similar to those used in Brown et al. (2014). We measure the requested loan currency based on the question "When you first asked for this loan at your bank, did you have a preference regarding the denomination of your loan?" An average of 15% (N=674)[7] of respondents state they had a preference for a FX loan when they initially applied (chart 2), but there is substantial variation between countries, with the highest share of borrowers with a FX loan preference in Hungary and Croatia.

Borrowers were also asked about their banks' behavior in the application process ("Did the bank provide you with an offer to take out a loan in any other currency than the one you got the loan in?"). An average of 9% (N=363) of borrowers report that the bank did not offer a choice with regard to the loan currency. However, this percentage also includes borrowers who did not have a preference or who had a preference that matched the single offer the bank made. If we exclude these borrowers and only look at those loans for which the bank chose the loan currency, we find that 8% (N=107) with a FX loan report having had a preference for the local currency, whereas 1% of local currency loan holders (N=49) originally had a preference for FX loans (bottom left-hand panel).[8] It is important to stress, though, that here, the conclusion that it was solely the banks that chose the loan currency is not based on hard facts (as opposed to the loan level data used by Brown et al. (2014)), but on borrowers' *ex post* perception, which may have been influenced by the subsequent loan performance.

Finally, borrowers were asked about the possible reasons why the bank did not offer them a choice regarding the loan currency: 26% (N=85) said they explicitly asked for one currency only, which constitutes a demand-side effect. 27% of respondents (N=99) said it would not have been possible to receive the required

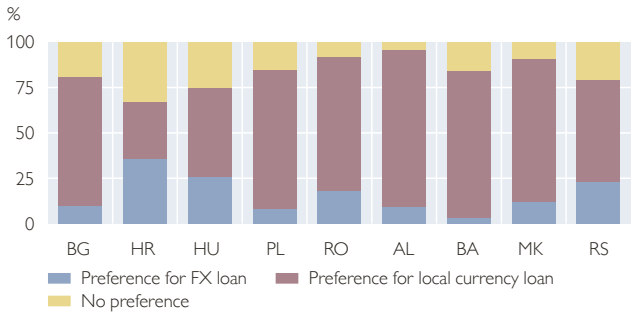
[7] *In the following, N denotes the number of observations which fall into the respective category, e.g. in this case the number of respondents who preferred a FX loan.*

[8] *These values are not weighted by country size due to the low number of observations.*

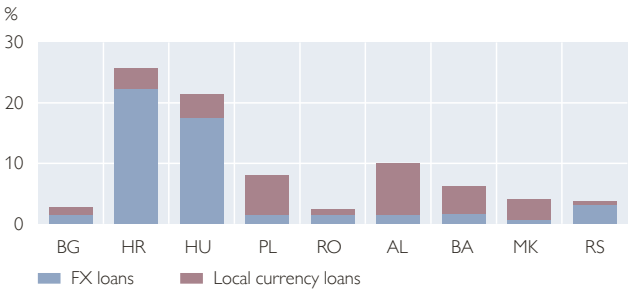
Chart 2

Loan Currency – Demand and Perceived Supply

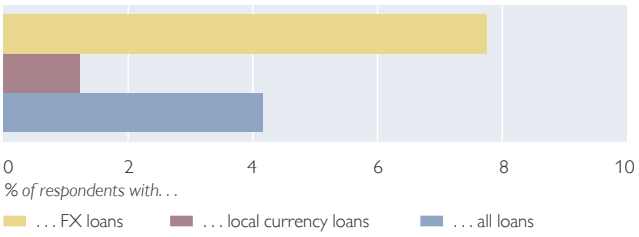
Respondents' Currency Preference when Loan Was Taken Out



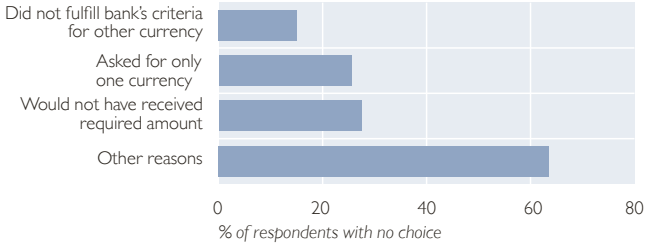
Respondents Not Offered a Choice of Loan Currency by Banks



No Match of Respondents' Preference and Bank Offer



Reason If Bank Did Not Offer Choice Loan Currency



Source: OeNB Euro Survey.

Note: Results are based on the following variables described in table A1: FX loan preference (top left panel), no choice (top right panel), no currency match (bottom left panel), reason (bottom right panel).

amount in another currency, and 15% (N=51) did not fulfill the bank's criteria for a loan in a different currency; these shares are indicative of supply-side effects. It must be noted, however, that these results are (1) based on a rather small number of observations (we do not differentiate between countries) and (2) based on respondents' *ex-post* perceptions only, which may have been influenced by how borrowers subsequently coped with loan repayments.

2.3 The Impact of Bank Ownership on the Loan Currency

Another determinant of the loan currency on the supply side may be bank ownership (domestic or foreign). To find out more about its role, we combine the information about the bank at which respondents hold their loan, which we glean from the survey, with information on bank ownership. We use BankScope data on bank ownership, which show the global ultimate owner at the highest consolidation level, thus ensuring comparability across banks. We check and supplement this information with the database by Claessen and van Horen (2013) as well as Internet-based research.

Table 3 shows the differences in the loan portfolios of domestically-owned banks and that of foreign-owned banks. We can see that there are no significant differences in the percentages of FX loans across all countries; the only exceptions are Croatia and Hungary, where the percentage of FX loans is significantly higher at foreign-owned banks. With regard to the type of loans, we do not find a significant difference in the percentages of mortgages held at foreign- or

Table 4

FX Loans, Mortgages and Loan Maturity at Domestically- and Foreign-Owned Banks

	Foreign-owned banks		Domestically-owned banks		H0: a=b
	(a)	N*	(b)	N*	p-Value
FX loans	*% of loans*				
Weighted country average	25	2,222	21	937	
Bulgaria	14	378	9	35	0.27
Croatia	67	513	54	94	0.00
Hungary	57	196	39	254	0.00
Poland	11	186	8	121	0.45
Romania	25	155	14	27	0.24
Albania	12	123	4	17	0.35
Bosnia and Herzegovina	3	293	9	90	0.03
FYR Macedonia	9	207	12	138	0.94
Serbia	37	171	34	161	0.51
Mortgages	*% of loans*				
Weighted country average	30	2,198	33	909	
Bulgaria	25	377	30	34	0.55
Croatia	52	514	43	92	0.01
Hungary	52	198	63	247	0.11
Poland	22	183	20	117	0.70
Romania	30	157	35	27	0.35
Albania	43	113	61	16	0.39
Bosnia and Herzegovina	35	293	27	87	0.22
FYR Macedonia	42	197	30	127	0.43
Serbia	15	166	16	162	0.59
Loan maturity	*Median in years*				
Weighted country average	5	2,073	5	868	
Bulgaria	7	351	6	30	
Croatia	9	503	6	88	
Hungary	10	183	13	228	
Poland	4	184	5	117	
Romania	6	138	8	25	
Albania	5	121	4	17	
Bosnia and Herzegovina	5	250	5	78	
FYR Macedonia	5	189	4	132	
Serbia	5	154	4	153	

Source: OeNB Euro Survey.

** Number of observations.*

Note: Respondents answering "Don't know" or "No answer" are excluded.

domestically-owned banks, again with the exception of Croatia. As far as loan maturity is concerned, the picture is mixed.

Beck and Brown (2014) argue that foreign-owned banks cherry-picked financially transparent customers. They report that people taking out mortgages from foreign-owned banks are more likely formally employed and richer than those taking out mortgages from domestic banks. Table 5 corroborates their finding but adds a further dimension by providing a breakdown by loan currency and including both mortgages and consumption loans. It shows that borrowers at domestic banks with a local currency loan most frequently belong to multiple-person households who own their main residence and a car; furthermore, the respondent most frequently has completed primary- or secondary-level education and is in employ-

Table 5

Socio-Economic Characteristics of Respondents Who Borrow from Domestically- and Foreign-Owned Banks

		Domestically-owned banks		Foreign-owned banks	
	All loans	Local curreny loan	FX loan	Local curreny loan	FX loan
	%				
Type of loan					
Mortgage	31	33	29	29	37
Consumption	69	67	70	71	63
Household size					
1 person	17	9	12	7	8
2 persons	32	24	23	30	22
3 or more persons	51	66	66	64	70
Household includes at least one child	32	52	49	44	52
Educational attainment of respondent					
Primary	38	42	34	25	22
Secondary	43	38	42	51	49
Tertiary	19	19	24	24	30
Monthly household income after taxes					
1–33 income percentile	55	19	17	14	12
34–66 income percentile	6	30	29	26	22
67–100 income percentile	29	27	26	36	39
No information on income provided	15	24	28	24	27
Labor market status of respondent					
Employed	26	72	76	75	78
Self-employed	22	12	10	9	8
Retired	21	19	14	16	11
Unemployed	30	9	11	10	10
Ownership of other assets					
Main residence	86	91	92	87	92
Secondary residence	7	6	11	10	18
Other real estate	12	14	22	14	20
Car	55	74	77	71	80

Source: OeNB Euro Survey.

Note: Results are weighted by sampling weights and population size.

ment. The profile of FX borrowers at domestic banks differs only slightly from that of local currency borrowers at domestic banks. Among borrowers at foreign-owned banks, the differences between local currency and FX borrowers is slightly more pronounced. We see the starkest differences, though, between domestically- and foreign-owned banks: At the former, the share of high-income local currency borrowers is 9 percentage points lower than at the latter, and the share of high-income FX borrowers at the former is even 13 percentage points lower than at foreign-owned banks.

3 Demand versus Supply – Estimations

To ascertain (1) whether the preference for FX loans depends on loan characteristics and (2) how the loan currency relates to demand and supply factors, we use an estimation approach. In particular, we relate FX borrowing to detailed individual-level survey information on socioeconomic characteristics, loan characteristics and the ownership structure of banks.

The first question closely follows previous research on demand for FX loans (Fidrmuc et al., 2013; Beckmann and Stix, 2014). The difference between our

approach and the approaches used in previous studies is that we can utilize information on loan characteristics. Our measure of demand for the loan currency is derived from a retrospective question about the requested loan currency. This implies that we cannot study the effect of exchange rate and inflation expectations as this information is only available at the date of the interview and not at the date when the loan was granted. Brown et al. (2014) analyze detailed loan and loan application information from a Bulgarian bank. They also study the determinants of the requested loan currency. The difference between our approach and their approach is that we focus on households (and not firms) and that we use survey data (and not administrative data). While administrative data are clearly superior to retrospective survey information, the main advantage of our data is that we can observe loan decisions made by multiple banks in multiple countries.

The second question also lines up with previous literature in that we study the relative importance of supply and demand factors. Specifically, we present evidence on how loan characteristics and credit ratings of loan applicants affect the loan currency. This question has been analyzed previously with survey data for firms in 26 transition economies (Brown et al., 2011). Our analysis focuses on households and additionally studies whether there are differences between the FX lending behavior of domestically-owned banks and that of domestically-owned banks.

The empirical framework accounts for sample selectivity by employing a two-step Heckman selection model. The incidence of a FX loan is observed only if a respondent has a loan (either in local currency or in foreign currency). To avoid biased estimates, we jointly estimate these two probabilities. In particular, the selection equation defines the probability that a respondent has a loan,

$$P(L=1)=\Phi_L(X_L\beta_L+u_L). \quad (1)$$

In the second stage, the outcome equation, we again estimate a probit equation that the respondent has a FX loan

$$P(F=1|L=1)=\Phi_F(X_F\beta_F+u_F), \quad (2)$$

where the error terms are normally distributed, $u_L \sim N(0,1)$, $u_F \sim N(0,1)$, and correlated, $\text{corr}(u_L,U_F)=\rho$. Our results confirm that both error terms are correlated and significant in some specifications.

The selection equation contains two variables for identification. First, similar to Beck and Brown (2014), we use information on whether there are children living in the respondent's household. This should positively affect the probability of taking out a loan. Since we control for loan characteristics in the outcome equation (e.g. whether the loan is a mortgage or a consumption loan), this information should not be correlated with the error term in the outcome equation. Second, the survey contains information on whether a respondent has contacted a bank with a view to obtaining a loan during the last 10 years, which, evidently, is strongly correlated with loan incidence.[9] All variables are defined in table A1, and descriptive statistics are presented in table A2 in the annex.

[9] *Results from the selection equations are summarized in tables A3 and A4.*

All subsequent regressions control for interacted country and time fixed effects. These dummy variables control for any macroeconomic, institutional and cultural differences across countries. Thus, the focus of the regression analysis is on the heterogeneity across individuals, holding country-wave differences constant.

3.1 Preferences for Foreign Currency Loans

We now turn to the demand side, seeking to determine the driving factors behind borrowers' choice of a loan currency. We measure demand using answers to the following question: "When you first asked for this loan at your bank, did you have a preference regarding the currency of your loan?" The answers to this question comprise several currencies from which we define a dummy variable "Preference for FX loan," which takes the value 1 if respondents answer that they requested a loan in foreign currency and the value 0 if respondents answer that they requested a loan in local currency. This specification omits all respondents who had no preference regarding the loan currency.

Table 6 shows the second-stage results with "Preference for FX loan" as the dependent variable. The corresponding first-stage results are selectively summarized in table A3. Of the variables used for identification, information on the loan application and the presence of children exert a sizeable and significant effect. Regarding the second-stage results, we focus first on column 1 and column 2.

In the respective sample about 23% of respondents said that they had a preference for a FX loan.[10] When splitting the sample by loan type, we find a foreign currency preference only for 15% of consumptions loans but for 39% of mortgages. This is also confirmed by regression results. Loans with a maturity of more than 10 years are 7 percentage points more likely to have been requested in foreign currency than in local currency (column 2 of table 6). Interestingly, we also find that foreign currency preferences were much more pronounced for loans that were granted prior to 2009 than for loans that were granted in 2009 or later, implying that households have reacted to the financial crisis.

With regard to the socioeconomic variables, the results in column 1 show a positively signed impact for persons with regular income in euro (12 percentage points), whereas the receipt of remittances is insignificant.[11] Persons who requested FX loans are also older, have completed a higher level of education and are more likely to own a car. Income is insignificant (column 1 of table 6). In column 2, which includes "loan term >10 years" and "took out loan in 2008 or before," the effect of income in euro and age vanishes, which can be traced to a correlation between these two variables and loan maturity.

The data set contains one variable which can be interpreted as a signal of a borrower's low level of creditworthiness: whether a respondent's application for a loan has been refused previously. The results indicate that such a refusal does not affect the currency preference of borrowers.

