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EUROSYSTEM

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REPORT 33

Stability and Security.

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The OeNB's semiannual Financial Stability Report provides regular analyses of Austrian and international developments with an impact on financial stability. In addition, it includes studies offering in-depth insights into specific topics related to financial stability.

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Contents

Editorial close: June 14, 2017

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Call for applications: Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers (EU or Swiss nationals) 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 2018 should be e-mailed to *eva.gehringer-wasserbauer@oenb.at* by November 1, 2017.

Applicants will be notified of the jury's decision by mid-December. The following round of applications will close on May 1, 2018.

Financial stability means that the financial system – financial intermediaries, financial markets and financial infrastructures – is capable of ensuring the efficient allocation of financial resources and fulfilling its key macroeconomic functions even if financial imbalances and shocks occur. Under conditions of financial stability, economic agents have confidence in the banking system and have ready access to financial services, such as payments, lending, deposits and hedging.

Reports

Management summary

International macroeconomic environment: global growth gaining strength despite subdued mid-term outlook

Macrofinancial conditions and inflation have improved in both advanced and emerging economies amid monetary stimulus from central banks, intensifying international trade and rising commodity prices. The medium-term outlook, however, remains subdued for advanced economies as well as commodity exporters, and the balance of risks remains tilted to the downside given geopolitical uncertainty.

In CESEE, economic conditions were generally solid in 2016. The EU Member States in the region experienced strong economic momentum based on domestic demand and benefiting from benign labor market and wage developments. In Russia and Ukraine, the economic situation also improved, while in Turkey growth decelerated. Euro-denominated government bond spreads for Eastern Europe remained notably below the respective figures for other emerging market regions and – despite some volatility – trended down from their peak registered in the aftermath of the Brexit vote in the U.K. Reflecting solid general economic conditions in an environment of low interest rates, growth of domestic credit to the private sector gained momentum, while bank profitability improved in most countries.

Corporate and household sectors in Austria: debt levels remain low while interest rate risk persists

In 2016, Austria overcame a four-year period of weak GDP growth. The recovery in investment increased the financing needs of nonfinancial corporations. While internal financing remained firms' most important and most stable source of funds, their recourse to external financing picked up in 2016. Roughly two-thirds of total external financing was raised through debt, the maturity structure of which continued to shift toward long-term instruments. This held true in particular for bank loans. While long-term loans by Austrian MFIs accounted for almost one-third of all long-term debt financing, short-term bank loans were reduced significantly, as firms continued to have substantial liquidity at their disposal. Household loans expanded at a steady pace, mostly driven by housing loans. Still, housing loan growth remained moderate compared to, e.g., pre-crisis growth rates or residential property price developments. The latter continued their upward trend in Austria in 2016, although house price growth abated somewhat over the course of the year.

Historically low bank lending rates, reinforced by the high share of variable rate loans, continued to support the current debt-servicing capacity of the corporate and household sectors. Although both enterprises' and households' recourse to variable rate loans shrank in 2016, both sectors are still subject to considerable interest rate risks. Likewise, despite a substantial decrease in past years, the still elevated share of foreign currency loans in the total stock of lending remains a legacy risk. However, household-level data suggest that a large number of variable rate as well as foreign currency loan debtors have adequate wealth to cover their debt obligations.

Austrian financial intermediaries: banks post strong profits in 2016 amid weaker operating results

Austrian banks stepped up their structural adjustment efforts in 2016 and booked strong profits, propelled by a significant reduction in risk provisioning. The formation of new problem loans has

slowed, as the economies in Austria and in CESEE started to recover and the reduction of nonperforming loans made further progress, especially in CESEE. This positive bottom line trend masks a weakening of underlying operating profits, however, as low interest rates and rising operating expenses continue to take their toll.

Regarding its risk-bearing capacity, the Austrian banking system substantially increased its capital ratios in 2016, as profits were retained and UniCredit Bank Austria AG restructured its CESEE business and Raiffeisen Zentralbank Österreich AG merged with Raiffeisen Bank International AG. Furthermore, banks' liquidity position continues to be solid and intra-group liquidity transfers to CESEE have declined further.

Real estate-induced systemic risks remain subdued for Austrian banks, as lenders have broadly adhered to sustainable lending standards. Nonetheless, future developments require continued supervisory attention.

Finally, the volume of foreign currency loans has continued its long-running decline in Austria and CESEE, as policy measures proved effective. Notwithstanding these positive developments, legacy issues continue to be of concern and warrant close monitoring.

Recommendations by the OeNB

The consolidation process in the Austrian banking sector gathered pace in the last years and led to visible adjustments in 2016. Despite improved profitability, there is no room for complacency, however, as very low risk costs still need to prove their sustainability and operating profitability remains under pressure.

Ensuring cost efficiency, risk-adequate lending rates and strong, sustainable and retained profits is essential for a stable banking system. These factors support the internal build-up of capital which is essential for covering loan defaults and allows investing into the (digital) future. A banking system with strong profitability and a high risk-bearing capacity hence contributes to the crisis-resilient provision of credit and a positive economic environment.

Against this background, the OeNB recommends that the following measures be taken:

- Austrian banks' profitability requires a sustainable increase in operating efficiency, especially in the domestic business. In CESEE, banks should continue their efforts to resolve the remaining nonperforming loans.
- Sustainable lending standards in real estate lending must be consistently complied with to prevent the build-up of systemic risks and speculation in residential real estate lending.
- Despite strong improvements in the year 2016, further capital strengthening remains crucial for the Austrian banking system given the still elevated volume of nonperforming loans (especially in CESEE) and in order to ensure resilience against global downside risks.
- Banks should comply with the enhanced FMA Minimum Standards regarding foreign currency and repayment vehicle loans (in force since June 2017) and continue to fulfill the sustainability package.
- Furthermore, banks should continue to prepare for upcoming requirements regarding their liquidity situation and their loss absorption capacity. Additionally, the revised EU Payment Services Directive and new international financial reporting standards require banks' attention.

International macroeconomic environment: global growth outlook more favorable

Improved global financial conditions amid political uncertainty

The growth momentum of the global economy has improved since the beginning of 2017. This is evidenced by upward growth revisions for advanced economies and a pickup in international trade according to the most recent international forecasts (IMF, European Commission and OECD). While rising commodity prices have improved the prospects for commodity-exporting emerging countries, growth in some other emerging markets has been revised downward. Trade growth has recovered from its slowest five-year period since the 1980s despite the danger of a backlash to globalization amid heightened political uncertainty. The medium-term outlook remains clouded, however, given still weak, albeit improving productivity trends and risks that are predominantly skewed to the downside. At the same time, the monetary policy stance has been very accommodative in general, which helped deflation pressures to recede. Political uncertainty remains the key risk, although so far markets seem to be little impressed by disintegration tendencies (Brexit) or anti-globalization rhetoric by individual key politicians. In the euro area the broad-based upswing of the domestic economy continues, and in CESEE (without Russia and Turkey) the economic recovery is driven by consumption and (EU-cofinanced) investment and reviving growth in Russia.

Rising contribution of advanced economies to global growth

The world economy is expected to grow by roughly 3.5% in 2017 and 2018 (IMF, European Commission, OECD). While the industrialized countries are set to make a stronger contribution to global growth, for many emerging economies the growth projections have been lowered, in particular for India, Brazil, Mexico, but also for several countries in the Middle East and Africa, amid increased uncertainty about the future course of U.S. economic policies as well as the progress and impact of China's rebalancing. In the medium term, structural barriers, low productivity growth and persistently high income inequality could also prevent a stronger upturn.

U.S. growth is expected to accelerate to 2.3% in 2017 and even more strongly in 2018 on the back of expected fiscal expansion measures, which, however, will promote investments in private-public partnership projects with uncertain productivity gains. In the first quarter of 2017, real GDP only grew by an annual 1.2%, driven by increased housing investment and private consumption spending, whereas government consumption had a dampening effect. However, special seasonal factors also seem to have played a role. The unemployment rate fell again in May, reaching 4.3%, the lowest level since 2001, and employment growth was robust. Despite the constantly improving situation in the labor market, there has been no appreciable increase in real wages. The consumer price index fell to 2.2% in April, down from record highs in February 2017, due to declining fuel prices. Core inflation was also down, dropping below 2.0% as the prices of a number of nonenergy product groups also declined. Political uncertainty remains the main risk to U.S. growth; a more expansive fiscal policy and financial market deregulation are likely to have positive effects only in the short term while implying destabilization in finan-

cial markets in the long term. In addition, negative effects may also result from increased protectionist economic policy intervention. Stable labor market developments and rising consumer prices prompted the Federal Reserve (Fed) to raise the target range for the federal funds rate by 25 basis points to 0.75% to 1.0% at its meeting in mid-March; this was the third rate hike in the current recovery after the global financial crisis, and market participants seem to expect interest rates to increase further in the course of 2017.

Japan's economy expanded by 0.1% in real terms (quarter on quarter) in the first three months of 2017. Private consumption was the main driver of growth, followed by net exports, which weakened against the background of a strengthening yen. GDP growth is forecast to be at or above 1% in 2017 but to slow down to just above 0.5% in 2018, given the planned phasing-out of fiscal measures and stronger import demand, which could cancel out the positive effects of foreign demand and investment in the context of the 2020 Tokyo Olympics. Despite the persistently weak economy, the unemployment rate fell further, reaching 2.8% in February. Nevertheless, there are still no signs of substantial wage growth. Inflation fell again in February (to 0.2%; core inflation: −0.1%). After its monetary policy meeting in mid-March, the Bank of Japan announced that it would not change its monetary policy orientation with its key interest rate at −0.1%.

In China, real GDP rose by 6.9% (year on year) in the first quarter of 2017, surpassing not only the previous quarter's growth rate of 6.7% but also the 2017 annual growth target of 6.5%. Private consumption seems to be providing strong growth impulses, while the contribution of investment appears to have been decreasing. For the first time since mid-2015, net trade also provided a minimal positive contribution to growth owing to recovering exports to the U.S.A. and Asia, which had possibly been fostered by the depreciation of the renminbi in the second half of 2016. That said, the official figures may be too high, given that they rely on local production reports as well as underestimated price deflators. The rate of inflation declined sharply, dropping from 2.5% in January to below 1% in February and March, with core inflation coming in at roughly 2%. The People's Bank of China (PBC) raised key interest rates in February, including those on open market transactions and short-term loans to banks. Following the Fed's interest rate hike of March, the PBC also raised the interest rates in the interbank market with a view to counteracting increasing corporate debt and further capital outflows.