[10] *If we include also those households who answered that they had no preference regarding the loan currency then we find that about 19% had a FX preference.*

[11] *Column 2 includes information on the loan, i.e., its maturity and when the loan was granted. This affects, for example, the size and significance of "income in euro" because the choice of loan type and "income in euro" are correlated.*

Table 6

Demand for FX Loans

Dependent variable	Preference for FX loan (0.1)			
Sample	All	All	Consumption loans	Mortgage loans
Model	(1)	(2)	(3)	(4)
Regular income in euro	0.118***	0.049*	0.066*	0.007
	(0.037)	(0.028)	(0.034)	(0.041)
Receives remittances	0.019	0.012	0.008	0.018
	(0.024)	(0.016)	(0.017)	(0.028)
FX deposit preference	0.032*	0.018	0.009	0.027
	(0.018)	(0.013)	(0.009)	(0.025)
Trust in government	0.021	0.013	0.008	0.014
	(0.017)	(0.012)	(0.011)	(0.020)
Loan refused	–0.017	–0.012	–0.004	–0.010
	(0.013)	(0.008)	(0.010)	(0.017)
Loan term >10 years		0.069***	0.008	0.057*
		(0.019)	(0.024)	(0.033)
Took out loan in 2008 or before		0.067***	0.052***	0.058
		(0.019)	(0.017)	(0.037)
Risk averse	0.010	0.018**	0.022*	0.007
	(0.016)	(0.009)	(0.012)	(0.010)
Married	0.033*	0.021*	0.019*	0.005
	(0.019)	(0.011)	(0.011)	(0.018)
2 person household	–0.039	–0.015	–0.015	0.000
	(0.034)	(0.024)	(0.025)	(0.025)
3+ person household	–0.027	–0.013	–0.025	0.021
	(0.032)	(0.026)	(0.025)	(0.027)
Age	0.006**	0.000	0.002	–0.005
	(0.003)	(0.003)	(0.003)	(0.005)
Age squared	–0.008**	–0.001	–0.003	0.005
	(0.003)	(0.003)	(0.003)	(0.005)
Secondary education	0.017	–0.001	–0.013	0.026
	(0.015)	(0.010)	(0.010)	(0.020)
Tertiary education	0.043**	0.011	–0.011	0.051
	(0.018)	(0.012)	(0.010)	(0.035)
Unemployed	0.004	0.007	–0.002	0.015
	(0.024)	(0.018)	(0.016)	(0.026)
Retired	–0.025	–0.017	–0.011	–0.011
	(0.022)	(0.015)	(0.014)	(0.017)
Self-employed	–0.028	–0.009	0.008	–0.043
	(0.026)	(0.017)	(0.016)	(0.038)
No information on income provided	0.030	0.020	0.023	–0.001
	(0.028)	(0.021)	(0.015)	(0.031)
Medium income	–0.008	0.000	–0.006	0.008
	(0.018)	(0.013)	(0.013)	(0.019)
High income	0.031	0.023	0.018	0.010
	(0.023)	(0.017)	(0.011)	(0.027)
No savings	–0.022	–0.011	–0.004	–0.019
	(0.016)	(0.009)	(0.011)	(0.021)
Own house	0.000	0.003	0.013	–0.037
	(0.023)	(0.014)	(0.014)	(0.035)
Own car(s)	0.039***	0.016*	0.011	0.021*
	(0.013)	(0.010)	(0.012)	(0.012)
Rho	–0.14**	–0.16**	–0.14	–0.32*
Mean of dependent variable	0.23	0.24	0.15	0.39
Country*wave fixed effects	Yes	Yes	Yes	Yes
Log likelihood value	–3,941.4	–3,404.9	–2,469.0	–1,711.6
Total observations	11,812	11,484	10,732	10,097
Uncensored observations	2,467	2,139	1,387	752

Source: OeNB Euro Survey.

*Note: The dependent variable in this table is FX loan preference, which takes a value of 1 if respondents answer that they requested a loan in foreign currency, 0 if they requested a loan in local currency. All models report the marginal effects from the outcome equation of a Heckman probit selection model. We employ information on whether the household has children and whether the household ever applied for a loan for identification. All models additionally include the following household control variables: inflation literacy, distance to banks. All models include fixed effects per country wave. Standard errors are reported in parentheses and are adjusted for clustering at the country-wave level. ***, **, * denote significance at the 0.01, 0.05 and 0.10 level, respectively. All variables are defined in the annex.*

Furthermore, we find a weakly significant effect of "FX deposit preference." Previous studies have found this variable to affect demand for FX loans (Fidrmuc et al., 2013; Beckmann and Stix, 2014). In our study, by contrast, this variable is found to be of minor importance – presumably because it measures FX preferences at the time of the survey interview and not at the time when the loan was taken out. Similarly, trust in government was also found to be insignificant.

Columns 3 and 4 split the sample into consumption loans and mortgages. First, regular income in euro plays a role mainly for consumption loans but has no effect on mortgages. Second, the financial crisis affected FX loan preferences with regard to consumption loans but not with regard to mortgages.

Finally, a word of caution is necessary regarding the central result of table 6, which shows that respondents had a FX preference mainly for mortgages. First, respondents could *ex post* rationalize their behavior by indicating that they had a preference or no preference for a foreign currency loan, in particular if they later ran into financial difficulties with their loans. Second, if respondents knew in advance that long-term funding would only be available in foreign currency, they might have included this information already in their loan currency preferences. We have no possibility to address the second issue – in other words, we must rely on the survey data. What we can do, however, is testing whether the results are influenced by borrowers' bad experience with a loan in the past. In particular, we repeat the estimation by including one variable which measures whether respondents are in arrears with their loans. We find that the variable does not affect the results qualitatively (the results are not shown in the table).

3.2 Incidence of Foreign Currency Loans

Having investigated customers' preferences regarding loan currencies in the previous section, we now turn to the actual incidence of FX loans. Table 7 presents the estimation results for the incidence of FX loans. We find that 31% of loans in our sample are FX loans, but only 23% of respondents (column 1 of table 6) said that they preferred their loan to be in foreign currency. It is noteworthy that these two figures can be compared as they refer to the same loans. One possible explanation of this discrepancy is that agents have a recall bias. However, even if we omit respondents with a bad loan experience, i.e. who are in arrears with their loans, the discrepancy is only slightly smaller (in this sample 28% of respondents have a FX loan). This is evidence that either banks played an active role in the choice of the loan currency (as suggested by results in Brown et al., 2014) and/or that loan applicants changed their mind during the loan application period.

A central question we want to answer is whether there are differences between domestic- and foreign-owned banks as far as FX lending is concerned. The regression results of table 7 provide some evidence, showing marginal effects of selected variables on the probability of a FX loan. We control for (1) preferences of loan applicants, (2) loan characteristics and (3) information on loan applicants' creditworthiness as measured by two direct variables as well as by socioeconomic variables. We stress that the socioeconomic information is measured at the time of the interview and not at the time of the loan application. However, our motivation for including these variables is that the socioeconomic variables (as they are correlated over time) proxy for borrowers' creditworthiness at the time of the loan application.

Table 7

Incidence of FX Loans

Dependent variable	Incidence of FX loans (0.1)		
Sample	All	All	All
Model	(1)	(2)	(3)
Regular income in euro	–0.050	–0.042	0.069
	(0.074)	(0.073)	(0.052)
No currency preference	0.409***	0.417***	
	(0.031)	(0.030)	
Preference for FX loan	0.824***	0.800***	
	(0.102)	(0.088)	
Secondary education	–0.010	–0.007	–0.008
	(0.049)	(0.041)	(0.032)
Tertiary education	0.015	0.027	0.043
	(0.055)	(0.048)	(0.039)
Unemployed	0.000	0.003	0.011
	(0.038)	(0.040)	(0.033)
Retired	0.044	0.052	0.017
	(0.047)	(0.041)	(0.030)
Self-employed	0.013	0.002	–0.003
	(0.047)	(0.048)	(0.041)
No information on income provided	0.081	0.090	0.071
	(0.064)	(0.059)	(0.056)
Medium income	0.008	0.014	–0.004
	(0.032)	(0.028)	(0.030)
High income	0.040	0.046	0.038
	(0.051)	(0.044)	(0.051)
No savings	0.003	0.005	–0.033
	(0.022)	(0.018)	(0.027)
Own house	–0.034	–0.028	–0.043*
	(0.032)	(0.030)	(0.023)
Own car(s)	0.069***	0.072***	0.101***
	(0.022)	(0.021)	(0.022)
Loan refused	–0.025	–0.015	–0.024
	(0.023)	(0.027)	(0.020)
Loan amount granted in part	0.066*	0.048	0.077***
	(0.037)	(0.032)	(0.029)
Loan term > 10 years	0.153***		
	(0.033)		
Took out loan in 2008 or before	0.076***	0.094***	0.186***
	(0.022)	(0.019)	(0.030)
Domestically-owned bank	–0.026		
	(0.034)		
Domestically-owned bank, mortgage loan		0.052*	0.152***
		(0.030)	(0.054)
Foreign-owned bank, mortgage loan		0.100*	0.217***
		(0.051)	(0.055)
Domestically-owned bank, consumption loan		0.015	0.061
		(0.041)	(0.040)
Rho	–0.59***	–0.51***	–0.31***
Mean of dependent variable	0.31	0.31	0.31
Country*wave fixed effects	Yes	Yes	Yes
Log likelihood value	–3,281.1	–3,342.5	–3,882.2
Total observations	12,493	12,560	12,585
Uncensored observations	2,420	2,487	2,512

Source: OeNB Euro Survey.

*Note: The dependent variable in this table is FX loan, which takes a value of 1 if respondents hold a foreign currency loan, 0 if they hold a local currency loan. All models report the marginal effects from the outcome equation from a Heckman probit selection model. We employ information on whether the household has children and whether the household ever applied for a loan for identification. All models additionally include the following household control variables: inflation literacy, distance to banks, age, household size, married, risk aversion. All models include fixed effects per country wave. Standard errors are reported in parentheses and are adjusted for clustering at the country-wave level. ***, **, * denote significance at the 0.01, 0.05 and 0.10-levels, respectively. All variables are defined in the annex.*

With this limitation in mind, we first discuss the results of our control variables and then move on to the effect of bank ownership.[12] With regard to the control variables, we obtain three main results: First, the currency preferences of loan applicants have a very strong impact on the incidence of a FX loan. Those with a preference for a FX loan are about 80 percentage points more likely to finally have a FX loan than those who had a preference for a local currency loan. We also find that loan applicants who said that they had no explicit preference for a loan currency have a higher likelihood (by about 40%) to get a FX loan than those with a local currency preference. This likelihood is much lower in comparison to respondents with a FX loan preference, but also higher than the overall incidence of FX loans. However, if one suspected banks to massively steer customers, one would expect an even higher coefficient for those without a currency preference.

Second, with respect to the creditworthiness of borrowers, we find that respondents with a FX loan are more likely to own a car. All other socioeconomic variables are found to be insignificant. Additionally, we observe two variables that signal a low level of creditworthiness of respondents: first, whether a respondent's demand for a loan has been refused at least once since the year 2000 and second, whether the loan amount was only granted in part. In column 1, we do not find that the prior refusal of loans has any impact on the incidence of a FX loan. The variable "amount granted in part" is positive but only marginally significant. Seen together, these results do not suggest a systematic and strong relationship between these creditworthiness proxies and the likelihood of a FX loan.

Third, we find that loan maturity is a very decisive factor for the credit currency: Loans that have a maturity of more than 10 years are 15 percentage points more likely to be in foreign currency (column 1). Additionally, the results in column 1 of table 7 suggest a significant effect of the time when the loan was granted, i.e., loans that were taken out prior to 2009 are 8 percentage points more likely to be FX loans than loans that were granted in or after 2009. As we control for FX preferences, which as table 6 shows also depend on loan maturity and on the time when the loan was taken out, this effect can be mainly ascribed to the supply side.

Does it matter whether banks are domestically or foreign owned? It is likely that the customers of and the type of loans granted by domestically- and foreign-owned banks differ in many important aspects (e.g. foreign banks could be more engaged in mortgage lending, etc.). Our comprehensive set of explanatory variables enables us to control for (many of) these differences. The dummy variable for bank ownership should thus indicate the respective marginal effect, keeping preferences of customers, their creditworthiness and their loan maturity constant. The results of column 1 of table 7 show no significant effect of bank ownership on FX lending.

In column 2 we study whether there are differences regarding the denomination of consumption and mortgage loans.[13] Our results show that mortgages are more likely to be in foreign currency than consumption loans, which confirms the importance of FX funding for long-term financial decisions. We do not find a

[12] *The respective results for the selection equation are summarized in table A4.*

[13] *This specification omits the loan maturity dummy as it is highly correlated with the type of the loan.*

significant difference between domestic and foreign banks neither with regard to consumption loans nor with regard to mortgages.[14]

The results of columns 1 and 2 control for the currency preferences of borrowers. Our interpretation of these specifications is that the remaining parameters should reflect the factors that impact on the difference between the requested and the granted currency. Thus, these differences should mainly reflect supply effects, although we acknowledge that this separation might also be confounded by other factors (like a change in borrowers' opinions during the loan application process). To ascertain this we repeat the specifications in column 3 without the preference variables and we expect those variables to gain importance that also affect currency preferences. By and large, the column 3 results support this interpretation as the effect of the loan maturity and of mortgages increases.[15] Again, there is a slightly higher incidence of mortgages at foreign-owned banks than at domestically-owned banks (by 7 percentage points, which compares with a difference of 5 percentage points in column 2), however this difference is not significant statistically.

4 Summary and Conclusions

This paper uses household survey data from nine CESEE countries to investigate how the choice of loan currency relates to loan characteristics, preferences of borrowers regarding the loan currency and bank ownership (domestic or foreign).

We find that both demand and supply factors play an important role in loan currency decisions. On average, 23% of borrowers requested FX loans. Estimations extend this evidence and show that FX loans are requested in particular for long-term loans. However, the actual incidence of FX loans (in the estimation sample of respondents) is higher than suggested by demand. This suggests that banks also play a role in FX lending dynamics. We find that banks are also more likely to grant loans in foreign currency that are large and long-term. Furthermore, descriptive results cautiously suggest that the quality of both foreign currency and local currency debtors is somewhat "better" at foreign-owned banks.

We also find that in Croatia and Hungary, foreign-owned banks had a higher share of FX loans than local currency loans, whereas in the remaining seven countries covered by the survey the shares of FX loans and local currency loans were statistically similar or the share of FX loans was lower. However, this picture can be misleading because compared to foreign-owned banks, domestically-owned banks may attract different customers that have different preferences or that demand different loans. In order to account for this issue, we run regressions that control for loan and customer characteristics. We find no significant difference between domestically- and foreign-owned banks with regard to loan currencies, neither for consumption loans nor for mortgages.

We note that our results are based on a relatively small number of observations and rely on survey respondents revealing the truth. Moreover, the regressions pool all countries and the respective results reflect an average effect across

[14] *The difference between "dom. bank, mortgage loan" and "for. bank, mortgage loan" is not different from zero statistically.*

[15] *One caveat of these specifications is that we treat the decision about the bank where the loan was taken out as exogenous. Explicitly modeling this decision would require having information on regional bank competition and on the geographical proximity of domestic and foreign banks. As this information is unavailable we have opted for the simpler approach.*

countries. Therefore, we advise to use the quantitative values with caution. Our findings mainly illustrate underlying tendencies; they are in line with findings in existing literature, which, however, focuses on firms rather than households and in particular on the existence of a demand effect for FX loans, the existence of supply effects and the quality of debtors. This implies that the present paper can be seen as a promising starting point for more detailed and elaborate analyses.

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Annex

Table A1

Variable Definition

Variable Name	Definition
Loan Information	
Amount granted in part	Dummy variable derived from the question "I would like to ask you some questions about your loans. If you have more than one loan, please refer to the largest, most important loan. Was the amount you requested granted in full or only granted in part?"; answer "Granted in part" coded as 1, "Granted in full" as 0, "Don't know" and "No answer" coded as missing.
Applied	Dummy variable derived from the question "Since the year 2000, have you or any other member of your household ever contacted a bank with a view of obtaining a loan?"; "Yes" coded as 1, "No" as 0, "Don't know" and "No answer" coded as missing. Those who answer "Yes" are then asked "Was this before 2009?"
Consumption loan	Dummy variable derived from answers to the question "What is the purpose of your loan?"; answers "for consumption goods," "to finance a car" and "for other purposes" are coded as 1,"to finance a house or apartment" coded as 0.
Domestic bank	Dummy variable; 1 if the general ultimate owner at the highest consolidation level of the bank at which respondents hold their loan is based in the country where the respondent lives. Information on the general ultimate owner is taken from BankScope and checked and supplemented by information from Claessens and van Horen, 2013, as well as by Internet-based research.
FX loan preference, no currency preference	Dummy variables derived from the question "When you first asked for this loan at your bank, did you have a preference regarding the currency denomination of your loan?"; FX loan preference answers ("Yes, I had a preference for euro / Swiss franc / other") coded as 1, answer "Yes, I had a preference for local currency" coded as 0, "No, I did not have a preference," "Don't know," "No answer" and "Not applicable, I do not have my loan from a bank" coded as missing. No currency preference answers ("No, I did not have a preference") coded as 1, answers "Yes, I had a preference for a loan in local currency / euro / Swiss franc / other" coded as 0, answers "Don't know," "No answer" and "Not applicable, I do not have my loan from a bank" coded as missing.
FX loan	Dummy variable that takes the value 1 if respondent has a FX loan, otherwise 0.
Loan	Dummy variable coded as 1 if respondent has a loan. Derived from the question "Do you, either personally or together with your partner, have any loans?"; answers are "No," "Yes, my loans are solely denominated in foreign currency," "Yes, my loans are predominantly denominated in foreign currency," "Yes, about equal amounts of loans in local and foreign currencies," "Yes, my loans are predominantly denominated in local currency," "Yes, my loans are solely denominated in local currency."
Loan refused	Dummy variable derived from the question "Since the year 2000, has a bank ever discouraged you from applying for a loan or ever refused a loan?"; answer "Yes" coded as 1, "No" as 0, "Don't know" and "No answer" coded as missing.
Loan maturity, loan maturity >10 years	Based on the question "When you took out this loan, what was the overall maturity of the loan?"; measured in years. Loan maturity >10years is a dummy variable which is 0 for answers 10 years or less and 1 for answers more than 10 years. "Don't know" and "No answer" are coded as missing.
Mortgage	Dummy variable derived from answers to the question "What is the purpose of your loan?" Coded as 0 for all respondents with a loan and 1 for those who answer "to finance a house or apartment."
No choice	Dummy variable derived from answers to the question "Did the bank provide you with an offer to take out the loan in any other currency than the one you got your loan in?"; answers "Yes, the bank offered a local currency / euro / Swiss franc / other currency" loan coded as 0, answer "No, the bank just offered the loan in one currency" coded as 1.
No currency match	Dummy variable derived from answers to the questions "When you first asked for this loan at your bank, did you have a preference regarding the currency denomination of your loan?" and the follow-up question "In which currency was this loan granted?"; answers in which the currency preference and the currency granted match are coded as 0, answers in which currency preference and currency granted do not match are coded as 1.
Plan loan	Dummy variable derived from the question "Do you plan to take out a loan within the next year and if so in what currency?"; answer "No" is coded as 0, answers "Yes, in local currency," "Yes, in euro," "Yes, in Swiss franc" and "Yes, in other foreign currency" are coded as 1. Answers "Don't know" and "No answer" are coded as missing.
Took out loan in 2008 or before	Dummy variable; 1 if the respondent took out the loan in 2008 or before, 0 if the respondent took out the loan in 2009 or later, missing if the respondent replies "Don't know" or "No answer."

Source: OeNB Euro Survey.

Table A1 continued

Variable Definition

Variable Name	Definition
Personal Characteristics, Sentiments	
FX deposit preference	Dummy variable derived from the question "Suppose you had about two times an average monthly salary to deposit in a savings account. Would you choose to deposit this amount in local currency, euro, U.S. dollar, Swiss franc, or other foreign currency?"; answer category "local currency" is coded as 0, all foreign currencies are coded as 1.
Inflation literacy	Dummy variable derived from the question "Suppose that the interest rate on your savings account was 4% per year and inflation was 5% per year. Disregarding any bank fees – after one year, would you be able to buy more than, exactly the same, or less than today with the money in this account?"; answers "less" coded as 1, answers "more," "exactly the same" and "don't know" coded as 0. "No answer" observations are excluded.
Risk averse	Derived from answers to the statement that "in financial matters, I prefer safe investments over risky investments." Categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree").
Trust in government	Based on question "I would like to ask you a question about how much trust you have in the government. Please tell me if you tend to trust it or tend not to trust it. 1 means 'I trust completely', 2 means 'I somewhat trust' , 3 means 'I neither trust nor distrust' , 4 means 'I somewhat distrust' and 5 means 'I do not trust at all'."; dummy variable coded as 1 if respondents somewhat or completely trust, all other coded as 0.
Socioeconomic Variables	
Age, age squared	Age of respondent divided by 10, age squared of respondent divided by 100.
Children	Dummy variable which takes the value 1 if children younger than 18 years old live in the household.
Distance to banks	Derived from answers to the statement "For me, it takes quite a long time to reach the nearest bank branch."; answers are "strongly agree," "agree," "somewhat agree," "somewhat disagree," "disagree," "strongly disagree;" categorical variable ranging from 1 ("strongly disagree") to 6 ("strongly agree").
Education (primary, secondary, tertiary)	Dummy variables; degree of education (university level, secondary and primary education).
Household size (1 person, 2 persons, 3+ persons)	Size of household: 1 person, 2 persons, 3 or more persons.
Income (low, medium, high; answer refused)	Dummy variables which take the value 1 for each net household income terciles (high, medium, low). Sample values are used to construct terciles. For those respondents who did not give an answer an additional dummy variable is defined (answer refused).
Labor market status (employed, unemployed, retired, self-employed)	Dummy variables coded as 1 if respondent belongs to a selected occupational category.
Married	Dummy variable; 1 if the respondent is married.
No savings	Dummy variable that takes the value 1 if respondent does not have any of the following form of savings: cash, savings deposits, life insurance, mutual funds, stocks, pension funds, bonds or current account.
Own car(s)	Dummy variable that takes the value 1 if the respondent owns one or more cars.
Own house	Dummy variable that takes the value 1 if the respondent owns a house or an apartment.
Receives remittances	Derived from answers to the question "Do you personally or your partner receive any money from abroad? E.g. from family members living or working abroad, pension payments, etc.?"; dummy variable coded as 1 if answer is "yes, regularly" or "yes, infrequently," else 0.
Regular income in euro	Dummy variable; 1 if the respondent regularly receives income in euro.

Source: OeNB Euro Survey.

Table A2

Descriptive Statistics

	Min/ Max	HU	PL	BG	RO	AL	BA	HR	MK	RS	Total
Age	19/94	47.20	46.95	47.65	49.81	40.84	46.83	46.73	49.10	44.41	46.61
		(14.41)	(16.52)	(15.94)	(15.80)	(14.61)	(15.24)	(14.75)	(16.13)	(13.33)	(15.42)
Age squared	4/88	24.36	24.77	25.24	27.31	18.81	24.25	24.01	26.71	21.50	24.10
		(14.23)	(16.41)	(15.86)	(15.97)	(12.90)	(14.97)	(14.46)	(16.33)	(12.49)	(15.11)
Loan amount granted in part	0/1	0.02	0.01	0.02	0.01	0.01	0.00	0.03	0.01	0.02	0.02
		(0.15)	(0.11)	(0.12)	(0.11)	(0.10)	(0.06)	(0.18)	(0.12)	(0.14)	(0.13)
Applied for loan	0/1	0.39	0.41	0.35	0.26	0.19	0.37	0.54	0.31	0.40	0.36
		(0.49)	(0.49)	(0.48)	(0.44)	(0.39)	(0.48)	(0.50)	(0.46)	(0.49)	(0.48)
Children	0/1	0.29	0.37	0.32	0.25	0.45	0.39	0.35	0.33	0.43	0.35
		(0.45)	(0.48)	(0.47)	(0.43)	(0.50)	(0.49)	(0.48)	(0.47)	(0.50)	(0.48)
Consumption loan	0/1	0.38	0.80	0.75	0.69	0.55	0.69	0.49	0.69	0.84	0.64
		(0.49)	(0.40)	(0.43)	(0.46)	(0.50)	(0.46)	(0.50)	(0.46)	(0.37)	(0.48)
Distance to banks	1/6	2.33	2.87	2.76	3.06	3.10	3.24	2.47	3.34	3.33	2.94
		(1.32)	(1.36)	(1.80)	(1.65)	(1.70)	(1.67)	(1.63)	(1.83)	(1.76)	(1.68)
Secondary education	0/1	0.42	0.38	0.68	0.49	0.46	0.42	0.56	0.48	0.62	0.50
		(0.49)	(0.49)	(0.47)	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)	(0.48)	(0.50)
Tertiary education	0/1	0.15	0.17	0.22	0.29	0.24	0.15	0.18	0.16	0.23	0.20
		(0.35)	(0.38)	(0.41)	(0.45)	(0.43)	(0.36)	(0.39)	(0.37)	(0.42)	(0.40)
FX deposit preference	0/1	0.52	0.16	0.42	0.30	0.27	0.53	0.63	0.55	0.77	0.46
		(0.50)	(0.36)	(0.49)	(0.46)	(0.45)	(0.50)	(0.48)	(0.50)	(0.42)	(0.50)
FX loan	0/1	0.52	0.24	0.31	0.40	0.18	0.23	0.82	0.22	0.70	0.44
		(0.50)	(0.43)	(0.46)	(0.49)	(0.39)	(0.42)	(0.38)	(0.42)	(0.46)	(0.50)
FX loan preference	0/1	0.24	0.08	0.10	0.18	0.10	0.03	0.38	0.11	0.24	0.18
		(0.43)	(0.27)	(0.29)	(0.38)	(0.30)	(0.18)	(0.48)	(0.31)	(0.43)	(0.38)
Household size: 2 persons	0/1	0.37	0.33	0.34	0.37	0.13	0.24	0.28	0.20	0.17	0.27
		(0.48)	(0.47)	(0.47)	(0.48)	(0.34)	(0.43)	(0.45)	(0.40)	(0.38)	(0.44)
Household size: 3+ persons	0/1	0.41	0.53	0.54	0.41	0.85	0.67	0.62	0.72	0.74	0.61
		(0.49)	(0.50)	(0.50)	(0.49)	(0.36)	(0.47)	(0.49)	(0.45)	(0.44)	(0.49)
High income	0/1	0.21	0.23	0.23	0.24	0.29	0.24	0.22	0.31	0.21	0.24
		(0.41)	(0.42)	(0.42)	(0.43)	(0.45)	(0.42)	(0.42)	(0.46)	(0.41)	(0.43)
Medium income	0/1	0.23	0.23	0.22	0.23	0.30	0.24	0.29	0.28	0.22	0.25
		(0.42)	(0.42)	(0.41)	(0.42)	(0.46)	(0.43)	(0.46)	(0.45)	(0.41)	(0.43)
No information on income provided	0/1	0.29	0.29	0.29	0.33	0.17	0.29	0.25	0.10	0.31	0.25
		(0.45)	(0.46)	(0.45)	(0.47)	(0.37)	(0.45)	(0.43)	(0.30)	(0.46)	(0.43)
Inflation literacy	0/1	0.64	0.44	0.76	0.41	0.32	0.46	0.69	0.47	0.64	0.54
		(0.48)	(0.50)	(0.43)	(0.49)	(0.47)	(0.50)	(0.46)	(0.50)	(0.48)	(0.50)
Loan	0/1	(0.45)	(0.41)	(0.43)	(0.37)	(0.32)	(0.45)	(0.48)	(0.42)	(0.41)	(0.42)
		0.28	0.22	0.25	0.17	0.12	0.28	0.36	0.22	0.21	0.23
Loan from domestically-owned bank	0/1	0.53	0.39	0.08	0.16	0.13	0.23	0.15	0.41	0.50	0.29
		(0.50)	(0.49)	(0.27)	(0.37)	(0.34)	(0.42)	(0.35)	(0.49)	(0.50)	(0.45)
Loans refused	0/1	0.06	0.05	0.06	0.02	0.02	0.03	0.13	0.05	0.06	0.05
		(0.24)	(0.21)	(0.23)	(0.15)	(0.15)	(0.17)	(0.33)	(0.21)	(0.24)	(0.22)
Loan term >10 years	0/1	0.51	0.17	0.13	0.19	0.06	0.05	0.32	0.04	0.11	0.21
		(0.50)	(0.38)	(0.34)	(0.39)	(0.23)	(0.22)	(0.47)	(0.20)	(0.31)	(0.40)
Married	0/1	0.59	0.66	0.71	0.64	0.71	0.71	0.68	0.83	0.73	0.70
		(0.49)	(0.47)	(0.45)	(0.48)	(0.45)	(0.45)	(0.46)	(0.37)	(0.44)	(0.46)
Mortgage	0/1	0.62	0.20	0.25	0.31	0.45	0.31	0.51	0.31	0.16	0.36
		(0.49)	(0.40)	(0.43)	(0.46)	(0.50)	(0.46)	(0.50)	(0.46)	(0.37)	(0.48)
No currency preference	0/1	0.06	0.03	0.05	0.01	0.01	0.04	0.12	0.03	0.04	0.04
		(0.25)	(0.18)	(0.22)	(0.11)	(0.07)	(0.20)	(0.32)	(0.16)	(0.20)	(0.21)
No savings	0/1	0.71	0.63	0.71	0.77	0.34	0.83	0.54	0.30	0.70	0.60
		(0.46)	(0.48)	(0.45)	(0.42)	(0.47)	(0.38)	(0.50)	(0.46)	(0.46)	(0.49)
Own car(s)	0/1	0.56	0.71	0.65	0.35	0.43	0.56	0.80	0.56	0.64	0.58
		(0.50)	(0.45)	(0.48)	(0.48)	(0.49)	(0.50)	(0.40)	(0.50)	(0.48)	(0.49)

Source: OeNB Euro Survey.

Note: The descriptive statistics shown in this table are average values for fall 2012 and fall 2013. The average across countries "Total" is not weighted by country size.

Table A2 continued

Descriptive Statistics

	Min/ Max	HU	PL	BG	RO	AL	BA	HR	MK	RS	Total
Own house	0/1	0.86	0.90	0.94	0.79	0.92	0.81	0.92	0.90	0.91	0.89
		(0.35)	(0.31)	(0.23)	(0.40)	(0.27)	(0.39)	(0.27)	(0.30)	(0.29)	(0.32)
Receives remittances	0/1	0.04	0.03	0.05	0.07	0.21	0.11	0.08	0.09	0.07	0.08
		(0.19)	(0.17)	(0.22)	(0.26)	(0.40)	(0.31)	(0.27)	(0.28)	(0.25)	(0.28)
Regular income in euro	0/1	0.02	0.01	0.01	0.02	0.04	0.04	0.05	0.04	0.03	0.03
		(0.14)	(0.11)	(0.08)	(0.13)	(0.20)	(0.19)	(0.22)	(0.19)	(0.16)	(0.17)
Retired	0/1	0.24	0.25	0.25	0.38	0.11	0.25	0.26	0.25	0.16	0.24
		(0.43)	(0.43)	(0.43)	(0.49)	(0.31)	(0.43)	(0.44)	(0.43)	(0.37)	(0.43)
Risk averse	0/1	0.56	0.56	0.75	0.63	0.58	0.51	0.64	0.81	0.74	0.64
		(0.50)	(0.50)	(0.44)	(0.48)	(0.49)	(0.50)	(0.48)	(0.39)	(0.44)	(0.48)
Self-employed	0/1	0.06	0.07	0.06	0.06	0.24	0.03	0.05	0.06	0.05	0.08
		(0.24)	(0.26)	(0.24)	(0.24)	(0.42)	(0.17)	(0.23)	(0.23)	(0.21)	(0.27)
Took out loan in 2008 or before	0/1	0.74	0.28	0.50	0.59	0.24	0.40	0.57	0.21	0.26	0.45
		(0.44)	(0.45)	(0.50)	(0.49)	(0.43)	(0.49)	(0.50)	(0.41)	(0.44)	(0.50)
Trust in government	0/1	0.25	0.18	0.20	0.21	0.52	0.17	0.18	0.44	0.25	0.27
		(0.43)	(0.39)	(0.40)	(0.40)	(0.50)	(0.37)	(0.38)	(0.50)	(0.44)	(0.44)
Unemployed	0/1	0.11	0.10	0.13	0.16	0.25	0.39	0.18	0.39	0.26	0.22
		(0.32)	(0.29)	(0.33)	(0.37)	(0.43)	(0.49)	(0.39)	(0.49)	(0.44)	(0.41)

Source: OeNB Euro Survey.