The U.K. economy grew robustly – at 1.8% – in 2016, contrary to widespread expectations after a majority of the British electorate had voted in favor of leaving the EU in the referendum of June 2016. In the first quarter of 2017, however, real economic growth was just 0.2%, as the positive contribution by investment was mainly offset by the negative contribution by net foreign trade. Growth is forecast to accelerate to 2% in 2017 and to still reach 1.8% in 2018. At present, there is great dispersion between available forecasts, which illustrates the persistent uncertainty that came with the result of the referendum. The unemployment rate is currently at a historically low 4.6%, but long-term unemployment has slightly increased recently. Nominal wage growth has recovered from its decline in winter but still hardly matches the inflation rate, which reached 2.6% in April – the highest value since Septem-

ber 2013 – partly on the back of a weaker pound. At its last meeting in mid-May, the Bank of England decided to keep the key interest rate at 0.25%, unchanged since the summer of 2016, and to continue its purchase program of government and corporate bonds. The Bank of England indicated that interest rate normalization could proceed faster than expected under a smooth Brexit scenario. In the June general elections, Prime Minister Theresa May lost the Conservative Party's overall majority in parliament; since her announcement in mid-April of holding an early election, the pound sterling exchange rate fell by 6 cent to below EUR 1.14 per GBP 1, reflecting expectations that a government potentially weakened by a bad election result would be in a worse negotiating position vis-à-vis the EU.

In Switzerland, the economy gained traction after a weak second half of 2016 so that a moderate expansion of around 1.5% is expected for 2017 and 2018. With both domestic demand and the external sector picking up, real GDP appears to have recovered from the erosion of Swiss export competitiveness due to a strengthening currency, unaffected by signs of protectionist trade policies in the U.S.A. and elsewhere. The exchange rate of the Swiss franc followed an upward trend that peaked in mid-May as the French presidential elections resulted in the victory of pro-EU candidate Emmanuel Macron; since then it has declined slightly to CHF 1.085 per EUR 1. In mid-March, the Swiss National Bank (SNB) reiterated its assessment that the franc was still overvalued and maintained its deposit rate at a record low of −0.75% while forecasting inflation for 2017 at 0.3%. The waning appeal of the Swiss franc as a safe haven currency against the euro has relieved the SNB of the need to continue to buy euro-de-

nominated assets. At present, the balance sheet of the SNB is still roughly five times larger than it was before the crisis.

Euro area recovery becomes stronger and more broad-based

Despite uncertainties arising from geopolitical events (Brexit, U.S. presidential elections) economic growth in the euro area reached 1.7% in 2016, mainly driven by domestic demand. At an estimated 0.6%, real GDP growth was even higher in the first quarter of 2017 than in the previous quarter, and recent sentiment indicators even point to a further strengthening of the upturn. While industrial and construction output figures do not fully reflect this optimism, the prospects for 2017 are positive on account of improved global demand and investment expectations. This is also reflected in the ECB's June forecast, which included a slight upward revision of real GDP growth to 1.9% and 1.8% for 2017 and 2018, respectively. The ECB explained that the revision was due to higher investment on the back of improved economic sentiment, monetary stimulus and higher foreign demand. The downward risks to the forecast are mainly associated with the external environment (Brexit, emerging markets, oil price), but also derive from the banking sector and government bond markets. According to the ECB, the negative output gap will only close toward the end of the forecast horizon (2019), even though potential output is estimated to be growing at just above 1%, which is clearly below the pre-crisis level. Productivity growth has been dampened by historically low investment levels and by an aging population. In view of the moderate economic recovery, the labor market situation is improving steadily but slowly. The euro area

unemployment rate fell to 9.3% in April 2017, reaching its lowest level in eight years, and is expected to gradually decline further to around 9% in 2018. The euro area countries recovering from a particularly deep recession – Greece, Ireland, Portugal and Spain – recorded particularly strong declines in unemployment. Recently accelerating actual and expected employment growth indicates sustained positive, but not very dynamic labor market growth.

Over the last twelve months consumer price inflation in the euro area (HICP) increased from negative levels to 1.4% in May 2017, mainly driven by energy prices. Annual core inflation, which includes the volatile components energy and food, reached just 0.9% in May, given weak wage growth. Inflation is forecast at 1.5% in 2017 and

slightly down at 1.3% in 2018. In June 2017, the Governing Council of the ECB kept the interest rate on the main refinancing operations, the marginal lending facility and the deposit facility unchanged at 0.00%, 0.25% and –0.40%, respectively. The Governing Council expects the key interest rates to remain at the present levels – and no longer considers the possibility of lower interest rates – for an extended period of time and well past the horizon of its net asset purchases. With regard to nonstandard monetary policy measures, the Governing Council confirmed its intention to run its net asset purchases at a monthly pace of EUR 60 billion – reduced from EUR 80 billion in March – until the end of December 2017, or beyond, if necessary, and in any case until a sustained adjustment in

ECB maintains accommodative monetary policy stance

Chart 1

Spreads of euro-denominated sovereign bonds issued in selected emerging market regions

Euro EMBIG spread in basis points
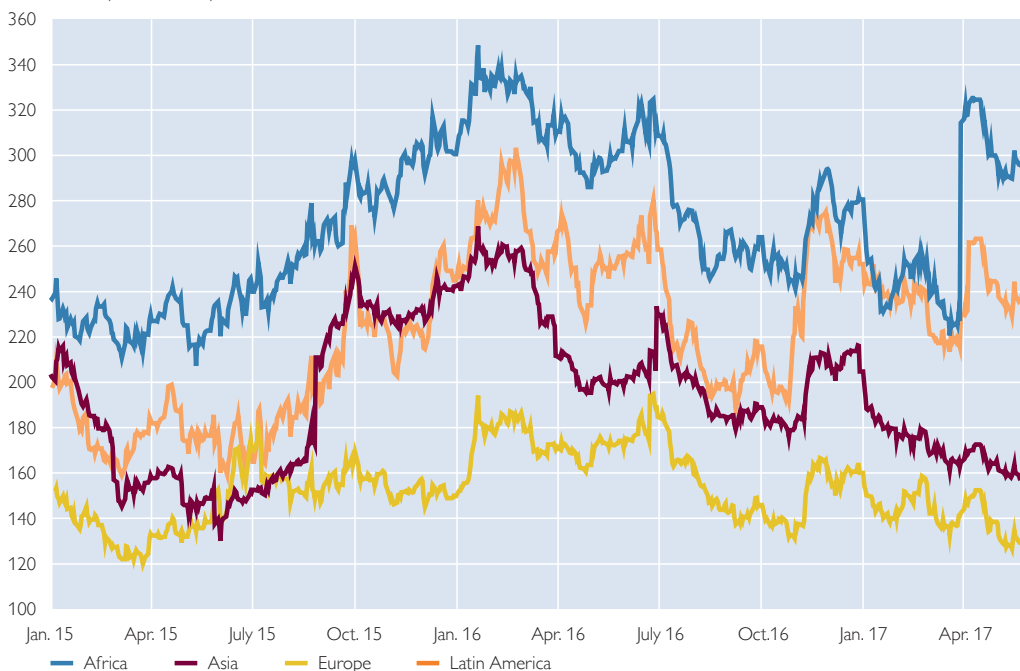
Source: Bloomberg.

Note: EMBIG = Emerging Markets Bond Index Global.

the inflation path consistent with its primary objective can be seen. Meanwhile fiscal policy in the euro area has been broadly neutral.

The annual growth rate of MFI loans to the private sector has been stable in recent months at just over 2%. Loans to households grew at a slightly higher pace than loans to nonfinancial corporations. Banks in the euro area slightly relaxed their guidelines for loans to companies in the first quarter of 2017. The benchmark yields of German ten-year government bonds have increased by some 5 basis points to 0.25% since the beginning of 2017. Market-based long-term inflation expectations have fallen below 1.5%. The ten-year spread between Italian and German government bonds has widened somewhat, whereas the spread between Portuguese, Cypriot and Greek bonds vis-à-vis German bonds has narrowed substantially. At the same time, emerging market spreads showed some volatility, particularly in Africa and Latin America.

Since the beginning of 2017 the exchange rate of the euro has appreciated by some 3% to roughly USD 1.09 per EUR 1 but it hardly increased against the Japanese yen. International stock exchanges performed well, with stock indexes at new – in some cases, record – highs. By mid-May 2017, the representative stock index DJ Euro Stoxx had gained around 11% against the previous year. Over the same period, the Dow Jones Industrial Index gained 6% and the FTSE 100 more than 3%. Brent crude oil prices oscillated around USD 50 per barrel – down by almost 12% due to still full inventories in industrialized economies.

Stable macrofinancial environment in CESEE EU Member States

CESEE: credit growth accelerates in an improving macrofinancial environment

There have been concerns that the high degree of uncertainty in the international political environment could also affect the countries of Central, Eastern and Southeastern Europe (CESEE). After all, a number of recent events have contested some of the building blocks of the political order in Europe: Brexit was a setback for European integration and put an end to the move toward an "ever closer union." And finally, there are uncertainties related to the policy decisions of the new U.S. administration, particularly with regard to the global trade and security architecture.

So far, however, these political events have had no substantial impact on most of the CESEE region. Quite the contrary, the region's risk assessment remained broadly favorable in the review period: Euro-denominated Eurobond spreads for Eastern Europe remained notably below the comparable figures for other emerging market regions and – despite some volatility – trended down after a peak related to the Brexit vote in June 2016.

Other financial market segments performed positively as well. In particular, equity prices increased substantially in most countries. This development reflects solid fundamentals: sentiment has brightened, initial Brexit concerns have eased, global trade has picked up speed, deflation fears have ebbed away and inflation concerns have not yet set in, and the economic outlook has improved. In fact, economic conditions were generally solid in the second half of 2016. The CESEE EU

Member States reported strong economic momentum firmly based on domestic demand and benign labor market and wage developments.[1] The favorable economic situation was also substantiated by rating and/or rating outlook upgrades for several countries (e.g. Slovenia, Slovakia, Poland, Hungary, Romania and Croatia). Furthermore, after a prolonged period of deflation, prices started to increase in the CESEE EU countries, mainly on the back of rising energy prices.