Note: The descriptive statistics shown in this table are average values for fall 2012 and fall 2013. The average across countries "Total" is not weighted by country size.

Table A3

Demand for FX Loans (Selection Equation)

Dependent variable	Loan(0.1)			
Sample	All	All	Consumption loans	Mortgage loans
Model	(1)	(2)	(3)	(4)
Loan refused	–0.034***	–0.023***	–0.011***	–0.004***
	(0.007)	(0.005)	(0.003)	(0.001)
Inflation literacy	0.001	0.002	0.003	–0.001
	(0.006)	(0.005)	(0.003)	(0.001)
Distance to banks	–0.002	–0.002	–0.000	–0.001*
	(0.002)	(0.001)	(0.001)	(0.000)
Children	0.028***	0.021***	0.010**	0.004**
	(0.008)	(0.007)	(0.004)	(0.002)
Applied for loan	0.325***	0.233***	0.117***	0.038***
	(0.015)	(0.023)	(0.021)	(0.008)
Loan mean	0.21	0.19	0.13	0.07
Log likelihood value	–3,941.4	–3,404.9	–2,469.0	–1,711.6
Total observations	11,812	11,484	10,732	10,097
Uncensored observations	2,467	2,139	1,387	752
Country*wave fixed effects	Yes	Yes	Yes	Yes
Rho	–0.14**	–0.16**	–0.14	–0.32*

Source: OeNB Euro Survey.

*Note: Marginal effects Heckman probit regression. ***, **, * denote significance at the 0.01, 0.05 and 0.10 level, respectively.*

Table A4

Incidence of FX Loans (Selection Equation)

Dependent variable	Loan (0.1)		
Sample	All	All	All
Model	(1)	(2)	(3)
Loan refused	–0.091***	–0.091***	–0.093***
	(0.029)	(0.027)	(0.027)
Inflation literacy	0.013	0.014	0.014
	(0.024)	(0.022)	(0.023)
Distance to banks	–0.014***	–0.014***	–0.014***
	(0.004)	(0.004)	(0.004)
Children	0.091***	0.097***	0.097***
	(0.023)	(0.024)	(0.026)
Applied	1.052***	1.046***	1.049***
	(0.061)	(0.058)	(0.058)
Mean of loan	0.23	0.20	0.20
Country*wave fixed effects	Yes	Yes	Yes
Log likelihood value	–3,281.1	–3,342.5	–3,882.2
Total observations	12,493	12,560	12,585
Uncensored observations	2,420	2,487	2,512
Rho	–0.59***	–0.51***	–0.31***

Source: Authors' estimations.

*Note: Marginal effects Heckman probit regression. ***, **, * denote significance at the 0.01. 0.05 and 0.10 level. respectively.*

Price and Wage Rigidities in the Republic of Macedonia: Survey Evidence from Micro-Level Data

Florian Huber, Magdalena Petrovska[1]

This paper exploits the information collected from an ad hoc survey conducted on a sample of Macedonian firms to study the extent of nominal price and wage rigidities in the Republic of Macedonia. The research was motivated by the observation that sticky prices influence the responsiveness of inflation to changes in a central bank's policy rate.

Against this background, the paper investigates the relative importance of most determinants of the frequency of price and wage changes identified in the literature. This paper presents a Bayesian analysis of ordinal data. Posterior inference is carried out using Markov Chain Monte Carlo (MCMC) techniques. Infusing the model with prior information allows us to shrink the parameter space, resulting in more precise and reliable parameter estimates. Our results suggest that higher price flexibility is associated with a higher degree of product market competition. Specifically, we find that firms facing high levels of domestic and international competition tend to adjust prices faster.

JEL Classification: D21, E30, J31
Keywords: price rigidity, wage rigidity, Bayesian inference, MCMC, survey data

The question of how the price- and wage-setting behavior of firms influences the effects of monetary policy on the economy has taken center stage in the recent literature. Short-run effects of monetary policy on real macroeconomic aggregates are mainly due to the presence of short-term price rigidities, which, through the real interest rate, allow monetary policy to influence real economic activity. Such nominal rigidities play an important role in modern New Keynesian macroeconomic models, which aim to provide key insights on the transmission mechanism of monetary policy to academics and practitioners in central banks and to policy institutions. An understanding of the transmission mechanism is crucial for the correct practical implementation of monetary policy.

Several theoretical studies have outlined the importance of price and wage rigidities on the transmission mechanism of monetary policy (Christoffel et al., 2006) or optimal monetary policy in the presence of wage rigidities (Blanchard and Galí, 2007). Both contributions employ a New Keynesian model with nominal rigidities combined with the Diamond-Mortensen-Pissarides paradigm, thus providing practical guidance on the implementation of optimal monetary policy. This paradigm aims to provide theoretically consistent explanations for phenomena typically occurring in economic systems and their corresponding equilibria. While both studies emphasize the great importance of real rigidity for the actual implementation of monetary policy, the theoretical findings remain inconclusive in explaining how shocks in the labor markets influence monetary policy.

Most theoretical studies provide a rather generic picture, as they investigate aggregate quantities and the reaction of a representative firm to changes of the underlying macroeconomic fundamentals. To provide a deeper understanding of how companies react to shifts in the underlying fundamentals, empirical studies

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have largely been confined to analyzing individual companies by using large cross-sectional panels. Carlton (1986) and Hall et al. (2000) investigate the pricing behavior of firms facing different degrees of competition. They conclude that firms facing more competition tend to adjust prices faster than companies encountering less competition. Carlton (1986) additionally incorporates the time dimension into the model, extending the analysis by explicitly accounting for persistence effects of demand shocks at some point in time on the price dynamics of a commodity. More precisely, a demand shock today influences not only current prices but also the future path of prices. Geroski (1992) and Álvarez and Hernando (2007) investigate the pricing behavior of firms in different sectors in the U.K. and the euro area, respectively. They corroborate the findings of Carlton (1986) and Hall et al. (2000) and establish that firms operating in less competitive sectors tend to exhibit a somewhat slower reaction to shocks.

This paper investigates the relative influence of several important determinants on the frequency of price changes identified in the literature, such as the degree of product market competition, the cost structure or firms' size. Additionally, we employ a model that is able to track idiosyncratic characteristics and that explains why base wages in some companies tend to be more flexible than in others. These characteristics include the institutional setup for wage bargaining, the composition and characteristics of the workforce, and the wage structure. Using a micro-level survey allows us to unveil the relevance of firm characteristics in the determination of price and wage rigidities, thus enabling us to exploit information that usually cannot be observed in administrative sources. Based on the survey data collected, this paper sheds light on what makes it more or less likely that prices and wages will be sticky, i.e. will not respond immediately to changes in market conditions.

We employ a Bayesian ordered probit model that allows us to incorporate information originating from other studies flexibly and efficiently. Exploiting information from other countries improves the quality of our estimates. Moreover, our Bayesian approach allows us to overcome several problems associated with large numbers of "I don't know" responses and insufficient degrees of freedom. Posterior inference is carried out using the Markov Chain Monte Carlo (MCMC) algorithm put forward by Albert and Chib (1993). In addition, we use a hierarchical prior setup that allows us to set the tightness of the prior in a data-based fashion. This allows us to derive posterior quantities which are infused with prior information when the data become increasingly noninformative.

Our results show that the higher price flexibility is directly related to higher degrees of competitive pressure and exposure to foreign sales as well as to a lower labor cost share. In that respect, our results are consistent e.g. with those of Álvarez and Hernando (2007), who analyze the relationship between price flexibility and competition in nine euro area countries. Our findings are also in line with those of Fabiani et al. (2007) and Vermeulen et al. (2012), who report an inverse relationship between the share of labor cost in total costs and the frequency of price adjustments in nine and six countries of the euro area, respectively. This corroborates the findings in Druant et al. (2009), whose work uses survey data collected in 17 European countries. In addition, the presence of higher workforce turnover, the availability of alternative forms of labor cost adjustment (i.e. of bonuses) along with the presence of any type of wage indexation practice translates into higher wage flexibility. Workforce turnover and the flexible wage component

(i.e. the share of bonuses on the firm's total wage bill) are basically margins of adjustment at firms' disposal, in addition to changing base wages, but they could in turn affect wage change mechanisms. Our results are also in line with those of Lebow et al. (2003), Dwyer (2003) and Oyer (2005), who analyze the role of benefits in reducing nominal wage rigidity on the basis of microdata underlying the U.S. Bureau of Labor Statistics' employment cost index (Lebow), Australian microdata (Dwyer), and U.S. data from the National Longitudinal Survey of Youth (Oyer). Their results corroborate those of Druant et al. (2009).

This paper is structured as follows. Section 1 describes the dataset used and provides detailed information on the design of the questionnaire, in parallel presenting some stylized facts emerging from the Macedonian survey evidence in a comparative perspective. Section 2 provides information on the basic econometric framework, prior specifications and the MCMC algorithms employed. Section 3 emphasizes the economic rationale behind the selection of covariates. Section 4 presents the estimation results, and section 5 concludes.

1 Stylized Facts from the Macedonian Survey Evidence Presented in a Comparative Context

The data employed in this paper were collected in a survey which was conducted during the spring of 2014 and which covered a sample of 514 Macedonian firms in manufacturing, construction, trade and other market services. The firms in the final sample account for around 11% of total employment in the Republic of Macedonia. The sample selected is unbiased and representative.[2] The replies seem to be internally consistent. Furthermore, the relatively high response rate (around 80%) promotes confidence in the results. The sample selection is explained in great detail in Ramadani and Naumovski (2014).

The survey applied the harmonized questionnaire of the Wage Dynamics Network (WDN) research project sponsored by a consortium of 23 central banks in the European Union under the lead of the European Central Bank (ECB).[3] This survey was originally carried out by 17 national central banks for countries for which fully harmonized data are available, i.e. Austria, Belgium, the Czech Republic, Estonia, France, Greece, Hungary, Italy, Ireland, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Slovenia, Slovakia and Spain, between the end of 2007 and mid-2008. The total sample size of the dataset is over 17,000 firms. We use the WDN findings to establish a comparative context for the Macedonian survey evidence discussed below. The WDN has two main research objectives: First, to identify the determinants and features of wage dynamics and labor costs that are pertinent to monetary policy; second, to shed light on the link between wages, labor costs and prices. Furthermore, a series of analytical studies is emerging

[2] *Individual weights were calculated for each firm to make the sample representative of the population of firms and to account for the amount of workers that the firm represents in the population. To this end, three different types of weights were introduced in the dataset: A basic sampling weight to adjust for the unequal probability of firms ending up in the realized sample; an employment-adjusted sampling weight to ensure that the sample represents employees in the population, and a so-called "importance weight" giving each firm in the sample a weight proportional to its size (in terms of employment).*

[3] *For more details on the WDN survey evidence, please refer to the following link: http://www.ecb.europa.eu/home/html/researcher_wdn.en.html. In addition, the October 2012 issue of Labour Economics 19(5) edited by Etienne Wasmer contains a special section on: Price, Wage and Employment Adjustments in 2007–2008 and Some Inferences for the Current European Crisis.*

from this network,[4] thus promoting the circulation of research results and providing a platform for discussion. Among the published research associated with this pooled dataset, we cite Druant et al. (2009), who focus on how European firms' wages and prices are linked, as they provide an infrastructure for our study.

The Macedonian survey questions use 2013 as the reference year. Thus, we find it appropriate to briefly sketch out the prevailing macroeconomic conditions in that period. Economic conditions were broadly favorable in the Republic of Macedonia in 2013. More precisely, following a contraction by 0.4% in 2012, growth accelerated to 2.9% in 2013 and labor markets improved significantly. The recovery was largely driven by the observed broadening of the growth base toward domestic private demand and a better performance of net exports. However, the inflation rate of 2.8% in 2013 to a large extent signaled the transmission of food and import price shocks. In 2013, the financial sector remained resilient. Against this background, monetary conditions were accommodative, with the main policy rate being reduced by 75 basis points to 3.25% in several steps from mid-2012. As a result, credit growth gathered steam from the second half of 2013. However, dynamic household lending growth contrasted with the still weak growth of lending to the corporate sector.

The time gap between the European and the Macedonian surveys spanned the post-2008 global financial and economic crisis period, so that comparisons reflect not only national differences but also changes in the global economic environment. However, note that while favorable economic conditions prevailed in the euro area in the precrisis period, the Republic of Macedonia entered a high-growth period when the survey data were collected.

Several important features of price- and wage-setting behavior have emerged. Below, we focus on some points, in a comparative context, that seem worth emphasizing.

First, the ECB's Final Report of the Wage Dynamics Network[5] (ECB, 2009) shows that prices are adjusted more frequently than wages. This result directly carries over to the Republic of Macedonia: Macedonian survey evidence shows that 30% of the firms revise prices more often than once a year. For the entire euro area, this fraction is 22%, about ten percentage points lower than the non-euro area figure. Moreover, firms that operate in both market services and manufacturing in Macedonia adapt prices much less frequently than those operating in the trade and construction sectors. In parallel, market services have the highest portion of firms reporting that they lack a regular price revision pattern. In addition, in the case of the Republic of Macedonia, survey results show that only 15% of the firms change base wages more often than yearly, which is generally in line with the European aggregate. In this context, around 40% of the European firms confirmed the existence of some correlation between the timing of price and wage changes. Conversely, in the case of the Republic of Macedonia, the majority of firms (70%) did not acknowledge a direct link between the two.

[4] *More information on the pool of research studies arising from this network is available under "Publications" under the following link: http://www.ecb.europa.eu/home/html/researcher_wdn.en.html.*

[5] *The analysis summarized in this report is based on employment-weighted answers. The same type of adjustment is conducted on the Macedonian survey data as well.*

An additional finding stemming from the WDN survey is that wage-setting institutions distinctly determine the nature of both wage dynamics and wage structure. Wage setting displays significant heterogeneity across Europe: Austria, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Sweden have a broadly regulated system of wage bargaining, which rests on a high number of collective agreements. Conversely, the Czech Republic, Estonia, Hungary, Lithuania, Poland and the U.K. have a largely deregulated system of wage bargaining.

The Republic of Macedonia also uses a broadly deregulated wage negotiation mechanism characterized by relatively loose employment protection. In addition, institutional rigidities are not very strong, social assistance is unlikely to push reservation wages, the tax wedge is modest, and the overall business environment appears to be rather supportive of strong job creation (IMF, 2013). The Macedonian authorities made sizeable efforts to improve the local business environment. Improved indicators raised the Republic of Macedonia's rank to 23rd among the 185 countries in the World Bank's "Ease of Doing Business" index for 2013. To achieve this position, the Republic of Macedonia reduced red tape in a significant number of areas, in turn enhancing working conditions in the private sector most clearly and consequently exerting a positive influence on labor.

The scope to which wages are indexed to inflation in Europe has attracted considerable attention on the part of policymakers. The survey results show that on average, one-third of European firms run a policy that adapts base wages to inflation. Around 29% of the Macedonian firms have a wage indexation mechanism that is predominantly informal and backward looking.

2 Econometric Framework

This section provides a brief overview of the modeling framework employed in the empirical application. More specifically, the following subsections describe the general ordered probit model, the prior setup employed and the corresponding posterior distributions.

2.1 The Ordered Probit Model

Following Albert and Chib (1993), we define the vector of ordered responses $Y=Y_1,...,Y_N$, where Y_i takes one of J ordered categories. Moreover, $X=X_1,...,X_K$ denotes a $N \times K$ matrix of exogenous variables. Finally, we define a latent variable, Y^*, which is related to Y through the definition of a suitable linking function $F(g)$. Regressing y_i^* on X_i yields the following latent variable model

$$y_i^* = X_i\beta + \varepsilon_i,\ \varepsilon_i \sim N(0,1) \tag{1}$$

where y_i^* denotes the i^{th} column of Y^* and β is a K-dimensional coefficient vector. X_i is the i^{th} column of X. Conditional on y_i^*, equation (1) is a simple regression model that can be analyzed using standard methods. To describe the behavior of y_i^*, we introduce a J– dimensional vector $\gamma=(\gamma_0,...,y_J)$ such that

$$y_i = j \ \text{ if } \ \gamma_{j-1} < y_i^* \leq \gamma_j \tag{2}$$

where $\gamma_{j-1} < \cdots \leq \gamma_J$ is necessary (but not sufficient) to identify the model.

As mentioned above, the latent variable y_i^* is related to y_i through $F(g)$. Let us denote the probability that $y_i=j$ as $P(y_j = j)$. Under the assumption that $F(g)= \phi(g)$ equals the cumulative distribution function of the standard normal distribution, the probability of observing $y_i=j$ is given by

$$P(y_i = j \mid \beta, \gamma) = \phi\left(\gamma_j - X_i\beta\right) - \phi\left(\gamma_{j-1} - X_i\beta\right) \quad (3).$$

The model described by equations (1) and (3) is not identified. Thus we have to assume that $\gamma_0 = -\infty$ and $\gamma_J = \infty$.

Again, conditional upon knowledge of γ (and thus Y^*), equation (1) reduces to a simple regression model that can be analyzed using standard prior specifications.

2.2 Prior Distributions

Bayesian analysis requires the researcher to specify prior distributions for each coefficient of the model described above. Under the (necessary) assumption that ε_i is standard normally distributed, we have to choose suitable priors for the elements of β and γ. To control the tightness of the prior on β, we introduce a latent hyper-parameter $\delta \in \mathbb{R}$.

More formally, we impose normal priors on both coefficient vectors, given by:

$$\delta \sim G(a_1, a_2)$$
$$\beta \mid \delta \sim N(\underline{\beta}, \delta\, \underline{V}_\beta)$$
$$\gamma \propto c$$

The hyperparameter δ is treated as a random quantity; thus it is necessary to impose a prior on δ. We specify a gamma prior with parameters a_1 and a_2. This choice has several convenient properties because it imposes the restriction that $\delta \in \mathbb{R}^+$.

The prior on β is a normal prior, where $\underline{\beta}$ denotes a $K\times 1$ vector of prior means and $\underline{V}_\beta$ denotes a $K\times K$ prior variance-covariance. Given that the variance of ε_i equals one, this prior is conjugate, which facilitates well-known conditional posterior solutions (see Koop, 2003).

Finally, the prior on γ is noninformative and improper for each γ_j. This choice reflects the belief that we have no information on the threshold levels of the latent variable y_i^*. Imposing a diffuse prior on γ, motivated in Albert and Chib (1993), has become a standard choice in the literature on the Bayesian estimation of ordered probit models. Another option would be to impose a normal prior that fulfills $\gamma_{j-1} \leq \cdots \leq \gamma_J$. However, unless we have strong information on the specific elements of γ, a flat prior proves to be a convenient choice.

2.3 Posterior Distributions and the Markov Chain Monte Carlo Algorithm

Combining likelihood and prior information yields posterior quantities. Under the prior assumptions described above, the conditional posteriors for β,γ and δ take the following form:

$$\delta \mid \beta, \gamma, Y^*, Y \sim p(\delta \mid Y)$$

$$\beta \mid \gamma, \delta, Y^*, Y \sim N(\overline{\beta}, \overline{V}_\beta)$$

$$\gamma \mid \beta, \gamma, Y^*, Y \sim U(\overline{\gamma}_{j-1}, \overline{\gamma}_{j+1})$$

Unfortunately, the conditional posterior of δ is of not a well-known form. This fact prevents the use of a simple Gibbs sampling scheme for that parameter. Fortunately, however, the marginal likelihood of the (latent) model in (1) is available in closed form under the conjugate prior. This makes it easy to set up a simple Metropolis-Hastings step to simulate δ.

The conditional posterior of β takes a simple form. More specifically, the posterior mean and variance of β are given by:

$$\bar{V}_\beta = \left((\delta \underline{V}_\beta)^{-1} + X'X\right)^{-1}$$
$$\bar{\beta} = \bar{V}_\beta \left((\delta \underline{V}_\beta)^{-1} \underline{\beta} + X'y\right)$$

The latent variable y_i^* can be sampled from the following conditional posterior (see Koop, 2003):

$$y_i^* \mid y_i = j\ ,\ \beta, \gamma \sim N\left(X_i\beta, 1\right) I(\gamma_{J-1} < y_i^* \leq \gamma_J)$$

where $I(\cdot)$ denotes the heavy side function that equals one if its argument is true. Thus the posterior of y_i^* is a truncated normal density from which it is straightforward to sample in general.

Finally, sampling γ can be done quite easily by noting that γ_i has to be between γ_{i-1} and γ_{i+1}. Furthermore, we condition on Y and Y^*, which implies that we know what value of Y^* corresponds to a given value of Y. This leads to a conditional posterior quantity that is uniformly distributed between $\bar{\gamma}_{j-1}$ and $\bar{\gamma}_{j+1}$ (Albert and Chib, 1993).

The conditional posterior distributions described above imply that we can set up a simple Metropolis-within-Gibbs algorithm to simulate the joint posterior of the parameters. Specifically, this implies sequentially drawing the parameters from their conditional distributions with the exception of δ, which is sampled through a simple Metropolis step.

3 Data Overview and Prior Implementation

The following section aims at providing a rough overview of the dataset employed and the specifics of the actual prior implementation.

3.1 Data Structure and the Economic Rationale behind the Selection of Covariates

The questionnaire allows us to extend our knowledge of the effects of different labor market institutions and policies on price- and wage-setting schemes. In addition to information on price and wage setting and adjustments, the survey collects data on firms' features, such as the sector of activity, size, structure of the product market, intensity of competitive pressures in the respective market, structure of the labor force and institutional characteristics potentially affecting wage and labor policies.

The dependent variables employed in this paper were constructed as follows. To model price rigidity, a categorical variable was created by breaking down firms' answers to the question on the frequency of price changes. More precisely, the firms were explicitly asked how often they changed the price of their main product. They were able to select one of the following answers: "daily," "weekly," "monthly,"

"quarterly," "twice a year," "once a year," "every two years," "less than once every two years," "never," or "no predefined pattern." To reduce the complexity, we regrouped the answers into four categories (1 – "daily to monthly," 2 – "quarterly to half-yearly," 3 – "yearly," and 4 – "less frequently than yearly"). Firms that opted for "never" or "no pattern" were not considered in the regression. To model wage rigidity, the value categories of the dependent variable were linked to the degree of stickiness according to one of three categories, with 1 = the firm changes wages more frequently than yearly; 2 = changes wages yearly, and 3 = changes wages less frequently than yearly.

The specific choice of the covariates follows insights provided in Druant et al. (2009), Martins (2013) and Garibaldi (2006). The following section aims to provide a short overview of the explanatory variables included and their economic rationale. The annex provides additional technical information on how the variables were constructed.

The *market competition variable* deduces the degree of competition a firm faces from the relevance it gives to changes in competitors' prices to explain its own price decreases. A firm operating in a more competitive environment and facing higher uncertainty about its future position in the market can be expected to be more concerned with ensuring short-run returns, which leads to higher responsiveness to current shocks.

The external competitive pressure variable is designed to indicate whether prices are stickier when higher portions of a firm's sales are from overseas operations. There is always a tradeoff between the loss of keeping prices unchanged and the cost of adjusting supply. The latter may include fixed costs of entry into the foreign market, which the firm could not recuperate if it decided to scale down supply.

Recent micro-level survey data evidence (see, for instance, Dhyne et al., 2007, Fabiani et al., 2007, and Vermeulen et al., 2012, among others) shows that *labor-intensive sectors* are typically characterized by lower frequencies of price changes, suggesting that stickiness in wages and labor costs may be one of the driving factors behind the slow adjustment of prices.

According to Fabiani et al. (2007), *price reviewing rules* might differ in the presence of frequent shocks: Time-dependent pricing might lead to stickier prices than state-dependent pricing, provided that the time frame is quite large and that the cost of adjustment is low. In the presence of nominal price rigidity, monetary policy can affect economic activity in the short run because it is able to respond to shocks before wages and prices adjust.

The following part of the analysis discusses the logic behind the variables employed as covariates in the nominal wage rigidity model specification.

In an imperfect labor market, *trade unions* play an important role in wage determination. The adoption of a less centralized (i.e. firm-level) wage setting agreement is expected to invoke higher wage flexibility.

The empirical literature points out that *permanent contracts* have a stronger effect on wage rigidity in countries with stricter labor regulations. According to Garibaldi (2006), it is very difficult to measure the degree of enforcement of these regulations because some countries may have rigid standards that are only softly enforced, whereas other apparently flexible countries enforce standards very strictly.

The field literature also suggests that wages of *high-skilled workers* are likely to display higher downward rigidity than those of low-skilled workers. Some characteristics of the labor force might prove to be very important in corroborating this suggestion. For instance, wage compressions (Garibaldi, 2006) could lead to situations in which firms change their recruiting behavior. More specifically, companies could adjust the quantity of their workforce and replace unskilled with skilled workers. The main reason for this willingness to hire overly qualified workers might be the lack of reservations that overly qualified workers will quit as soon as possible, which in turn could be considered an indicator of poor outside options. According to Mojsoska-Blazevski and Kurtishi (2012), overqualification in the Republic of Macedonia is higher than that in most of the EU Member States.

The availability of alternative margins of labor cost adjustment other than adjustment of base wages is essential to evaluate the overall degree of labor cost flexibility. The *share of flexible components* was included to measure the extent to which firms with a higher share of the *flexible pay components* in total labor costs are also those with a lower degree of wage rigidity.

Following the literature, it can be expected that firms experiencing high *workforce turnover* adjust wages more often. A high turnover of skilled workers and a high percentage of novices may be harmful to a company's productivity.

3.2 Prior Implementation

As the harmonized questionnaire of the WDN was used for the Macedonian survey, thus basing the latter on the same underlying theoretical concept as the EU survey, we can exploit information from countries in the EU survey to improve our coefficient estimates. Using the study by Druant et al. (2009) as a reference study, we construct our prior as follows. For the coefficient associated with variable i, we center the prior mean β_i on the corresponding coefficient estimate obtained by Druant et al. (2009). The resulting posterior distribution is thus a weighted average of our data information and the information originating from a study conducted in another country. The weight attached to this specific information is controlled by the hyperparameter δ, which is estimated simultaneously with the other coefficients.

The hierarchical nature of our model implies that we let the data inform us about the appropriateness of the prior choice. Thus, the question of whether the study by Druant et al. (2009) is appropriate in our context is handled in an automatic fashion. Additionally, we estimated our models using uninforma-

Table 1

Prior Means

Variable	Mean
Price rigidity equation	
Competitive pressure	–0.300
Share of exports	–0.141
Labor cost share	0.504
State-dependent pricing	–0.241
Wage rigidity equation	
Competitive pressure	0.012
Share of exports	–0.023
Share of permanent workers	0.030
Workforce turnover	–0.170
Share of high-skilled workers	0.012
Collective agreement at firm level	–0.088
Share of bonuses on total wage bill	–0.160
Wage indexation policy	–0.393

Source: Druant et al. (2009).

Note: The data used for this paper consist of a subset of the dataset collected by the Wage Dynamics Network survey. This subset concentrates on 15 EU countries for which fully harmonized data are available, namely Austria, Belgium, the Czech Republic, Estonia, France, Greece, Hungary, Italy, Ireland, Lithuania, the Netherlands, Poland, Portugal, Slovenia and Spain. In addition, the covariates used in our ordered probit models are a subset of our benchmark case, with the exception of the state-dependent pricing variable. The reference for this variable is Martins (2013), who analyses the survey data of Portugal.

tive priors on the latent regression model. The results thus obtained were quite similar to those obtained from the baseline model described above.

4 Empirical Results

This section investigates the key determinants influencing the frequency of price and wage changes across Macedonian firms within a multivariate framework.

4.1 Investigating the Determinants of Price Changes

A core part of this overview section basically represents a model of the frequency of price changes that accounts for the interaction of a number of firm-level characteristics, such as the degree of market competition, price reviewing rules, as well as the relative importance of labor costs. The variable frequency of price changes is intended to provide a rough measure of the extent of nominal rigidities.

We estimate an ordered probit model in which the dependent variable is the four-category variable defined in section 2. The model also controls for firms' characteristics, such as the sector of activity (manufacturing, construction, trade or business services) or size (in terms of employees: 20 to 49, 50 to 199, 200 or more).

The results summarized in table 2 confirm the presence of some cross-sectional differences in price rigidity between firms. Comparing firms in manufacturing (the reference category) with their counterparts engaged in construction, trade and market services reveals that the former are less prone to leaving the price unchanged for more than one year. The estimates also show that prices are changed less frequently in large firms (firms with more than 20 employees). Conversely, our survey data confirms that higher price flexibility, observed as an increase in the frequency of price adjustment, is more typical of the small firms that perceive strong or severe market competition. In addition, price setting by small companies is found to be more diverse than price setting by larger companies, which most often use markup over cost as their pricing strategy.

Investigation of the specific market structure shows that firms operating in more competitive environments change their prices more frequently. A similar result is also found for the exposure to foreign markets. Thus, companies that increasingly operate abroad tend to adjust prices faster than their purely domestic counterparts. This corroborates the findings of Hall et al. (2000). The results also indicate that price reviewing rules do not seem to have a statistically significant bearing on the frequency of price changes. The results of the analysis of firms' cost structure confirm that a greater share of labor costs in total costs is associated with lower price flexibility, thus suggesting that stickiness in wages and labor costs

Table 2

Price Rigidity: Posterior Means and 95% Credible Sets

		Percentile	
Variable	Mean	5%	95%
Intercept*	2.106	1.824	2.394
Construction*	–0.994	–1.324	–0.656
Trade*	–1.462	–1.701	–1.224
Market services*	–0.385	–0.628	–0.141
20–49*	0.447	0.201	0.692
50–199*	0.449	0.221	0.68
>200*	0.828	0.444	1.208
Competitive pressure*	–0.251	–0.454	–0.048
Share of exports*	–0.034	–0.037	–0.031
Labor cost share*	0.461	0.283	0.634
State-dependent pricing	0.126	–0.051	0.296

Source: Authors' calculations.

Note: (*) denotes statistical significance at 5%.

might be one of the factors behind the slow adjustment of prices.

While the coefficient estimates described above provide a rough picture of the relative importance of several variables for the frequency of price changes, we are ultimately interested in the probability of price changes. We determine this probability by investigating the marginal effects, which establish a relationship between the covariates and the probability of each company to adjust prices.

The marginal effects summarized in table 3 show that firms operating in the most competitive environments are 7.8% less likely to leave prices unchanged for more than one year and 5.8% more likely to change prices within a one-month period than firms operating in the least competitive environment. The results also indicate that firms with high exposure to foreign markets are 51.2% less likely to leave prices unchanged for more than one year and 90.4% more likely to change prices within a one-month period than firms with the smallest portion of foreign sales.

Controlling for the cost structure indicates that firms with the greatest share of labor costs in total costs are 13.5% more likely to leave prices unchanged for more than one year and 11.3% less likely to change prices within a one-month period than firms with the least labor-intensive processes. Also, firms with more than 200 employees are 29.4% more likely to leave prices unchanged for more than one year and 13.6% less likely to change prices within a one-month period. Moreover, trade firms are 33.9% less likely to leave prices unchanged for more than one year and 43.1% more likely to change prices within one month than manufacturing firms.