Against this background, the Czech National Bank (CNB) officially discontinued the exchange rate floor of the koruna against the euro in early April 2017 as inflation approached its target. The floor had been in place since November 2013 in order to prevent the exchange rate of the Czech koruna from appreciating to levels below CZK 27 per EUR 1. It was installed as an additional instrument to ease monetary conditions after the CNB's policy rate had reached "technically zero." The immediate reaction after the removal of the exchange rate floor was an appreciation of the Czech koruna against the euro by around 1.9% to around CZK 26.5 per EUR 1. In the following days, the Czech koruna depreciated again, reaching a level that was very close to that of the original exchange rate floor. The CNB underlined its commitment to use its instruments to mitigate potential excessive exchange rate fluctuations if needed.

Looking beyond the CESEE EU members, it is worth noting that annual growth in Russia returned to positive territory in late 2016 for the first time since the final quarter of 2014. Also, the recovery in Ukraine strengthened. Following a deep recession in 2014 and 2015, annual GDP growth accelerated to 4.8% in the fourth quarter of 2016.

Largely driven by oil price increases, the exchange rate of the Russian ruble recovered notably throughout 2016 and 2017. This appreciation in combination with the Central Bank of Russia's (CBR) continued tight monetary policy (with the key repo auction rate at 10% from September 2016 to March 2017) and the country's 2016 record harvest contributed to dampening inflation to a five-year low in March 2017. The CBR thus decided to cut its key policy rate in two steps from 10% to 9.25% in May 2017. Furthermore, all major rating agencies upgraded their ratings outlooks.

In Ukraine, the central bank saw its inflation targets for 2017 and 2018 (8% +/–2 percentage points and 6% +/–2 percentage points, respectively) within reach – despite a temporary uptick in inflation in early 2017 – and cut its key policy rate by 100 basis points to 13% in April 2017. Also in April, the IMF Executive Board completed its third review of Ukraine's economic program under the Extended Fund Facility, enabling the disbursement of about USD 1 billion. The nationalization of the largest Ukrainian bank (Privatbank) in December 2016 was a priority for the Ukrainian authorities[2] and a step that had to be taken before the completion of the third review. Furthermore, Fitch increased its rating for Ukraine to B–.

Turkey has been an outlier in CESEE in terms of economic activity, with growth having decelerated notably from its peak in late 2015. Rising polit-

Improving situation in Russia and Ukraine

Czech National Bank discontinues unconventional measures

Slowing growth in Turkey amid rising political uncertainty

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[1] Schreiner, J. 2017. Developments in selected CESEE countries. In: OeNB. Focus on European Economic Integration Q2/17. Hildebrandt, A. 2017. Outlook for selected CESEE countries. Ibid.

[2] For in-depth information on banking sector developments in Ukraine, see Barisitz, S. and M. Lahnsteiner. 2017. Ukraine's banking sector: still very weak, but some signs of improvement, in this Financial Stability Report.

ical uncertainty in connection with the failed coup in mid-2016 and the tense security situation had a negative impact on capital formation and the tourism sector and sent the Turkish lira on a downward trend. Fiscal stimulus bolstered growth in the final quarter of 2016 but the political and economic situation remained challenging. The implications of the constitutional referendum of April 16, 2017, in which a majority voted in favor of an executive presidency, are not yet clear, in particular as regards the possible impact this result might have on Turkey's relations with the EU. Immediate financial market reactions to the referendum have been positive so far. The Turkish lira also benefited from a tightening of monetary policy: The Central Bank of the Republic of Turkey (CBRT) raised the late liquidity window lending rate by 50 basis points to 12.25% at the end of April, bringing the weighted average cost of CBRT funding up to 11.8% in early May (from 8.2% just before the coup). This marked increase was also fueled by several other upward adjustments of the CBRT's policy rates in the review period, most importantly an increase in the key policy rate (one-week repo lending rate) by 50 basis points to 8% in late November 2016.

As regards credit growth in CESEE, lending to the private sector (nominal lending to the nonbank private sector adjusted for exchange rate changes) finally gained speed in the review period, reflecting solid general economic conditions in an environment of low interest rates, monetary accommodation in the euro area and ample global liquidity.

Among the CESEE EU Member States, credit growth was highest in the Czech Republic and Slovakia at 9.2% and 11.5% in annual terms, respectively, in March 2017. While credit growth had remained broadly stable throughout most of 2016, some acceleration was observed in early 2017 as corporate credit growth gathered momentum. In both countries, macroprudential measures were taken in response to strong loan growth with the aim of building up buffers and preserving lending standards. The Czech Republic was the first EU country to introduce a countercyclical capital buffer of 0.5% of total risk exposure as of January 1, 2017, and the buffer rate will be increased to 1% with effect from July 1, 2018. Slovakia will follow suit and put into effect a similar buffer of 0.5% in August 2017. Furthermore, the CNB issued recommendations on loan-to-value limits and the Slovak central bank introduced a package of measures to address the strong growth of housing loans, including limits on the loan-to-value ratio and on the debt service-to-income ratio as well as maturity limits.

Credit growth was also rather swift in Poland but nevertheless fell short of the growth rates recorded in the Czech Republic and Slovakia. This might in part be related to heightened levels of uncertainty regarding institutional (mainly legal and tax) changes that contributed to the tightening of lending standards in some credit segments. Furthermore, Poland still reports a substantial share of foreign currency loans (especially denominated in Swiss francs) in total loans.

In Romania, credit growth accelerated to 2.3% in March 2017 after having come to a standstill in August 2016. Especially household credit expanded at a robust pace, while corporate credit remained a drag on overall credit growth. Progress has been achieved in shoring up the banking sector in recent years and banking sector uncertainty declined. In particular, the constitu-

Chart 2

CESEE: growth of credit to the private sector

Year-on-year change in %, adjusted for exchange rate changes

Year-on-year change in %, adjusted for exchange rate changes

Slovakia   Poland   Czech Republic
Bulgaria   Hungary   Slovenia
Romania   Croatia

Turkey   Russia   Ukraine

Source: ECB, national central banks.
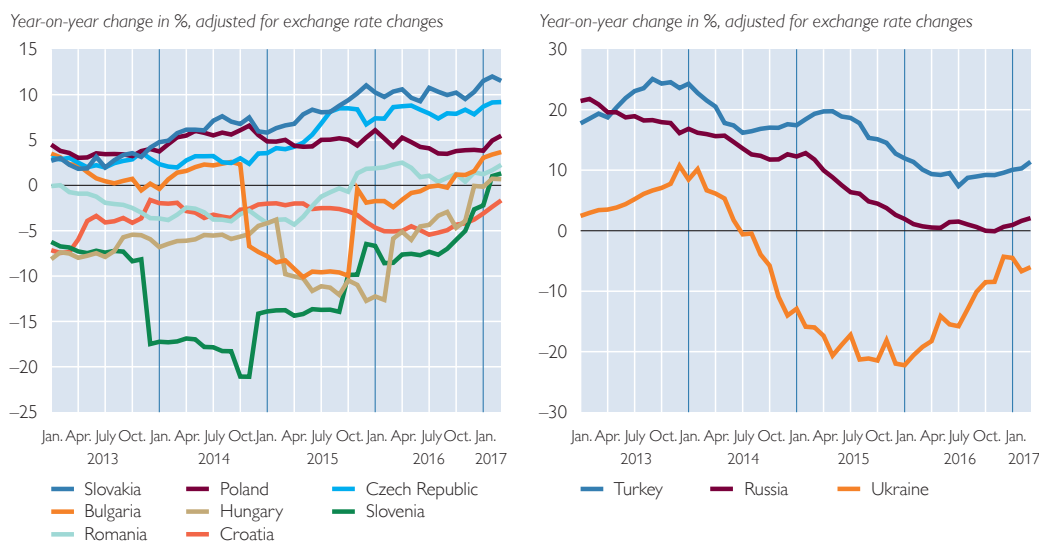
tional court ruled that the giving-in-payment law must respect the civil code, meaning i.a. that debtors have to prove that they entered into default because of unpredictable circumstances. Moreover, the constitutional court decided that the law on the conversion of Swiss franc loans was unconstitutional.

Bulgaria, Slovenia and Hungary reported a turnaround in credit developments: After a prolonged period of decline, credit started to expand again in the review period on the back of robust and broadening GDP growth and a notable decline in nonperforming banking sector assets in all three countries. In Bulgaria, credit growth also reflected intensified bank lending in the wake of the completion of an asset quality review in the banking system in August 2016. Furthermore, in Hungary, credit expansion was fueled by central bank measures (e.g. Funding for Growth Scheme, Growth Supporting Programme). In Slovenia, household credit accelerated while corporate credit continued to decline (at decreasing rates, however).

Croatia was the only CESEE country where the credit stock continued to decrease in the review period. The rate of decrease, however, moderated notably, which was mainly attributable to some recovery in household credit, reflecting an improvement in the general economic environment and labor market conditions. Furthermore, banking sector trends are promising with asset quality and banking sector profitability going up. Credit aggregates, however, are still burdened to a certain extent by the impact of the conversion of household loans indexed to the Swiss franc into euro and a partial write-off of such loans that was completed in mid-2016. In early April, Croatia's constitutional court rejected a request by local banks to assess whether the conversion of Swiss franc loans was constitutional.

Credit growth in Turkey and Russia reached a trough in mid-2016 and late 2016, respectively, before gaining speed in recent months, reaching 11.4% in Turkey and 2.1% in Russia in March 2017. In Turkey, this acceleration was related to accommodative macropru-

dential policies, the CBRT's liquidity measures and government incentives. Consumer loans in particular performed strongly. In Russia, the incipient recovery fueled loan demand, especially by households. In Ukraine, the contraction of the credit stock moderated to −6% in March 2017.

Lending surveys corroborate positive trends

The most recent CESEE Bank Lending Survey carried out by the European Investment Bank[3] (EIB) found that demand for loans further improved across the board in the first half of 2017. Access to funding also continued to improve in CESEE, supported by easy access to domestic sources (mainly retail and corporate deposits).

Aggregate supply conditions remained basically neutral over the first half of 2017. Across the client spectrum, credit standards eased slightly only for corporates while they tightened on mortgages and consumer credit. Changes in regulation and banks' capital constraints are perceived

as key factors that adversely affect supply conditions. Moreover, the EIB survey also consistently indicates nonperforming loans (NPLs) as a drag on credit supply.

In the period ahead, banks foresee a pickup in expected credit demand and an easing of expected supply conditions. Aggregate supply conditions are expected to ease, and the easing is expected to be more broadly based than before. However, the gap between credit demand and supply positions seems to be widening further: Optimism on the demand side is still not fully reflected by aggregate conditions on the supply side.