Table 3

Marginal Effects – Price Rigidity

			Percentile	
Variable	Probability	Mean	2.50%	97.50%
Construction*	Y=1	0.326	0.173	0.480
	Y=2	0.030	–0.033	0.075
	Y=3	–0.158	–0.232	–0.083
	Y=4	–0.198	–0.255	–0.136
Trade*	Y=1	0.431	0.334	0.528
	Y=2	0.092	0.041	0.144
	Y=3	–0.184	–0.241	–0.133
	Y=4	–0.339	–0.407	–0.274
Market services*	Y=1	0.104	0.024	0.195
	Y=2	0.047	0.014	0.081
	Y=3	–0.048	–0.095	–0.010
	Y=4	–0.104	–0.175	–0.029
20–49*	Y=1	–0.092	–0.145	–0.035
	Y=2	–0.079	–0.140	–0.024
	Y=3	0.024	0.005	0.045
	Y=4	0.147	0.047	0.255
50–199*	Y=1	–0.097	–0.151	–0.043
	Y=2	–0.077	–0.133	–0.028
	Y=3	0.029	0.010	0.051
	Y=4	0.144	0.055	0.243
>200*	Y=1	–0.136	–0.190	–0.076
	Y=2	–0.155	–0.243	–0.063
	Y=3	–0.003	–0.069	0.038
	Y=4	0.294	0.122	0.466
Competitive pressure*	Y=1	0.058	0.002	0.111
	Y=2	0.041	0.001	0.087
	Y=3	–0.021	–0.042	–0.001
	Y=4	–0.078	–0.158	–0.002
Share of exports*	Y=1	0.904	0.861	0.935
	Y=2	–0.104	–0.144	–0.062
	Y=3	–0.288	–0.345	–0.237
	Y=4	–0.512	–0.580	–0.442
Labor cost share*	Y=1	–0.113	–0.168	–0.061
	Y=2	–0.068	–0.105	–0.035
	Y=3	0.046	0.022	0.075
	Y=4	0.135	0.074	0.199
State-dependent pricing	Y=1	–0.031	–0.082	0.021
	Y=2	–0.019	–0.051	0.013
	Y=3	0.013	–0.008	0.037
	Y=4	0.037	–0.025	0.097

Source: Authors' calculations.

4.2 Investigating the Determinants of Wage Changes

In contrast with the evidence found for price rigidity, the results on wage rigidity summarized in table 4 show that the degree of wage flexibility does not differ

substantially across sectors, no matter what sector is used as a reference category. This does not hold for the size variable: The degree of wage rigidity seems to decrease in line with firm size. In other words, wage rigidity is more prevalent in small firms than in large firms. We offer the following explanation for the observation that firm size is associated with more price rigidity but less wage rigidity: According to the survey, small firms facing strong or severe competition that are not involved in collective wage agreements tend to absorb input cost shocks mainly by reducing other costs, but also to a large extent by directly adjusting prices. This explains the higher flexibility of small firms' prices. Conversely, big firms tend to absorb input cost shocks predominantly by reducing other costs and by reducing their profit margins, which can be one reason for the higher rigidity of big firms' prices. The fact that big firms have more flexible wages is a signal of higher allocative efficiency, meaning that big firms generally find it easier to absorb shocks or to adjust to structural changes. Furthermore, small firms more often apply a smaller share of flexible wage components, reducing their wage flexibility. Additionally, small firms with low turnover rates (low quit rates) are characterized by stronger wage rigidity. Assuming that firms with low quit rates are those with high turnover costs, such firms have an incentive to avoid wage cuts in order to reduce (costly) job quits. Firm-level collective bargaining does not seem to have a statistically significant impact on wage flexibility.

The results on the flexibility of firms' cost structure and the characteristics of their labor force show that firms in which flexible pay components (i.e. bonuses) account for a greater share of total labor costs exhibit a higher degree of base-wage flexibility. On the other hand, the results demonstrate that the impact of the share of permanent employees on wage flexibility is not statistically significant. The literature also suggests that wages of high-skilled workers are likely to display higher rigidity than those of low-skilled workers. However, table 4 clearly shows that firms with a higher share of high-skilled workers do not display a statistically different attitude toward wage flexibility than firms with low-skilled workers. To some extent, this might reflect the relatively poorer outside options of high-skilled workers as well as their overqualification. On the other hand, the results show that the use of the alternative price margins of labor cost adjustment (like the adoption of bonus schemes) increases wage flexibility.

In addition, the marginal effects summarized in table 5 show that firms operating in the most competitive environments are 11.7% more likely to leave wages unchanged for more than one year and 10.3% less likely to change wages more than once a year than firms which operate under the least competitive pressure. Also, firms with the

Table 4

Wage Rigidity: Posterior Means and 95% Credible Sets

		Percentile	
Variable	Mean	5%	95%
Intercept*	1.275	0.926	1.634
Construction	–0.190	–0.531	0.156
Trade	0.068	–0.198	0.334
Market services	0.130	–0.130	0.389
20–49*	–0.462	–0.745	–0.173
50–199*	–0.627	–0.880	–0.376
>200*	–0.537	–0.872	–0.203
Competitive pressure*	0.366	0.163	0.571
Share of exports	0.000	–0.003	0.003
Share of permanent workers	–0.031	–0.232	0.164
Workforce turnover*	–0.006	–0.007	–0.005
Share of high-skilled workers	–0.109	–0.292	0.073
Collective agreement at firm level	0.089	–0.096	0.273
Share of bonuses on total wage bill*	–0.011	–0.015	–0.007
Wage indexation policy*	–0.372	–0.575	–0.169

Source: Authors' calculations.

Note: (*) denotes statistical significance at 5%.

highest workforce turnover are 34% less likely to leave wages unchanged for more than one year and 85.8% more likely to change wages more frequently than yearly than firms with the smallest staff turnover. In addition, firms that adopt indexation strategies are 11.8% less likely to leave wages unchanged for more than one year and 10.6% more likely to change wages more frequently than yearly than firms that do not follow a policy of indexing wages to prices.

5 Conclusions

This paper exploits the information collected from an ad hoc survey conducted on a sample of Macedonian firms to study the extent of nominal price and wage rigidities. The data show that in the Republic of Macedonia, changes in wages occur less frequently than changes in prices. Wages tend to remain unchanged for an average of 16 months. In addition, job tenure is the most important factor behind wage adjustments. Unlike wages, prices tend to remain unchanged for only 7 months. Prices of firms in construction, trade and market services are consistently found to be less sticky than those of firms in manufacturing. The estimates also show that prices tend to be stickier in large firms (firms with 20 or more employees). In addition, unlike price rigidity, the degree of wage flexibility does not differ substantially across sectors. This does not hold for the size variable: Large firms (firms with 20 or more employees) tend to have more flexible wages.

The multivariate analysis of the determinants of price and wage rigidity at the firm level confirms that more frequent price adjustments are associated with more intense competitive pressure and a higher exposure to foreign markets as well as with a lower share of labor costs in total costs.

Higher wage flexibility, on the other hand, is contingent on the presence of higher workforce turnover, the availability of margins of labor cost adjustment

Table 5

Marginal Effects – Wage Rigidity

			Percentile	
Variable	Probability	Mean	2.50%	97.50%
Construction	Y=1	0.057	–0.053	0.190
	Y=2	0.001	–0.034	0.019
	Y=3	–0.058	–0.173	0.079
Trade	Y=1	–0.016	–0.094	0.071
	Y=2	–0.008	–0.045	0.016
	Y=3	0.024	–0.084	0.137
Market services	Y=1	–0.031	–0.105	0.048
	Y=2	–0.014	–0.056	0.011
	Y=3	0.046	–0.059	0.156
20–49*	Y=1	0.139	0.032	0.254
	Y=2	–0.001	–0.044	0.024
	Y=3	–0.138	–0.223	–0.038
50–199*	Y=1	0.187	0.092	0.288
	Y=2	0.000	–0.041	0.031
	Y=3	–0.188	–0.266	–0.105
>200*	Y=1	0.169	0.038	0.313
	Y=2	–0.017	–0.085	0.017
	Y=3	–0.152	–0.241	–0.046
Competitive pressure*	Y=1	–0.103	–0.180	–0.032
	Y=2	–0.014	–0.035	0.005
	Y=3	0.117	0.041	0.190
Share of exports	Y=1	0.005	–0.083	0.106
	Y=2	–0.003	–0.043	0.020
	Y=3	–0.002	–0.118	0.123
Share of permanent workers	Y=1	0.008	–0.054	0.067
	Y=2	0.003	–0.015	0.027
	Y=3	–0.011	–0.093	0.069
Workforce turnover*	Y=1	0.858	0.822	0.889
	Y=2	–0.517	–0.569	–0.463
	Y=3	–0.340	–0.391	–0.291
Share of high-skilled workers	Y=1	0.028	–0.028	0.084
	Y=2	0.009	–0.008	0.032
	Y=3	–0.037	–0.112	0.036
Collective agreement at firm level	Y=1	–0.023	–0.079	0.034
	Y=2	–0.008	–0.031	0.010
	Y=3	0.030	–0.044	0.107
Share of bonuses on total wage bill*	Y=1	0.361	0.187	0.534
	Y=2	–0.103	–0.223	–0.008
	Y=3	–0.258	–0.332	–0.171
Wage indexation policy*	Y=1	0.106	0.034	0.180
	Y=2	0.012	–0.007	0.033
	Y=3	–0.118	–0.189	–0.042

Source: Authors' calculations.

Note: (*) denotes statistical significance at 5%.

other than changes in wages, as well as on the presence of formal or informal wage indexation clauses. The Bayesian approach employed in this paper allows us to combine the prior information obtained from existing studies with our data information, thus effectively updating our beliefs. This mechanism in fact sets the floor for a comparative dimension. Basically, this comparative dimension is built into the model's logic, so that we are able to draw reasonable conclusions about the price and wage rigidity similarities and differences between the Republic of Macedonia and the EU. This framework is rather general and can be employed as a platform for bilateral comparisons between any individual countries or between a country and the average EU outlook.

The survey data are also largely consistent with the macro evidence, notably in the light of macroprudential adjustments to address employment and wage cuts in the aftermath of the global financial and economic crisis. Finally, the inflation outlook in the postcrisis period reflects firms' strategies of adjusting prices after facing an adverse demand shock with the intention of counteracting the negative effect of the demand shock as much as possible.

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Annex: Covariates – Technical Summary

Determinants of Price Stickiness

Competitive pressure: dummy that takes a value of one if a firm considers a price decrease likely or very likely when its main competitors decide to cut their prices

Share of exports: export sales as a percentage of total turnover

State-dependent pricing: dummy that takes a value of one for firms that reply that they change their prices without any predefined frequency (prices are reviewed in response to movements in economic conditions) and zero otherwise

Labor cost share: dummy that takes a value of one for firms whose labor cost share overshoots the sample's median share (35%) and zero otherwise

Determinants of Wage Stickiness

Collective agreement at firm level: dummy that takes a value of one if the firm adopts a firm-level collective agreement

Share of permanent workers: dummy that takes a value of one for firms whose share of permanent workers is equal to or greater than the sample median (85%)

Workforce turnover: workers who leave the firm as a percentage of the total workforce (total number of employees in the firm)

Share of high-skilled workers: dummy that takes a value of one for firms in which the share of high-skilled employees is equal to or greater than the sample median (74%)

Share of bonuses on total wage bill: bonus payments as a percentage of total labor costs

Wage indexation policy: dummy that takes a value of one for firms that adopt any form of wage-to-price indexation and zero otherwise

Table A1

Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Standard deviation
Competitive pressure	514	0	1	0.720	0.450
Share of exports	514	0	100	24.000	37.560
Labor cost share	514	0	1	0.490	0.500
State-dependent pricing	514	0	1	0.540	0.500
Share of permanent workers	514	0	1	0.660	0.480
Workforce turnover	514	0	100	24.200	87.090
Share of high-skilled workers	514	0	1	0.550	0.500
Collective agreement at firm level	514	0	1	0.420	0.490
Share of bonuses on total wage bill	514	0	100	10.720	22.470
Wage indexation policy	514	0	1	0.240	0.430
Frequency of price adjustments	329	1	4	2.620	1.050
Frequency of wage adjustments	417	1	3	2.060	0.700

Source: Authors' calculations.

Note: More detailed information on the dataset and the survey used is available on request.

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.

Austrian Subsidiaries' Profitability in the Czech Republic and Slovakia – CESEE Margins with an Austrian Risk Profile

Stefan Kavan, Daniela Widhalm

The Czech Republic and Slovakia belong to the small and increasingly concentrated group of countries in Central, Eastern and Southeastern Europe (CESEE) whose banking markets have continued to generate substantial profits for Austrian banks also after the outbreak of the financial crisis in 2008. This short study sheds light on why Austrian subsidiaries have been able to maintain their profitability in these two countries especially when compared to those in other CESEE countries. We find that the strong quality of their asset portfolios is the main contributing factor; also, the Czech and Slovak markets now offer net interest margins well above Austrian levels, while the credit risk level is close to that in Austria. By contrast, several other CESEE markets have recorded worsening credit quality and, consequently, dwindling returns. Despite some downside risks related to the low interest rate environment, the openness of the Czech and Slovak economies and a potential intensification in competition, it seems that, from a current perspective, Czech and Slovak subsidiaries can be considered the most stable earnings generators in Austrian banks' international portfolio.

Published in *Financial Stability Report 28*.

The Euroization of Bank Deposits in Eastern Europe

Martin Brown, Helmut Stix

In Eastern Europe a substantial share of bank deposits are denominated in foreign currency. Deposit euroization poses key challenges for monetary policy and financial sector supervision. On the one hand, it limits the effectiveness of monetary policy interventions. On the other hand, it increases financial sector fragility by exposing banks to currency risk or currency induced credit risk. Policymakers disagree on whether Eastern European countries should tackle deposit euroization with "dedollarization" policies or should rather strive to adopt the euro as their legal tender. Assessing the potential effectiveness of "dedollarization" policies requires a clear understanding of which households hold foreign currency deposits and why they do so.

Based on survey data covering 16,375 households in ten countries in 2011 and 2012, we provide the first household-level analysis of deposit euroization in Eastern Europe. We examine how households' preferences for and holding of foreign currency deposits are related to individual expectations about monetary conditions and network effects. We also examine to what extent monetary expectations, network effects and deposit euroization are the legacy of past financial crises or the outflow of current policies and institutions in the region.

Our findings suggest that deposit euroization in Eastern Europe can be partly tackled by prudent monetary and economic decisions by today's policymakers. The preferences of households for euro deposits are partly driven by their distrust in the stability of their domestic currency, which in turn is related to their assessment of current policies and institutions. However, our findings also suggest that a stable monetary policy may not be sufficient to deal with the hysteresis of deposit

euroization across the region. First, we confirm that the holding of foreign currency deposits has become a "habit" in the region. Second, we find that deposit euroization is still strongly influenced by households' experiences of financial crises in the 1990s.

Published as *OeNB Working Paper 197*.

Spillovers from Euro Area and U.S. Credit and Demand Shocks: Comparing Emerging Europe on the Basis of a GVAR Model

Ludmila Fadejeva, Martin Feldkircher, Thomas Reininger

We examine the international effects of adverse loan supply and aggregate demand shocks originating in the euro area and the U.S.A. For that purpose, we use a global vector autoregressive (GVAR) model and isolate disturbances stemming from loan supply from those of four other macroeconomic shocks by means of sign restrictions. Our general results are as follows: Domestic and international responses of total credit and output to an adverse loan supply shock are substantial. They are more pronounced than the responses to an aggregate demand shock. Under both types of shocks, total credit decreases considerably more strongly than output in the long run, implying a reduction in financial deepening. This deleveraging process is particularly pronounced in the case of loan supply shocks. Taking a regional angle, Central, Eastern and Southeastern Europe (CESEE) and even considerably more the Commonwealth of Independent States (CIS) are the most strongly affected regions, and their total credit and output responses are stronger than in the country of shock origin. This is true for both types of structural shocks in the euro area and in the U.S.A. Last, historical decompositions of deviations from trend growth show that for the euro area developments, foreign shocks originating in the U.S.A., the UK and the CESEE and CIS regions feature most prominently, while for the U.S. developments, foreign shocks emanating from the euro area and China play a considerable role.

Published as *OeNB Working Paper 198*.

Event Wrap-Ups and Miscellaneous

Conference on European Economic Integration 2014: The Rebalancing Challenge in Europe – Perspectives for CESEE

Compiled by
Andreas Breitenfellner,
Susanne Steinacher
and Julia Wörz[1]

The Conference on European Economic Integration (CEEI) 2014, which the Oesterreichische Nationalbank (OeNB) hosted in Vienna on November 24 and 25, 2014, focused on the rebalancing challenges in Central, Eastern and Southeastern Europe (CESEE) and the euro area.[2] The presentations and debates offered interesting insights, for instance: (1) The EU convergence process has slowed down but might be revived by closing the investment gap and promoting reindustrialization. (2) Sequencing private and public balance sheet repair is critical in a balance sheet recession. Income inequality can be both the source and the consequence of macroeconomic imbalances. (3) The current external rebalancing in the euro area periphery and in CESEE may be structural rather than cyclical even if it is import and demand driven. (4) The first choice when it comes to easing the cost of rebalancing in terms of growth and employment would be fiscal policy, but fiscal policy is legally constrained. (5) Monetary policy is the second choice, but it is less effective at the zero low bound. (6) Structural reforms such as the recent advances in banking sector regulation and coordination might be less desirable in the short term than in the long term.

Around 420 participants from 35 different countries attended the CEEI 2014 to listen to presentations and discussions by high-ranking representatives of central banks, international organizations, the business and banking sectors, and academia.

In his opening remarks, *OeNB* Governor *Ewald Nowotny* referred to three important anniversaries: 25 years since the fall of the Berlin Wall, 15 years since the introduction of the euro and 10 years since the (so far) biggest round of EU enlargement. He affirmed that for an overwhelming majority of Europeans, these watershed events implied a marked rise in living standards and the level of freedom. Enlargement was a "win-win situation" for the acceding countries, the EU as a whole and Austria with its strong links to the CESEE region. As Nowotny pointed out, however, "the crisis has revealed that the previously remarkable catching-up process is neither automatic nor irreversible." In some cases, a strengthening industrial base helped economies escape the dilemma of either chronic disequilibria or contractive deleveraging. The 18% decline in investment levels across the EU-28, however, has negative consequences for present and future growth. Nowotny commended the countries at the Southern and Eastern European periphery for improving their external competitiveness but regretted that the price for this progress was high unemployment, stating that the macroeconomic environment will have to improve all over Europe to make rebalancing successful. Nowotny dismissed the popular presumption that "There is no alternative," supporting the investment package proposed by the new European Commission.

[1] *Oesterreichische Nationalbank, Foreign Research Division. Compiled on the basis of notes taken by Andreas Breitenfellner, Markus Eller, Martin Gächter, Krisztina Jäger-Gyovai, Paul Ramskogler, Thomas Reininger, Maria Silgoner and Julia Wörz.*

[2] *The conference proceedings will be published by Edward Elgar Publishing Ltd. in the course of 2015. Presentations and papers, information about the speakers and the conference program are available at www.oenb.at.*

He also underlined the successful creation of the banking union as a major step toward completing the architecture of Economic and Monetary Union (EMU).

The Role of Investment in a New Growth Model for CESEE

In the first keynote lecture, *Sir Suma Chakrabarti,* President of the *European Bank for Reconstruction and Development (EBRD),* addressed the rebalancing challenges for the CESEE economies. While the EBRD has strongly supported the development of local currency and capital markets, Chakrabarti said that capital flows from advanced to emerging economies in Europe are a good business for both sides. He welcomed some rebalancing in the ownership structure of banks toward domestic ownership as long as this rebalancing was based on market principles without implying any "targets" for national ownership. He also pointed to the importance of high-quality investment, which is a key precondition for growth-enhancing high-impact infrastructural projects. In Chakrabarti's view, the CEEI 2014 addressed a crucial agenda for the coming years, namely the building of a sustainable growth model rooted in domestic productivity growth. Despite a slight slowdown in the post-crisis period, structural reforms continue to be essential for growth and convergence. In this context, Chakrabarti pointed out four challenges: First, dealing with the post-crisis overhang of nonperforming loans (NPLs), which has become a renewed priority under the Vienna Initiative; second, addressing corporate debt distress, which underlines the need for a legal environment that encourages financial restructuring as promoted in the Austrian parent bank groups' initiative; third, mitigating the precipitous decline in both public and private investment; and fourth, invigorating innovation, given the exceptionally low levels of public and private R&D spending in CESEE. In the future, growth will need to be more balanced, Chakrabarti concluded – between different sectors, between domestic and external demand, and between different forms of funding.

Risk Aversion Disturbs European and Global Economy

J. Bradford DeLong (University of California) started the second keynote lecture with an appraisal on what has been achieved in Europe over the centuries, focusing in particular on the unprecedented success of economic integration and growth in post-World War II Europe and pointing out that current problems, by comparison, were relatively small. The major problem today, according to DeLong, is the shock triggered by the 2008 collapse of Lehman Brothers and its aftereffects. The 2008 shock is best viewed as a collapse in risk tolerance on both sides of the North Atlantic. The shock was good, on the one hand, because savers have become more cautious, and bad, on the other, because savers are less willing to bear risk. But in an economy, someone must assume the risk-bearing function. Prior to the crisis, when both perceived return and risk tolerance were high (and probably too high), the European convergence model employed "peripheral" labor in extremely risky enterprises at high equilibrium wages. To properly rebalance the European economies, wage levels in the euro area periphery must adjust to match productivity levels – given the resistance of core euro area taxpayers against permanent fiscal transfers. Countries outside the euro area can use exchange rate policy to restore competitiveness, although this can lead to high inflation. Within the euro area, where devaluation is not a possibility, there are other options to replace missing

risk tolerance: (1) large-scale loan guarantees, asset purchases or public spending programs to save "peripheral" firms; (2) structural reform to boost "peripheral" firms' productivity; (3) "peripheral" euro area deflation or core euro area inflation. DeLong suggested to attempt all these and to remain flexible enough to reverse course if one of these options appears too costly to implement.

Difficult Monetary Policy Trade-Offs in CESEE

The panel discussion among high-level CESEE central bank representatives was opened by *Lars E.O. Svensson,* Professor at the *Stockholm School of Economics.* He claimed that in normal times, monetary policy and financial stability policy should be conducted independently, whereby each policy should be fully informed of, and take into account, the conduct of the other. However, in instances where one policy fails to achieve its objective, the other policy must be able react to this failure as a last line of defense. Hence, full cooperation between both types of policy is needed in times of crisis. Svensson said that the current euro area situation, with inflation below the target, was problematic and advocated quantitative easing as an effective tool at the zero lower bound.

Daniel Dăianu, Member of the Board of *Banca Naţională a României,* recalled that some challenges to monetary policy arise from older dilemmas – such as constraints caused by unlimited capital flows, persistent high inflation and the transition crisis. He mentioned the painful adjustment of huge current account deficits in Romania that were coupled with the misallocation of resources into nontradable sectors. New dilemmas for many CESEE economies derive from substantial capital in- and outflows, the impact of EU sanctions against Russia and a general lack of policy coordination. *Nikola Fabris,* Vice-Governor of the *Central Bank of Montenegro,* outlined the experience of a small country whose policy space is extremely limited due to euroization. The main objective of the Central Bank of Montenegro is financial stability, with reserve requirements serving as the only effective macroprudential policy instrument. *Raimondas Kuodis,* Deputy Chairman of *Lietuvos bankas,* observed that the conventional policy mix has reached its limits in the current crisis and that therefore unorthodox policies are to be used. He pointed out that distributional aspects of monetary policy have not received enough attention and pleaded for the use of macroprudential policy to address business cycle fluctuations caused by credit growth. He also referred to the functional finance argument, which states that increasing public debt can be tolerated as long as unemployment and inflation are kept low. *Miroslav Singer,* Governor of *Česká národní banka (CNB),* explained how the CNB had recently been able to reconcile both inflation and exchange rate targeting and hence use its full policy space despite pressure from international capital markets.

The general discussion first centered around the Czech policy experiment, which was generally judged as being successful even if other factors (e.g. reviving domestic demand) were also seen as having been instrumental. Prompted to comment on the prospects for euro adoption, both Singer and Dăianu confirmed their countries' commitment. Dăianu also stressed the need to further improve EMU in a pragmatic way. Panelists agreed that it remains key to preserve ample room for monetary policy and to have as many policy instruments as possible at one's disposal. OeNB Governor Nowotny concluded the panel discussion by highlighting that an evaluation of the criteria for euro introduction should focus on

sustainability. It is in the interest of both the euro area and other EU Member States to make the euro a long-term success and achieve real economy convergence.

Balance Sheet Adjustments Dampen Economic Growth

OeNB Executive Director *Kurt Pribil* gave a short introduction to Session 1 on "Balance Sheet Adjustments and Economic Growth" by turning the attention to balance sheet recessions, debt overhangs and the associated question of the optimal sequencing of adjustment across institutional sectors. He highlighted two crucial policy questions, namely whether Europe is at the beginning of a stagnation period and whether current efforts of banking regulation are jeopardizing the current recovery.

Jan in 't Veld from the *European Commission* focused on current deleveraging and argued that debt overhangs and balance sheet repair are currently important drivers of the slowdown in economic growth. Furthermore, he distinguished between "passive" deleveraging, which is characterized by still positive net credit flows associated with even faster (nominal) GDP growth, and the much more painful "active" deleveraging, which is driven by negative net credit flows. With reference to model-based scenarios, he was able to show that the cost of private sector deleveraging is considerably higher when it is combined with public sector deleveraging. He proposed further unconventional monetary policy measures, a fiscal demand stimulus in public infrastructure and the implementation of structural reforms as possible policy responses.

Richard Koo, Chief Economist at *Nomura Research Institute,* addressed the issue of balance sheet recessions by comparing Europe with Japan. According to his line of argument, as a consequence of the bursting of the asset price bubble, balance sheets are currently under water and firms pay down debt despite of zero interest rates, i.e. they minimize debt instead of maximizing profits. In the euro area and many other advanced economies, the corporate sector has considerably increased its financial surplus during recent years. In such a situation, according to Koo, the government is the only sector still willing to borrow and therefore should step in to increase aggregate demand. In the euro area, Koo identified two main structural deficiencies, namely the fiscally restrictive Maastricht Treaty and the existence of procyclical and destabilizing capital flows between government bond markets.

Helene Schuberth (OeNB) took a closer look at the role the nonfinancial corporate sector plays in sluggish EU recovery. She highlighted the significance of inter-related balance sheets across institutional sectors and the massive drop in private sector demand in many EU economies following the 2008 crisis. From a micro perspective, falling capital expenditures are associated with a significant increase of cash holdings among large (listed) firms in the euro area. This indicates that large firms aim at becoming more independent from external funding sources in an environment of high uncertainty. Furthermore, the significant external rebalancing at the macro level is found to be based rather on a drop in investment than on an increase in national saving. This massive decline in investment further jeopardizes the European convergence process, as poorer countries have discontinued their investment overproportionally.

Macroeconomic Imbalances Are Related to Economic Inequality

The next session dealt with an aspect very often overlooked in discussions: the two-sided link between macroeconomic imbalances and economic inequality. As the session's chair, *OeNB* Director *Doris Ritzberger-Grünwald* pointed out that the trend of mounting external imbalances and diverging income levels was only interrupted temporarily during the crisis. In the meantime, economic research has found that these developments are important factors in hindering economic growth and reducing growth prospects in the euro area.

Michael Kumhof (IMF), who gave his presentation via video recording, focused on the U.S. case. Comparing the pre-1929 and the pre-2008 decades, he observed sharply increasing income inequality, mounting debt leverage of low- and middle-income households and wealth inequality accompanying income inequality. Households' increasing debt leverage eventually triggered a large financial and economic crash. Differentiating between top earners (top 5% of incomes) and bottom earners (the rest), his theoretical model tracks the data very well. He concludes that rising income inequality was the main driver of debt growth as top earners save the additional funds while bottom earners borrow to increase consumption. He concluded that, as crisis probability rises with debt, income inequality was also a key contributing factor to the 2008 crisis.

Till van Treeck, Professor at the *University of Duisburg-Essen,* confirmed Kumhof's finding that with top earners' rapidly rising income shares, the savings rate in the U.S.A. declined and debt increased as low income households dissaved and borrowed to increase consumption. This resulted in rising current account deficits. The German case is different as it is dominated by small and medium-sized, family-owned firms which retained profits within the company instead of distributing bonuses and dividends. Thus the top income shares hardly increased in boom years, and corporate financial balances increased strongly. Weak domestic demand in Germany and its current account surplus are hence not the result of weak equipment investment but rather of excessive retained corporate profits.

Mario Holzner, Deputy Director of *The Vienna Institute for International Economic Studies (wiiw),* focused on the countries in CESEE and the CIS. He showed that income inequality is low in the more industrialized core CESEE countries, but high in the northern and southern periphery of the region and even higher in the CIS. Just as in advanced economies, inequalities contributed to credit growth, bubble formation and imbalances, which in turn cemented inequality. In his view, industrial policy and social partnership could contribute critically to the establishment of a balanced and prosperous economy.

Future Growth Strategies in CESEE Rest on Productivity

In his dinner speech, President *Marek Belka (Narodowy Bank Polski – NBP)* discussed the mid-term growth perspectives of Poland as an example for the whole CESEE region. He started with an appraisal of the real convergence process after transition. Between 1995 and 2012, GDP per capita in Poland more than doubled in purchasing power parity (PPP) terms, reaching around 60% of the EU-15 average. The implied catching-up by an impressive 25 percentage points originated mainly from the accumulation of both physical and human capital. Belka noted, however, that the prospects for future growth stemming from traditional sources, which in turn are related to factor accumulation, are rather gloomy – both for Poland and for

many other CESEE countries. EU cohesion funds aside, foreign investment – the main productivity driver so far – tends to diminish, overinvestment is becoming a potential threat (particularly in countries with fixed exchange rates) and skill accumulation in human capital cannot last forever, given worrying demographic trends. Similarly, the growth effects from sectoral shifts gradually dry up: The reallocation of resources from agriculture to services lifted the productivity level, but continued shifts from manufacturing to services tend to lower productivity growth. "The only way to ensure rapid growth in GDP per capita in the future is to encourage ongoing increases in total factor productivity. This calls for a well-crafted policy related to the issues of R&D, technology adoption and our countries' position in the global value chain," Belka concluded. When asked about Poland's perspective of euro introduction, Belka stated that the crisis has revealed the importance of improving shock resilience before losing exchange rate flexibility. He also suggested that EMU should solve its governance problems by mimicking a state with all its essential institutions rather than relying on rules.

Quantitative Easing in the Euro Area via Synthetic Bonds

The second conference day started with a keynote lecture by *Lucrezia Reichlin,* Professor at the *London Business School.* Maintaining that the ECB's targeted inflation rate is increasingly being undershot and expected inflation has continued to decline, Reichlin expressed doubts about how the ECB will re-anchor inflation expectations without implementing a considerable quantitative easing (QE) program. Between 2008 and 2010, when the euro area was confronted primarily with a liquidity crisis in the interbank market, the ECB did not to have to resort to QE (unlike the U.S.A.). But the current situation of prolonged economic stagnation, together with policy rates that have reached the zero lower bound, is reminiscent of traditional macroeconomic crises when the central bank runs out of tools. When pursuing macroeconomic stabilization, there is therefore not really an alternative to QE. However, its implementation, according to Reichlin, is subject to fundamental difficulties. When it comes to the required size of QE, the current ECB purchases of asset-backed securities (ABS) will not be sufficient as the ABS market is rather small. Thus, sovereign bond purchases will also be necessary. To deal with the related moral hazard issues (e.g. reluctant budgetary discipline), more safe assets would be needed at the euro area level; however, such safe assets do not yet exist. Reichlin therefore proposed that for its QE operations, the ECB should exclusively use a synthetic safe bond formed by euro area national bonds combined in GDP-weighted proportions. Only the senior tranche of this synthetic bond should qualify as risk-free for regulatory purposes. According to Reichlin, this solution would eliminate incentives for misbehavior as banks would be protected from the fallout of government defaults and reduce investors' geographic bias in the flight to safety.