Notably, the cross-border deleveraging trend seems to be bottoming out, as more and more banking groups expect exposure to stabilize over the second half of 2017 according to the EIB survey. While cross-border banking groups continue to discriminate between countries of operation as they reassess their country-by-country strat-

Chart 3

CESEE banking sector: credit quality

Nonperforming loans (NPLs) and loan loss provisions (LLPs) in % of total credit at end of period
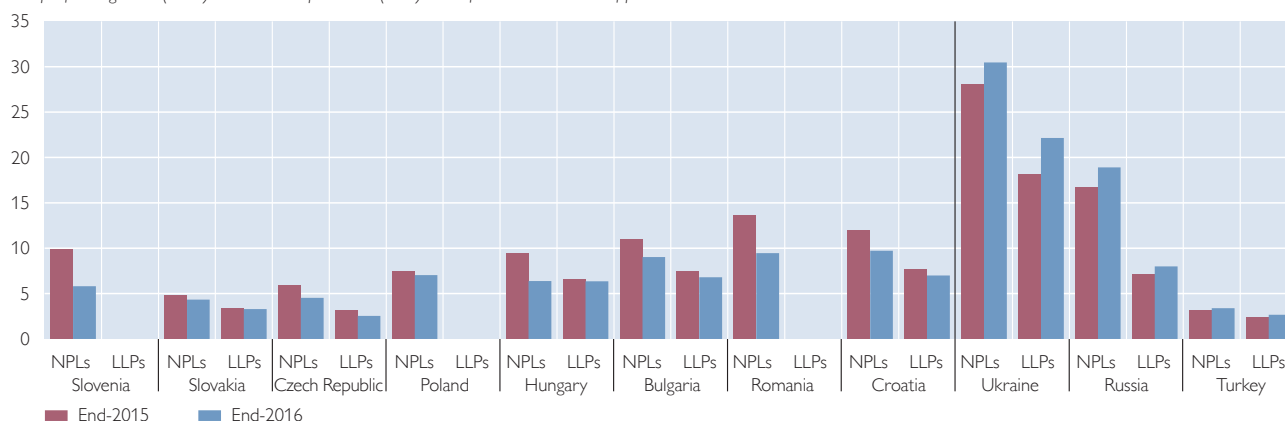
Source: IMF, national central banks, OeNB.

Note: Data are not comparable across countries. NPLs include substandard, doubtful and loss loans, except for Ukraine (doubtful and loss loans) and for Romania and Slovenia (in arrears for more than 90 days).

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[3] http://www.eib.org/attachments/efs/economics_cesee_bls_2017_h1_en.pdf.

egies, they are also increasingly signaling their intentions to expand operations selectively across the region.

The resolution of NPLs in CESEE progressed in the review period. All CESEE EU Member States reported a reduction of NPL ratios. This positive momentum was attributable to the pickup in credit growth on the one hand and to active portfolio cleansing measures on the other hand. For example, the strong decrease in nonperforming assets in Slovenia and Romania (more than –4 percentage points between end-2015 and end-2016) was related to writing off bad debt, selling NPL portfolios as well as to restructuring and forbearance agreements. In addition, in Slovenia, a further tranche of bad claims was transferred to the Bank Asset Management Company. Given those measures, NPL ratios reached the lowest level since 2010 in both countries. Contrary to the positive developments in the CESEE EU Member States, credit quality deteriorated further in Russia and Ukraine. In Turkey, the share of NPLs in total loans increased somewhat but remained at a comparatively low level, with the provision coverage ratio coming to around 75%.

The average return on assets (ROA) in the CESEE EU Member States reached 1.2% at the end of 2016. This corresponds to a doubling of average profitability compared to 2015. The ROA improved particularly in Hungary and Croatia, increasing by 1.4 percentage points and 2.4 percentage points, respectively. In both countries operating (especially noninterest) income was higher in 2016 than in 2015. Most of the improvement, however, was related to lower costs for provisioning and write-offs. In Hungary, a reduction in the bank tax played a role too. In most of the other CESEE EU Member States,

profitability also improved somewhat, the changes vis-à-vis 2015 were smaller, however. Only Romania reported a slight decline in ROA on the back of lower other income.

Returns also improved in Russia and Turkey. In Russia, lower provisions and write-offs drove the results, while in Turkey operating income was somewhat higher as interest income performed well. Ukraine was the only country of the region to report a substantial deterioration in profitability, with the ROA declining from –5.9% at the end of 2015 to –12.5% at the end of 2016 and losses in the banking sector reaching record highs (UAH 159 billion). This deterioration resulted mainly from provisioning for Privatbank after the nationalization of the institute in December 2016.

Capital adequacy ratios remained high and broadly stable in most of the CESEE countries under review at the end of 2016. In the CESEE EU Member States, they ranged between 17.7% in

Most CESEE banking sectors remain well capitalized

NPL resolution progresses

Profitability on the rise

Chart 4

CESEE banking sector: profitability

Return on assets (ROA) in %

Source: IMF, national central banks, OeNB.

Note: Data are not comparable across countries. They are based on annual after-tax profits, except for Russia's data, which are based on pretax profits.

Chart 5

CESEE banking sector: gap between claims and deposits, and net external position

% of GDP at end-2016

Domestic claims less private sector deposits
Net foreign assets (positive value) or liabilities (negative value)
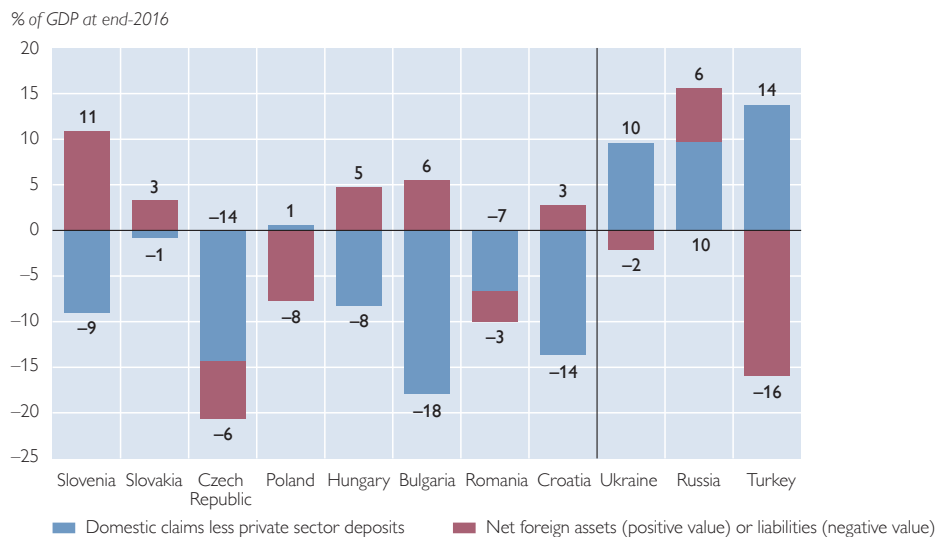
Source: ECB, Eurostat, national central banks, national statistical offices, OeNB.

Funding gaps still moderate in most CESEE countries

Poland and 22.2% in Bulgaria. In the non-EU Member States of the region, capitalization was notably lower (between 12.7% in Ukraine and 15.1% in Turkey).

The refinancing structure of CESEE banking sectors has increasingly shifted toward domestic deposits over the past few years. This is especially true for the CESEE EU Member States that had no substantial gap or a negative gap between total outstanding domestic claims and total domestic deposits (relative to GDP) at the end of 2016. The overhang of deposits over claims even increased notably in Hungary, Croatia and Slovenia. In all three countries, claims were lower at the end of 2016 than a year earlier, while deposits continued their upward trend.

Compared to the EU Member States, Ukraine, Russia and Turkey exhibited positive and large funding gaps of between 10% and 14% of GDP. While the gap narrowed somewhat in Ukraine and Turkey, it widened by 4% of GDP in Russia, as deposits declined notably.

The banking sectors of five of the eleven CESEE countries under observation reported net external liabilities at the end of 2016, mostly ranging between 2% and 8% of GDP. Only Turkey recorded substantially higher net external liabilities of 16% of GDP. Despite its negative funding gap, the Czech Republic's banking sector became a net debtor in the review period. At the same time, the Hungarian banking sector managed to turn from a net debtor into a net creditor.

Corporate and household sectors in Austria: debt levels remain low while interest rate risk persists[1]

Nonfinancial corporations: favorable financing conditions buttress investment recovery

Investment recovers after four years of weak growth

With an annual real GDP growth rate of 1.4% in 2016, Austria overcame a four-year period of weak GDP growth of less than 1%. Austrian industrial output gained significant momentum toward the end of 2016, which – together with improved sales prospects and favorable financing conditions – supported Austrian companies' propensity to invest. Over the past two years, Austrian companies expanded their investment in equipment by almost 10%. Demand for vehicles rose particularly strongly in 2016, but increasing investments were also made in the replacement of production capacities (machinery and equipment). The

investment stimulus package launched by the Austrian government in October 2016 will provide further support for investment activity. In contrast, growth in housing investment remained relatively subdued in 2016, considering that house prices were soaring, population growth was high and lending rates were low.

The left-hand panel of chart 6 shows the development of (nominal) capital formation and financial investments, both in gross terms. The sum of the two items represents the total use of funds of nonfinancial corporations, which increased by 17.8% year on year in 2016. While gross fixed capital formation rose by 4.5% in nominal terms, nonfinancial corporations acquired 61.5% more financial assets than in the year before. More than half were equity[2] instruments and loans extended by nonfinancial corporations, summa-

Equipment investment picks up

Financial investment does not substitute capital formation

Chart 6

Use and sources of funds of Austrian nonfinancial corporations

Use of funds

EUR billion

Sources of funds

EUR billion

Strategic acquisitions[1]
Gross fixed capital formation
Other financial investments
Total use of funds
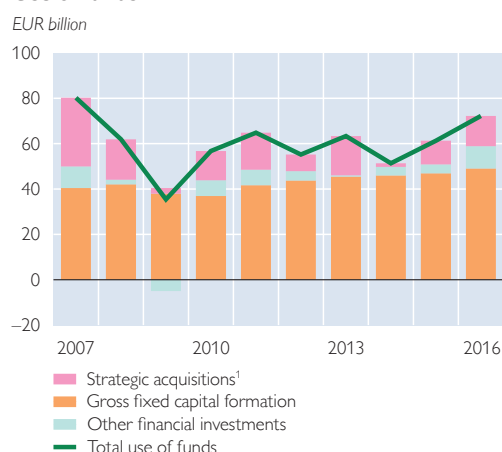
Internal financing (gross)
External financing: debt
External financing: equity
Total sources of funds
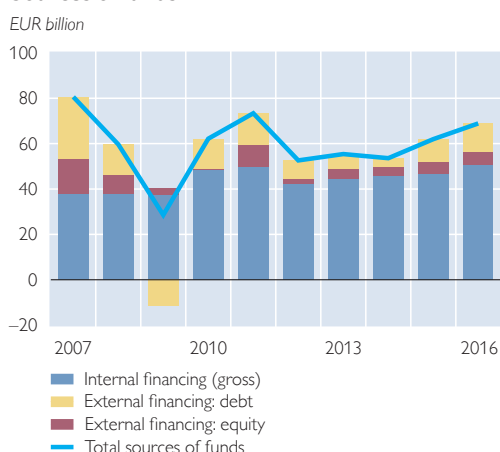
Source: OeNB, Statistics Austria, Eurostat.