External Rebalancing Is Both Cyclical and Structural

The third session focused on the main determinants of the reduction in external imbalances observed since the outbreak of the crisis. *OeNB* Executive Director *Peter Mooslechner,* who chaired the session, recalled that despite significant progress in external rebalancing, many emerging economies are still vulnerable – a fact

that became obvious from the effects of the Federal Reserve's announcement that it would start to taper its bond-purchase program.

Daniel Gros, Director of the *Centre for European Policy Studies,* noted that not everything that is noncyclical is automatically structural. In particular, he referred to co-movements in both cyclically adjusted as well as unadjusted trade balances that have been observed in the euro area despite the fact that trade balance adjustment is largely attributable to import compression, which is typically considered a cyclical factor resulting from weak demand in most European economies. With respect to the large corrections that have taken place since 2008, he stressed that adjustments have been observed in deficit countries while little has changed in the current account balances of surplus countries. Hence, Gros was reluctant to label such unidirectional shifts "rebalancing." Turning to the CESEE countries, which showed a particularly strong reduction in their current account deficits, he concluded that improvements in competitiveness – as evidenced by real depreciations – were beneficial in addition to CESEE's geographical position close to the Russian market, which was dynamic until the outbreak of the Ukrainian crisis. He concluded that improvements in (price) competitiveness dominated in the recent external rebalancing of both CESEE and euro area economies. Structural factors such as targeting growing export markets were only of minor importance.

The second speaker, *Stefan Zeugner* from the *European Commission,* confirmed the view that most of the external imbalance adjustment in the euro area was noncyclical. However, he approached the topic from a supply-vs.-demand perspective rather than from a trade perspective. He recalled that adjustment in Europe resulted from declining demand in the periphery along with sluggish demand (below supply) in the core euro area. With inflation below target, the outlook for nominal GDP has started to worsen recently in the core euro area, compounding the declining trend in nominal GDP in the periphery countries and causing the debt-to-GDP ratio to worsen. This shortfall in "structural" demand arises from lower potential growth and is thus clearly not cyclical. He concluded that given this noncyclicality, the large deficits of the past are not going to reappear. But this piece of good news hides some very bad news as the underlying reasons for trade adjustment are lower demand and lower potential growth in Southern Europe. He deduced that more inflation and growth through investment in Northern Europe will be necessary.

The ensuing discussion centered on persistent surpluses in the core countries, swings in financial fragmentation within Europe as well as the impact of the financial cycle on current account imbalances and the fact that the net international investment positions of euro area economies have not seen any rebalancing so far.

Banking Sector Regulation: The Glass Is Half Full

The final panel brought together the views of bank representatives, regulators and researches. *OeNB* Vice Governor *Andreas Ittner* recalled three crucial lessons for banking regulation from the Austrian perspective: regulation should be harmonized, capital ratios should be increased and macroeconomic policies should be coordinated. *Thorsten Beck,* Professor at *City University London,* asserted that we were only midway to a successful banking union. While the Single Resolution Mechanism (SRM), the establishment of the Single Supervisory Mechanism (SSM) and the comprehensive assessment exercise were steps into the right direction, he

called for a euro area-wide insurance with back-stop funding by the European Stability Mechanism (ESM) and a European recapitalization agency.

Adrian Blundell-Wignall, Director of Financial and Enterprise Affairs at the *Organisation for Economic Co-Operation and Development (OECD),* insisted that capital ratios are an inferior indicator for institutions' propensity to default. An improved regulatory framework should therefore also focus on leverage ratios, since the risk-weighting process is polluted by banks' incentives to reduce their capital ratios as far as possible. *Irmfried Schwimann,* Director of the Directorate-General for Competition of the *European Commission,* echoed that the hike in the return generated through high leverage ratios was achieved only by implicit insurance through tax payers. Tighter regulation thus need not necessarily be detrimental to growth but might even foster competition. Based on his experience in the Netherlands, *Wim Boonstra,* Chief Economist of *Rabobank Nederland,* highlighted that regulatory capture can become a serious problem as unhealthy banks might be kept alive insensibly long. The most important feature of a regulatory system therefore was the possibility to unwind banks without causing costs for the tax payers. *Barbara Potisk-Eibensteiner,* Chief Financial Officer of *RHI AG,* who represented the nonfinancial sector on the panel, pointed to the asymmetric financing conditions nonfinancial corporations are facing. Unlike small and medium-sized enterprises, large corporations can increasingly refinance themselves and benefit from a reduction in lending costs through liquidity injections by monetary authorities. However, since firms' trust in banks has significantly decreased, relationship lending might be the business model banks will opt for in the future. Finally, *Gunter Deuber,* Director of *Raiffeisen Bank International AG,* could not confirm a credit crunch for CEESE countries. Also, he was far more cautious with regard to further banking regulation than his co-panelists. He concluded that it was time for a "regulatory pause" even if more equity in the banking sector would be useful in general.

The panel's views on the shadow banking sector varied. Beck underlined its importance for competition, and Blundell-Wignall stressed its increasing role in bypassing banks and directly providing long-term investments. Contrary to that, Boonstra was worried about the quick rise of shadow banking and argued that the next crisis might be arising in this segment.

In his concluding remarks, OeNB Governor *Nowotny* expressed his gratitude for the excellent food for thought the CEEI 2014 had provided in the current economic situation. He pointed out that many people still consider all CESEE countries emerging market economies, while the conference made it clear that several CESEE countries have a well-established and functioning market economy that is well beyond the stage of "emerging." Finally, he invited all participants to next year's conference: The CEEI 2015 will be held in a greater European format as a joint venture with the *Conference on the Future of the European Economy (CFEE)* of *Narodowy Bank Polski (NBP)* and take place in Warsaw, Poland, on October 15 and 16, 2015.

Olga Radzyner Award Winners 2014

Compiled by
Markus Eller

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

In 2014, the OeNB received 19 submissions for the Olga Radzyner Award from candidates from 11 countries. The submitted papers covered a wide range of topics related, inter alia, to international trade, banking sector stability, the integration of financial markets, the role of foreign currency loans and euroization, the volatility of capital flows, total factor productivity growth, or the way fiscal and monetary policy measures are transmitted to the real economy. In terms of regional coverage, the submitted papers provided empirical evidence for Europe in general and for CESEE in particular.

From these submissions, the jury of OeNB reviewers chose four papers for distinction with the Olga Radzyner Award because they were considered outstanding in terms of originality, motivation and analysis as well as the use of state-of-the-art methods. The awards were conferred by OeNB Governor Ewald Nowotny on November 24, 2014, at the OeNB's Conference on European Economic Integration, and the winners[1] are:

Tomislav Globan (Croatia), Senior Teaching Assistant at the University of Zagreb, investigated the relative importance of domestic versus foreign factors for capital flows in a structural vector autoregressive framework. He found that macroeconomic developments in the euro area have become increasingly important determinants of capital inflows in the CESEE EU Member States. This trend can be connected to rising levels of financial integration in these countries. At the same time, the volatility of capital inflows into the region has increased. These results call upon host countries to strengthen their domestic financial and regulatory systems in order to limit sudden stops in capital flows.

Ildikó Magyari (Romania), PhD student at Columbia University, New York, identified a meaningful impact of financial liberalization on imports, both in theoretical and empirical terms. Her theoretical analysis builds on a conventional trade model with heterogeneous firms and predicts that better access to bank loans, generated by financial liberalization, provides incentives for firms to engage in import transactions and to purchase more imported intermediate inputs. In the empirical part of her paper, she verifies these predictions – applying a difference-in-difference approach – for a sample of Hungarian firms and shows that the import-promoting impact of financial liberalization is economically significant.

Dzsamila Vonnák (Hungary), PhD student at the Central European University in Budapest, studied the determinants and riskiness of corporate foreign currency borrowing, investigating a rich firm-level dataset for Hungary. Her multinomial logit regression results suggest that companies with weaker balance sheets systematically chose to borrow in Swiss francs rather than in euro in the observation period. Moreover, she shows that both the exchange rate movements of the

[1] *In alphabetical order.*

Hungarian forint vis-à-vis the Swiss franc and the per se stronger risk appetite of firms borrowing in Swiss francs contributed to the significantly worse performance (in terms of firm defaults) of Swiss franc-borrowing firms during the crisis.

Vukan Vujić (Serbia), also a PhD student at the Central European University in Budapest, analyzed the impact of funding by foreign parent banks on their CESEE subsidiaries' lending activities in the period of 2009 to 2011. Based on a comprehensive dataset of multinational banking groups operating in 19 CESEE countries he showed that parent bank funding, particularly funding via equity investments, is positively and significantly linked to asset growth of banks' CESEE subsidiaries. Direct exposure of parent banks to stressed euro area countries is associated with lower asset growth of these banks' CESEE subsidiaries. These results can be interpreted in a causal manner, as Vujić convincingly applied instrumental variable estimation techniques.

Hélène Rey on Monetary Policy and International Capital Flows
Summary of the 19th Global Economy Lecture

Compiled by
Julia Wörz

The 2014 Global Economy Lecture[1] was delivered by *Hélène Rey,* Professor of Economics at the London Business School. In her engaging presentation at the OeNB on December 1, 2014, she stressed how important the credit channel is for the international transmission of monetary policy shocks, underlining, in particular, the international role of the U.S. dollar and the need to incorporate insights from international finance into the analysis of international macroeconomics.

In traditional Mundell-Fleming-type models, the international transmission of monetary and fiscal policy depends on the exchange rate regime. More specifically, floating exchange rates can successfully insulate an open economy from foreign monetary policy shocks. Large cross-border capital flows and deep financial integration – salient features of the modern global economy – substantially alter this result, however.

Modern models of monetary policy transmission that incorporate capital market frictions highlight the effects of what is broadly defined as the "credit channel." Such models emphasize agency costs as well as risk, and they postulate an effect of monetary policy on an external finance premium. In her research, Hélène Rey has added the international dimension to models of monetary policy transmission that incorporate net wealth or balance sheet effects. As she argued convincingly in her lecture, allowing for international spillovers in such models leads to large amplifications of agency costs, procyclicalities and leverage through the credit channel. All this implies gains from international cooperation not present in traditional models.

Looking into a wide range of asset classes (equity, FDI, debt and credit), Hélène Rey continued her talk by illustrating the presence of tremendous worldwide co-movements, which constitute a global financial cycle. Her research shows that this global financial cycle is essentially driven by just one global factor. In light of the dominance of the U.S. dollar in all asset classes and its disproportionate importance worldwide as a funding and investment currency, Rey concluded that U.S. monetary policy is affecting financial conditions even in countries with a flexible exchange rate regime. U.S. monetary policy spillovers occur in this case globally through credit spreads and risk premiums and bilaterally through leverage and credit flows. The international credit channel can operate even if policy rates do not react, which implies that domestic monetary policy becomes ineffective in countering such spillover effects. Hélène Rey concluded by emphasizing the need for additional policy tools, in particular macroprudential policies and instruments, which are necessary to restore monetary autonomy in such an environment.

The discussion first revolved around the magnitude of the effects of U.S. monetary policy shocks relative to domestic monetary policy shocks, which Hélène Rey assessed as being of equal importance. Prompted on the role of fiscal policy in response to the limitations of monetary policy, she referred to the long time lag in implementing fiscal policy and its limited role as an active cyclical buffer, but she

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

agreed that the spillover effects could be cushioned through a timely removal of fiscal distortions. Questioned about the relevance of U.S. monetary policy for the euro area, she referred to a general lack of empirical evidence. Yet her findings suggest ample room for monetary policy transmission from the U.S.A. to the euro area, as many of the globally most important banks are domiciled in the euro area.

Notes

Studies Published in Focus on European Economic Integration in 2014

For more information, see *www.oenb.at*.

Issue Q1/14

Do the Drivers of Loan Dollarization Differ between CESEE and Latin America? A Meta-Analysis
Mariya Hake, Fernando Lopez-Vicente and Luis Molina

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Impact of Trade Linkages on Economic Growth Forecasts in Selected CESEE Countries
Tomáš Slačík, Katharina Steiner and Julia Wörz

The Cyclical Character of Fiscal Policy in Transition Countries
Rilind Kabashi, Olga Radzyner Award winner 2012

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Macrofinancial Developments and Systemic Change in CIS Central Asia from 2009 to 2014
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To What Extent Can Czech Exporters Cushion Exchange Rate Shocks through Imported Inputs?
Peter Tóth

Issue Q4/14

FDI in Russia from CESEE and Central Asia: A Micro-Level Perspective
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Periodical Publications

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Geschäftsbericht (Nachhaltigkeitsbericht) — German | annually
Annual Report (Sustainability Report) — English | annually

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

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

Konjunktur aktuell — German | seven times a year

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

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

Monetary Policy & the Economy — English | quarterly

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

http://www.oenb.at/en/Publications/Economics/Monetary-Policy-and-the-Economy.html

Fakten zu Österreich und seinen Banken — German | twice a year
Facts on Austria and Its Banks — English | twice a year

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

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

Financial Stability Report — English | twice a year

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

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

Focus on European Economic Integration — English | quarterly

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

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

Statistiken – Daten & Analysen — German | quarterly

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

http://www.oenb.at/Publikationen/Statistik/Statistiken---Daten-und-Analysen.html

Statistiken – Daten & Analysen: Sonderhefte
German | irregularly

Statistiken – Daten & Analysen: Special Issues
English | irregularly

In addition to the regular issues of the quarterly statistical series "Statistiken – Daten & Analysen," the OeNB publishes a number of special issues on selected statistics topics (e.g. sector accounts, foreign direct investment and trade in services).
http://www.oenb.at/en/Publications/Statistics/Special-Issues.html

Research Update
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CESEE Research Update
English | quarterly

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

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This online series provides a platform for discussing and disseminating economic papers and research findings. All contributions are subject to international peer review.
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Proceedings of the Economics Conference
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The OeNB's annual Economics Conference provides an international platform where central bankers, economic policymakers, financial market agents as well as scholars and academics exchange views and information on monetary, economic and financial policy issues. The proceedings serve to document the conference contributions.
http://www.oenb.at/en/Publications/Economics/Economics-Conference.html

Proceedings of the Conference on European Economic Integration
English | annually

The OeNB's annual Conference on European Economic Integration (CEEI) deals with current issues with a particular relevance for central banking in the context of convergence in Central, Eastern and Southeastern Europe as well as the EU enlargement and integration process. For an overview see:
http://www.oenb.at/en/Publications/Economics/Conference-on-European-Economic-Integration-CEEI.html
The proceedings have been published with Edward Elgar Publishers, Cheltenham/UK, Northampton/MA, since the CEEI 2001.
www.e-elgar.com

Publications on Banking Supervisory Issues
German, English | irregularly

Current publications are available for download; paper copies may be ordered free of charge.
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Most of the research papers published in *Focus on European Economic Integration* (FEEI) are subject to a double-blind peer review process to ensure a high level of scientific quality. The FEEI's Editors in Chief wish to thank the following researchers for their work and diligence in reviewing studies published in *Focus on European Economic Integration* in the period from 2012 to 2014:

Elif C. Arbatli
Jan Babecký
Christian Bellak
Martin Brown
Guglielmo Maria Caporale
Stéphane Dées
Katia D'Hulster
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Oliver Fritz
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