[1] *Equity and loans.*

[1] *Due to changes in the methodology applied in the compilation of banking statistics, there are breaks in the time series in a number of banking-related items as of October 2016.*

[2] *(Listed and unlisted) shares and other equity, according to financial accounts data.*

rized as "strategic acquisitions." These items largely represent direct investments in other enterprises. The expansion of other financial investments was mainly driven by short-term items such as bank deposits and trade credit, which both about doubled. In total, less than one-third of the total use of funds went into financial investments in 2016.

Despite the upturn in economic growth, the gross operating surplus of Austrian nonfinancial corporations showed a more or less flat development in 2016, posting a year-on-year decrease of 0.3% in real terms in the fourth quarter of 2016 (based on four-quarter moving sums; see chart 7). In nominal terms, gross operating surplus rose by 1.0%. The growth of nonfinancial corporations' value added remained below that of compensation of employees. As the expansion of gross operating surplus fell short of that of gross value added, profitability (as measured by gross operating surplus divided by gross value added) continued its downward trend, which had been registered since the onset of the crisis. In the fourth quarter of 2016, the gross profit ratio amounted to 40.8%, down 0.3 percentage points compared to end-2015. However, the low interest rate

Chart 7

Gross operating surplus of Austrian nonfinancial corporations[1]

%

10	50
5	48
0	46
–5	44
–10	42
–15	40

2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

— Annual change in %, real (left-hand scale)
— % of gross value added (profit ratio) (right-hand scale)

Source: Statistics Austria.

[1] Moving four-quarter sums.

environment reduced the interest burden of indebted nonfinancial corporations (see below) and thus supported the nonoperational part of corporate income. Overall, increased earnings not only alleviated debt-servicing difficulties for vulnerable firms, but also augmented the internal financing potential of the corporate sector.

Financing volumes of nonfinancial corporations expand

The recovery in investment increased the financing needs of nonfinancial corporations. Internal financing (measured as the sum of changes in net worth and depreciation) remained the most important and most stable source of funds for Austrian nonfinancial corporations (see right-hand panel of chart 6). It increased by 8.7% in 2016 to reach EUR 50.9 billion, a value slightly above that of gross fixed capital formation. At the same time, nonfinancial corporations' recourse to external financing picked up in 2016 and, at EUR 18.0 billion, was up 18.7% compared to the 2015 value. Despite recording the highest value in five years, external financing volumes still remained below pre-crisis figures, reflecting the ample liquidity on the asset side of firms' balance sheets.

As a result of the buoyant growth of internal and external financing, total financing of nonfinancial corporations continued to rise briskly in 2016 (11.1%). At 74%, the share of internal financing in total financing continued to be higher than before the crisis. Overall, the structure of corporate financing was again marked by a significant weight of own funds (internal financing and equity-based external financing), accounting for 82% of financing in 2016.
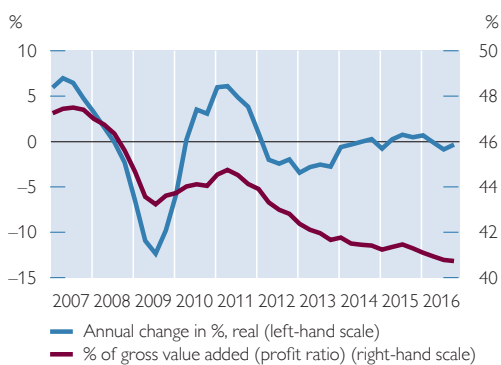
Roughly one-third of total external financing came in the form of equity in

2016, which rose by 7%. The net issuance of listed shares slumped to a mere EUR 0.2 billion. There was one new listing of an Austrian company in Frankfurt, but none on the Vienna stock exchange. Thus, virtually all equity financing came from other equity instruments (mainly purchases by foreign strategic investors). Not only did firms have enough cash reserves to finance investment projects, debt financing continued to be very attractive in light of low interest rates (despite a decrease in the cost of equity issuance implied by rising stock prices).

Debt financing continues to recover

Debt instruments provided two-thirds of nonfinancial corporations' external financing in 2016. Debt financing grew by 24.4% to EUR 12.6 billion but, as in the case of equity financing, still remained below pre-crisis levels despite reaching the highest value in five years. As in the years before, other nonfinancial corporations (both domestic and foreign) were the primary source of debt financing for the Austrian corporate

sector. Mostly, this financing took the form of trade credit, which – including cross-border trade credit – accounted for almost half of total debt financing despite the fact that this form of finance is comparatively more expensive in a low interest rate environment. One reason for the large share of trade credit might be that as a key element of firms' working capital, trade credit is particularly relevant in the early stages of a cyclical upswing. Loans from other (domestic) enterprises, which mostly reflect transactions within corporate groups, played a minor role in 2016. In sum, domestic nonfinancial corporations provided 46% and foreign funding about 60% of external financing for the corporate sector. In contrast, the domestic financial sector contributed very little to external financing in 2016. This was especially true for short-term financing, as short-term bank loans were reduced significantly. Therefore, despite the strong recourse to trade credit, the maturity structure of nonfinancial corporations' debt financing continued its shift toward
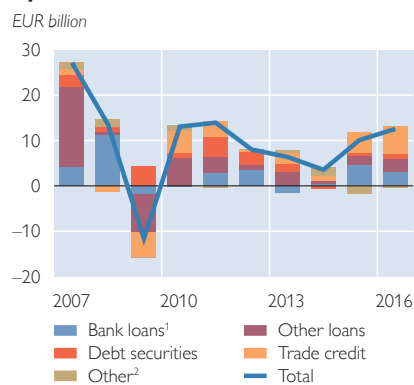
Equity accounts for close to one-third of external financing
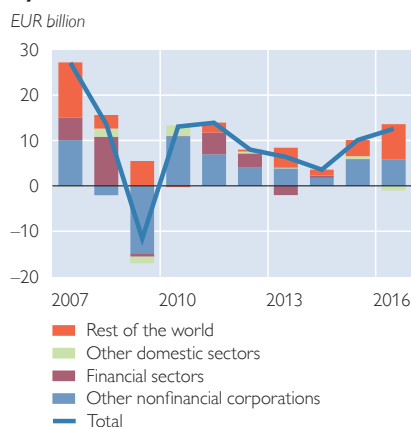
Debt dominated by long-term financing

Chart 8

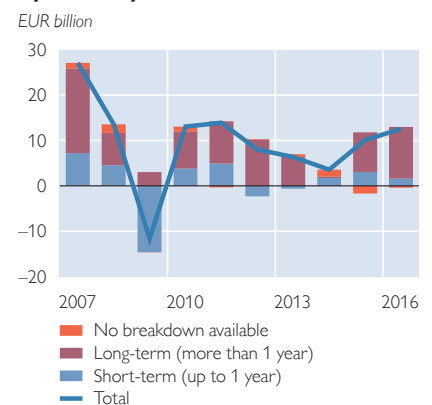### Debt financing of Austrian nonfinancial corporations

Source: OeNB.

[1] By domestic and foreign banks.
[2] Pension entitlements and other accounts payable.

Note: 2016 data are preliminary.

Chart 9

MFI loans to Austrian nonfinancial corporations
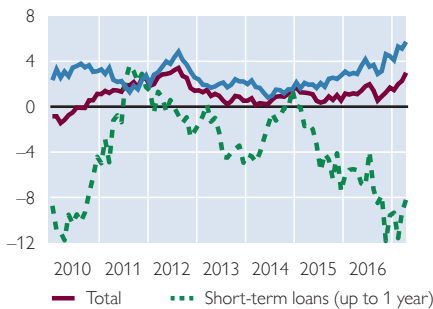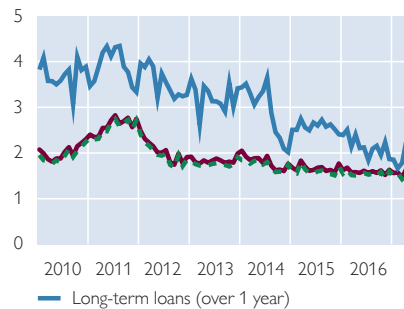
Volumes	Interest rates	Credit standards
Annual change in %[1]	*%*	*Change over last quarter, diffusion index*

−1 = tightened considerably
−0.5 = tightened somewhat
0 = remained basically unchanged

+0.5 = eased somewhat
+1 = eased considerably

Total　　　Short-term loans (up to 1 year)　　　Long-term loans (over 1 year)
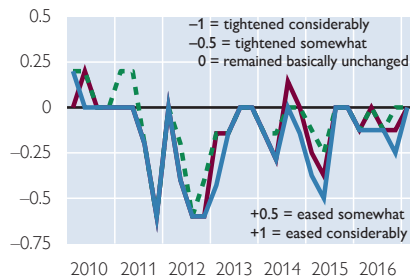
Source: OeNB.

[1] Adjusted for reclassifications, valuation changes and exchange rate effects.

Buoyant growth of longer-term bank loans

long-term instruments (with a maturity over one year) in 2016.

Looking at long-term debt financing only, financial institutions provided more than one-quarter of external financing to nonfinancial corporations in 2016 (twice the contribution of nonfinancial corporations). Long-term loans by Austrian monetary financial institutions (MFIs) accounted for 32% of all long-term debt financing. Over the past few months, overall lending by Austrian banks to domestic nonfinancial corporations has gained some momentum. In April 2017, its annual growth rate (adjusted for reclassifications, valuation changes and exchange rate effects) amounted to 3.0% in nominal terms, the highest value in more than four years (see left-hand panel of chart 9).[3] Short- and long-term loans have been following opposite trends: Loans with medium-term and longer maturities (more than one year), which are most relevant for business fixed investment, went on to expand, growing by 5.7% annually in April 2017, while short-term loans (with maturities of up to one year) have been decreasing for the past two years.

Cautious lending policies persist

Austrian banks continued their cautious lending policies and somewhat tightened their credit standards for loans to enterprises in 2016 and the first quarter of 2017 according to the euro area bank lending survey (BLS; see right-hand panel of chart 9). Respondent banks primarily attributed their tighter standards to reduced risk tolerance. Thus, firms with poor credit ratings and higher insolvency probabilities may have experienced difficulties in obtaining a bank loan. Moreover, banks cited costs related to their capital position and risk related to the collateral demanded as reasons for tightening their credit standards. In contrast, other factors reflecting banks' risk perception, such as their assessment of the general economic situation and of borrowers' creditworthiness, which had been named frequently in the past, played a minor role in recent survey rounds; this was largely attributable to the cyclical upswing of the Austrian economy.

At the same time, corporate loan demand began to recover in 2016, after a prolonged period of decline. From the second quarter of 2016, the banks

[3] At the cutoff date, financial accounts data were available up to the fourth quarter of 2016. More recent developments of financing flows are discussed on the basis of data from the MFI balance sheet statistics.

surveyed in the BLS reported a slight pickup in corporate loan demand. Reflecting the current cyclical situation, in late 2016 and early 2017 banks named funding requirements for fixed investment as a driver of increasing loan demand; previously, these had been cited as a dampening factor almost continuously since 2008. Merger and acquisition activities as well as debt restructuring and re-negotiations remained other factors behind this rise, while internal financing continued to dampen loan demand.

Historically low bank lending rates continued to support lending to the corporate sector, as lower bank funding costs continued to translate into reduced lending rates. Between end-2015 and April 2017, interest rates on new loans to nonfinancial corporations sank by 12 basis points (see middle panel of chart 9). In 2016 and 2017 so far, the spread between interest rates on loans of lesser amounts and larger loans, which – given the lack of other data – is commonly used as an indicator of the relative cost of financing for SMEs, averaged 37 basis points, one of the lowest levels recorded in the euro area.

Moreover, firms continued to have substantial liquidity at their disposal. According to the OeNB's statistics on new lending business, the total amount of undrawn credit lines available to enterprises increased further, although a change in the data collection method as of October 2016 makes direct comparisons with former time periods difficult (see chart 10). Undrawn credit lines continued to expand more strongly than the overall volume of credit lines, implying a significant increase in unutilized liquidity on which enterprises could have drawn if necessary. Additionally, firms' transferable deposits continued to rise (+12.5% year on year in April 2017). Over the past years,

firms have built up sizeable deposits: Total corporate deposits outstanding in April 2017 exceeded gross investment in 2016 by more than 20%. While these liquidity buffers may reflect precautionary motives as well as low opportunity costs of holding liquid assets, in the current environment of budding loan demand recovery, they suggest that the restrictive policies of Austrian banks probably do not constrain financing the Austrian enterprise sector.

Chart 10

Indicators of Austrian nonfinancial corporations' liquidity

EUR billion (left scale) / *EUR billion* (right scale)

Undrawn credit lines (left-hand scale)
Overnight deposits (rigt-hand scale)
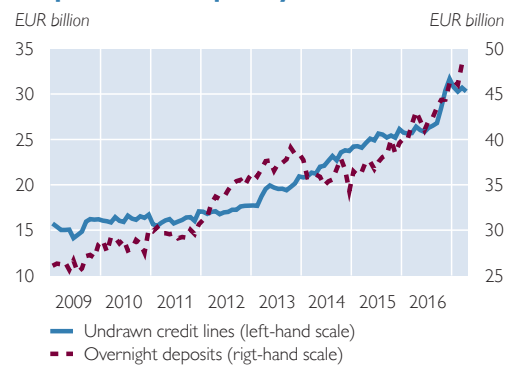
Source: OeNB.

Bank interest rates decline further

Debt securities' contribution to corporate financing remained moderate in 2016. According to financial accounts data, corporate bond issuance increased slightly, supported by low corporate bond yields; amounting to EUR 1.1 billion, it accounted for 6% of total debt financing (and 9% of long-term debt).

Slight increase in corporate bond issuance

Growing liquidity buffers

Interest rate risk remains elevated for the corporate sector

At 2.6% year on year, the growth of corporate debt (measured in terms of total loans raised and bonds issued) surpassed the nominal expansion rate of gross operating surplus in the fourth quarter of 2016. Hence, the debt-to-income ratio of the corporate sector increased by about 6 percentage points

over the past year to reach 420% by the final quarter of 2016 (see upper left-hand panel of chart 11). Due to lower debt levels, the debt-to-income ratio is lower in Austria than in the euro area as a whole, whereas the debt-to-equity ratio, which fell slightly to 92% in 2016 according to financial accounts data[4], is higher in Austria than in the euro area, reflecting the greater importance of debt financing in Austria.

Share of variable rate loans remains high

The low interest rate environment continued to support firms' current debt-servicing capacity. In 2016, the proportion of gross operating surplus spent on interest payments for (domestic) bank loans continued to decline slightly, reaching 3.4% in the fourth quarter of 2016. This reduction reflected the still high share of variable rate loans in new loans, which has come down only 8 percentage points since mid-2014 to reach 86% in the first quarter of 2017. While Austrian companies are therefore currently experiencing lower interest expenses than their euro area peers, they face a higher exposure to interest rate risk. A rebound of interest rates could become a burden, especially for highly indebted companies, even if rising debt-servicing costs may be accompanied by increasing corporate earnings in an economic recovery.

The Austrian corporate sector's exposure to foreign exchange risk de-

Chart 11

Risk indicators for Austrian nonfinancial corporations

Debt

% of gross operating surplus
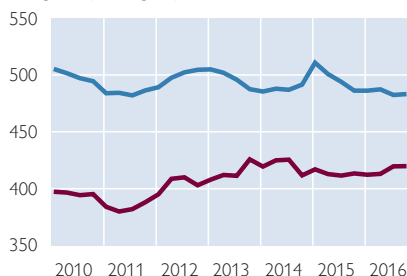
Debt-to-equity ratio

%
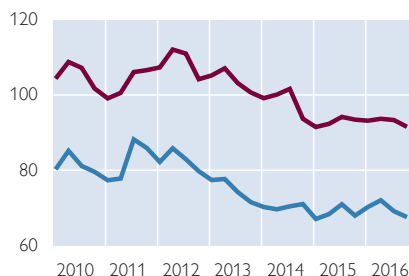
Interest expenses[1]

% of gross operating surplus
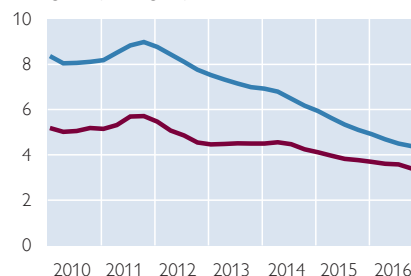
Variable rate loans

% of total new (euro-denominated) lending
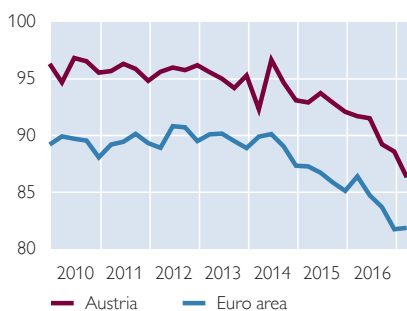
Foreign currency loans

% of total loans
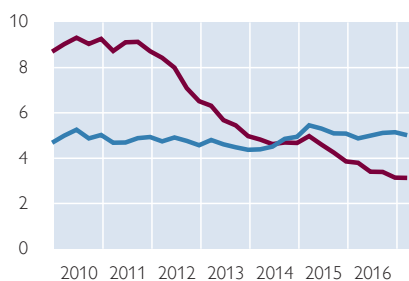
Insolvencies

Number of insolvencies in % of companies, four-quarter moving sum

— Austria   — Euro area
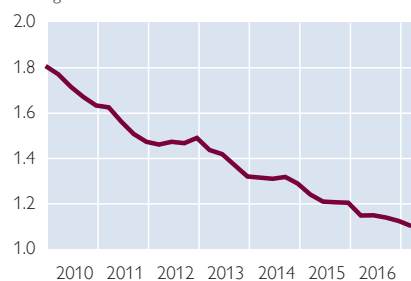
Source: OeNB, ECB, Eurostat, KSV 1870.

[1] Euro area: euro loans only.

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[4] *According to international conventions, financial accounts value equity on the liabilities side of nonfinancial corporations' balance sheets at market prices. The fact that the debt-to-equity ratio decreased although debt financing grew more strongly than equity financing in 2016 reflects price increases in Austrian stocks.*

creased further, amounting to 3.1% of outstanding loans in the first quarter of 2017. Since the second quarter of 2014, the foreign currency loan share in Austria has remained below the figure for the euro area as a whole.

The insolvency ratio (i.e. the number of corporate insolvencies in relation to the number of existing companies), which had already shown a downward trend over the past years, came down further in 2016 and the first quarter of 2017 (based on a moving four-quarter sum to account for seasonality). This downtrend may be attributed to the moderate increase in debt financing and the low interest rate level, which makes debt servicing easier even for highly indebted companies, as well as to recent improvements in economic activity.

Household indebtedness remains comparatively low
Disposable household income improves

Having displayed some weakness over the preceding four years, households' income situation improved in 2016, with real disposable income rising by 2.3%. On the one hand, the tax reform, which had entered into force at the beginning of 2016, generated substantial tax relief, and on the other hand, the economic recovery led to an improvement in the labor market situation. Undoubtedly, this increase in disposable income contributed to households' financial soundness. At the same time, strong income growth revived consumer spending, even if — as already seen in the past — consumers reacted with a time lag to the income growth resulting from the tax reform. Thus, the saving ratio increased from 7.3% to 8.2% in 2016.

Households' preference for liquid assets persists

Reflecting the higher saving ratio, financial investments by households surpassed the comparable 2015 value by more than one-quarter to reach EUR 13 billion in 2016 (see chart 12). Yet, they still amounted to less than two-thirds of the values seen before the onset of the crisis. Financial investments were again largely driven by deposits, reflecting a strong preference for highly liquid assets in the low nominal interest rate environment. In 2016, more than 85% of net financial investments were accounted for by currency and deposits.

Households shifted more than EUR 16 billion into transferable deposits at domestic banks (see chart 13). This value surpassed total financial investments in 2016, implying considerable substitution of other financial assets. In contrast, bank deposits with agreed maturity continued to decline, dropping by more than EUR 5 billion. Between 2009 and 2016, households' transferable deposits increased by

Households' financial investments rebound

Insolvencies bottom out

Strong expansion of transferable deposits

Austrian households' saving ratio increases in 2016

Chart 12

Net financial investments

EUR billion
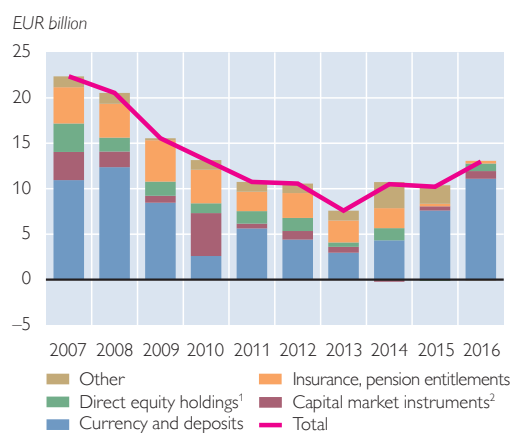
Source: OeNB.

[1] Unlisted shares and other equity.
[2] Debt securities, mutual fund shares and listed shares.

Chart 13

Net investments in deposits

EUR billion

Considerable
(unrealized)
valuation gains
since 2012

Transferable deposits   Other deposits   Total
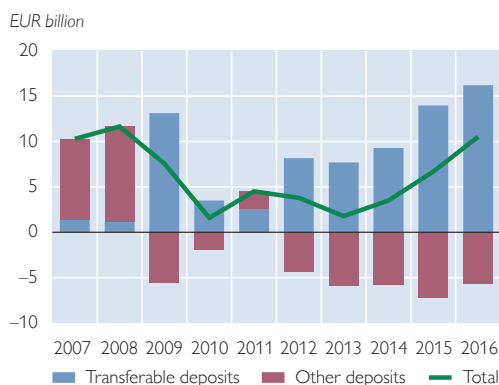
Source: OeNB.

Chart 14

Net investments in capital market instruments

EUR billion

Debt securities   Listed shares
Mutual fund shares   Total

Source: OeNB.

Net investments in
life insurance
policies remain
negative
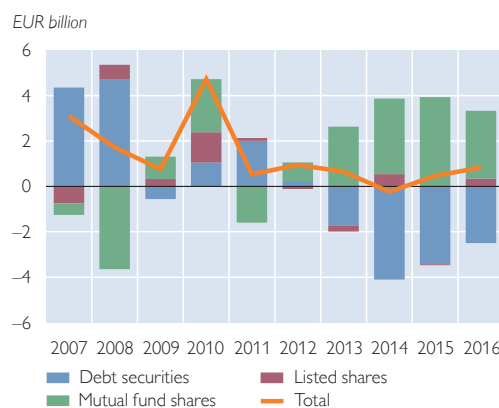
almost EUR 75 billion, while deposits with agreed maturity fell by EUR 35 billion. As a result, the share of transferable deposits in total financial assets rose from 12.1% to 19.8% in the same period while the share of deposits with agreed maturity fell from 28.3% to 17.8%.

Similarly, as households shunned investments with longer interest rate fixation periods, they continued to reduce their direct holdings of long-term debt securities, cutting them by almost EUR 12 billion since 2013 (see chart 14). In the same period, net investments in mutual funds reached EUR 13 billion. In comparison, over the same period households invested EUR 0.6 billion in listed shares. In total, households' net financial investments in capital market instruments were quite muted in recent years, totaling EUR 2.7 billion in the five years from 2012.

Since 2012, the Austrian household sector recorded unrealized valuation gains on its securities portfolios in the amount of EUR 11.8 billion on aggregate, of which EUR 2.6 billion occurred in 2016. As a result of rising stock prices, listed shares accounted for the lion's share, with valuation gains amounting to 8.2% of the holdings of listed shares at end-2015; in the case of mutual fund shares, the gains equaled 1.5% of the household portfolio. Thus, (unrealized) valuation effects were the main driver of the increase in the Austrian household sector's holdings of capital market instruments, contributing 79% to their increase in the period from 2012 to 2016. Hence, muted net investments notwithstanding, the share of capital market instruments in total financial assets has remained quite stable in recent years at around 18%. So while there are few indications that households made up for low interest rates by investing in riskier assets, the assets they hold contain increasingly risky elements in the form of unrealized valuation gains. However, capital market investments in general and stocks in particular are very much concentrated in the portfolios of households with higher income, which have a higher risk-bearing capacity, as the results of the Household Finance and Consumption Survey (HFCS) for Austria show.

Investments in life insurance and pension entitlements remained subdued in 2016, amounting to a mere EUR 0.3 billion, virtually unchanged against

Chart 15

**Net investments in insurance
and pension entitlements**

EUR billion

Pension entitlements
Non-life insurance
Life insurence
Total
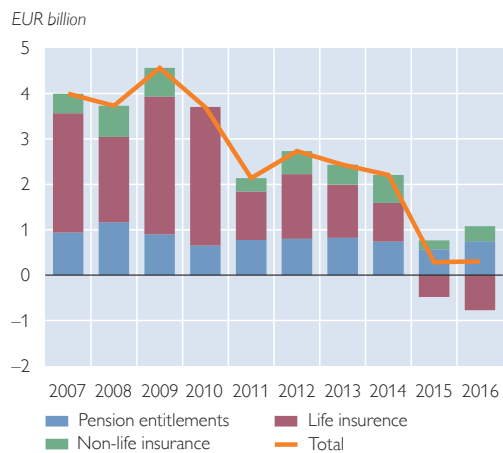
Source: OeNB.

2015. This was mainly attributable to life insurance policies, where disbursements outstripped contributions by EUR 0.8 billion. The negative net investment in life insurance is all the more remarkable as a large proportion of gross inflows into these instruments were not an outcome of current investment decisions, but rather reflected past decisions, given the long maturities and commitment periods involved. Moreover, life insurance policies often serve as repayment vehicles for foreign currency bullet loans (even if these are converted into euro loans). By contrast, investments in pension entitlements (including both claims on pension funds and direct pension benefits granted by private employers) continued to expand, amounting to EUR 0.8 billion in 2016. Based on outstanding amounts, the share of these investments in total financial assets contracted to 20.3%.

Household loans expand at a steady pace

More than 85% of Austrian households' financial liabilities are made up of loans by (domestic) banks. The expansion of bank lending to households has re-

mained stable in recent months. In April 2017, bank loans to households (adjusted for reclassifications, valuation changes and exchange rate effects) increased by 3.0% year on year in nominal terms. A breakdown by currency shows that euro-denominated loans continued to grow briskly (by 6.5%), while foreign currency loans continued to contract at double-digit rates; by April 2017, they had fallen by 15.3% year on year. Broken down by loan purpose (see chart 16), consumer loans and other loans shrank by 0.3% and 1.9% year on year, respectively, whereas housing loans grew by 4.1% year on year. Yet, housing loans continued to expand at a rather moderate pace if compared e.g. to property price growth or to pre-crisis growth rates (see top-left panel of chart 16). Housing loans are the most important loan category for households, accounting for almost two-thirds (64.8%) of all their bank loans in April 2017.

The conditions for taking out housing loans remained favorable. According to the results of the euro area bank lending survey, banks' credit standards for housing loans to households were stable in the first quarter of 2017 as well as in the previous quarter. Overall, there has been little change in lending standards in this segment over the past three years.

Credit terms also continued to be advantageous. At 1.85%, average interest rates on euro-denominated housing loans to households were 10 basis points lower in April 2017 compared to one year earlier. The interest rate on variable rate loans (with a rate fixation period of up to one year) decreased by 16 basis points to 1.70%. The effective annual rate of interest on housing loans, which reflects total borrowing costs (interest rate component and related charges) dropped by 11 basis points

Loan growth driven by housing loans

year on year to reach 2.27% in April 2017.

At the same time, banks reported a slight increase in household demand for housing loans in the first quarter of 2017, which had remained rather stable in 2016. Since this factor was included in the BLS questionnaire in the first quarter of 2015, banks have largely attributed the increase in the demand for housing loans to the general level of interest rates. In contrast, housing market prospects, including expectations of rising house prices, which had affected the increasing demand for housing loans in former years, have been barely mentioned in recent survey rounds. Yet, the strong increase in house prices registered over the past years (see below) may have boosted the funding needs for real estate investment. In 2016, the transaction volume on the residential property market in Austria increased by roughly 8% year on year in nominal terms according to data published by RE/MAX and compiled from the land register by IMMOunited.[5] While this rise was lower than in the two years before, it nevertheless implied an increase in financing needs. Still, housing loans most likely continued to grow at a slower pace than the volume of residential property transactions in Austria.

Chart 16

MFI loans to households: volumes and interest rates

Housing loans: volumes

Annual change in %[1]
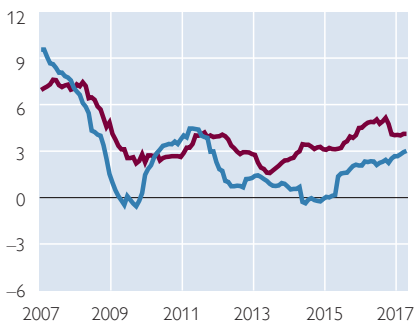
Consumer loans: volumes

Annual change in %[1]
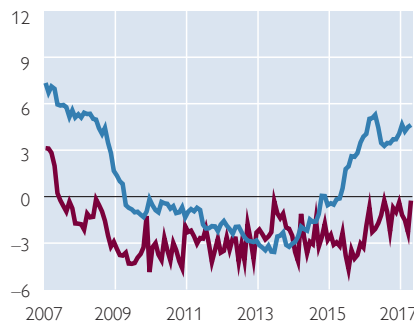
Other loans: volumes

Annual change in %[1]
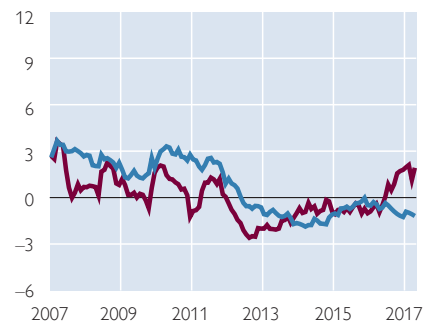
Housing loans: interest rates

%
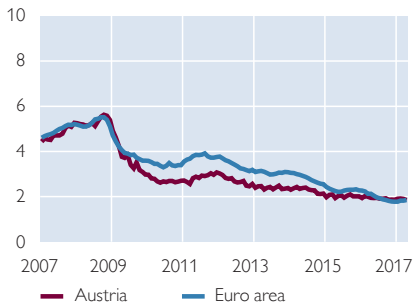
Consumer loans: interest rates

%
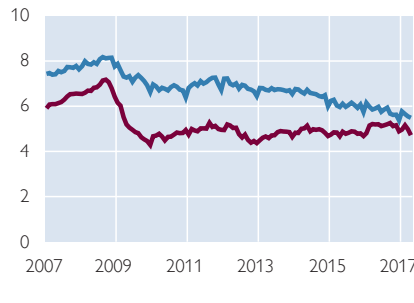
Other loans: interest rates

%

— Austria   — Euro area
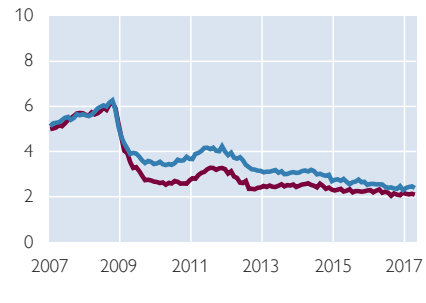
Source: OeNB, ECB.

[1] Adjusted for reclassifications, valuation changes and exchange rate effects.

[5] *This increase is in part attributable to the effects of the tax reform that entered into force in January 2016. The prospect of the new tax provisions led to anticipatory effects relating to free-of-charge transactions within families and thus to a temporary spike in transactions toward the end of 2015. Many of these transactions, however, were not recorded in the land register until the first quarter of 2016.*

Households' currency and interest rate risks

By end-2016, the household sector's total liabilities amounted to EUR 181.5 billion according to financial accounts data, up by 3.7% in nominal terms against end-2015. As they expanded at the same pace as disposable income, household's debt-to-income ratio remained steady at 91% (see upper left-hand panel of chart 17). Accordingly, the debt ratio of households in Austria remained lower than that of households in the euro area as a whole. Moreover, it should be taken into account that, according to HFCS data, only about one-third (34%) of Austrian households have a loan outstanding. Thus, it is not the absolute level of Austrian households' indebtedness that is the primary concern, but rather the still high shares of variable rate and of foreign currency loans.

In the first quarter of 2017, variable rate loans (loans with an initial rate fixation period of up to one year) accounted for 59% of new lending (in euro) to households compared to 80% in the same quarter of the previous year; over the same period, their share in housing loans narrowed from 80% to 51%. But despite this recent decline, the share of variable rate loans is still very high by international comparison. On the one hand, this implies lower current interest expenses. In the fourth quarter of 2016, households' interest expenses equaled 1.6% of aggregate disposable income, more than 2 percentage points less than in 2008, i.e. the year before interest rates had started to fall. Lower current interest expenses result from the faster pass-through of the ECB's lower key interest rates to lending rates in Austria than to

those in the euro area as a whole. In view of the comparatively low level of indebtedness of Austrian households, loan quality may also have played a role. On the other hand, however, the high share of variable rate loans in total lending implies considerable interest rate risks in the household sector over the medium term.

Likewise, despite a substantial decrease in past years and the fact that most foreign currency loan debtors have substantial wealth to cover their obligations,[6] the still very high share of foreign currency loans in the total stock of lending remains a major risk factor for vulnerable households. In April 2017, the share of foreign currency loans fell to 13.0%, less than half the peak value reached about ten years ago. The foreign currency share varies considerably depending on loan purpose: For housing loans, it was 16.9%, for consumer loans 3.9 % and for other loans 13.0%. Almost all outstanding foreign currency-denominated loans are denominated in Swiss francs (close to 97%).

Residential property prices in Austria continue to increase

The upward trend in residential property prices in Austria continued in 2016, although Austrian house price growth abated somewhat over the course of the year, reaching 4.6% year on year in the fourth quarter. For a long time price increases had been significantly more pronounced in Vienna than in the rest of Austria; however, in the last two and a half years, it has been the "Austria excluding Vienna" aggregate that has shown more pronounced residential property price growth, reaching 5.2% year on year in the fourth

Households' debt-to-income ratio stable

Foreign currency loans remain a concern

Share of variable rate loans continues to decrease

Property price growth in Vienna below the national average

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[6] See: Foreign currency borrowers in Austria – evidence from the new wave of the Household Finance and Consumption Survey. In: OeNB. Financial Stability Report 32. December 2016. 41–46.

Chart 17

Indicators of household indebtedness

Liabilities

% of disposable income
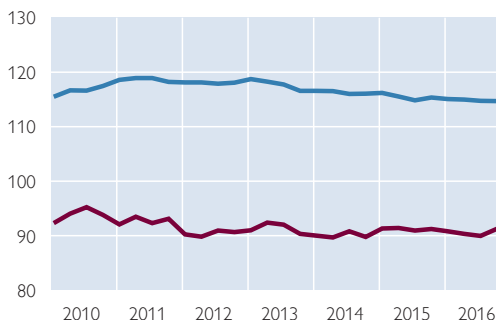
Interest expenses[1]

% of disposable income
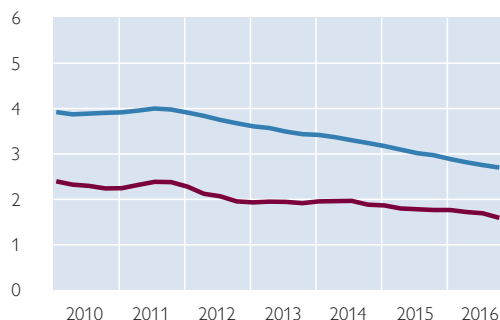
Foreign currency loans

% of total stock of loans
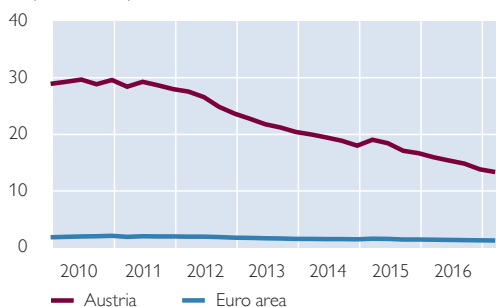
Variable rate loans

% of total stock of loans
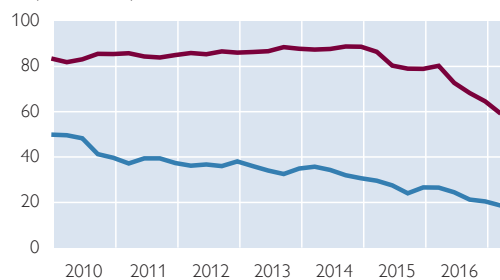
— Austria   — Euro area

Source: OeNB, Statistics Austria, ECB, Eurostat.

[1] *Figures for the euro area represent only interest rate expenses on euro-denominated loans.*

Systemic risks from the domestic real estate market remain limited

quarter of 2016. In Vienna, residential property prices rose by 3.4% year on year in the fourth quarter of 2016. While cost pressures, such as building costs, remained moderate in 2016, housing supply did not keep up with high population growth, as real housing investment remained subdued for most of 2016.

Because of the price rise against the previous quarter, the OeNB fundamentals indicator for residential property prices in Vienna went up by 1.5 percentage points in the fourth quarter of 2016, reaching 19.8%. For Austria as a whole, the indicator reached 6.0%, which was attributable primarily to residential property price growth clearly outpacing the growth rates of

household income, rents, construction costs and consumer prices.[7]

The OeNB's assessment of real estate-induced systemic risks rests on a comprehensive approach and takes into account real estate price growth, as well as the resilience of borrowers, the risk-bearing capacities of lenders and the wider context that influences the real estate market in Austria.

Real estate-induced systemic risks remain limited in Austria, largely due to the fact that Austrian households show low and decreasing indebtedness on the aggregate level and that mortgage borrowers feature income and wealth levels that are well above those of the median household. Furthermore,

[7] *For more analyses and data on the Austrian real estate market, see https://www.oenb.at/en/Monetary-Policy/real-estate-market-analysis.html.*

Chart 18

Austrian residential property market

Residential property prices

Annual change in %

**OeNB fundamentals indicator for
residential property prices**

Deviation from fundamental price in %

Vienna — Austria — Austria excluding Vienna

Vienna — Austria
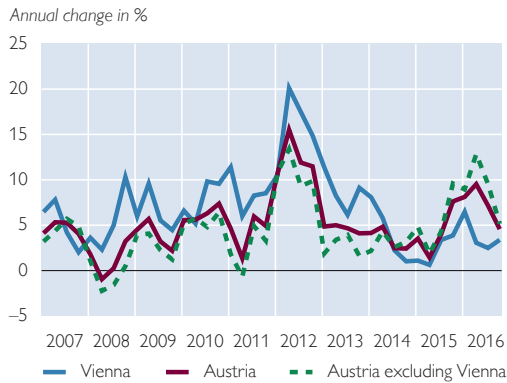
Source: Vienna University of Technology, OeNB.
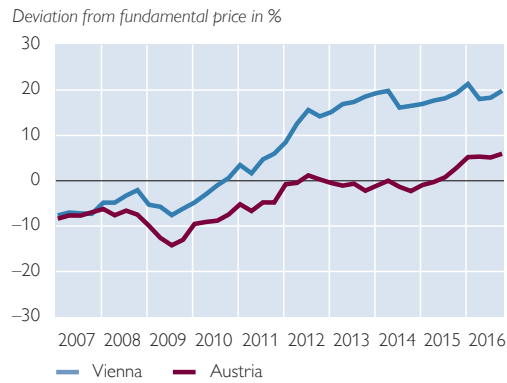
the strongest surge in real estate prices coincided with a period of stable mortgage loan growth of around 4%, indicating that it was largely equity-funded, driven by shifts in asset allocation. Recently, price growth has come down considerably. Also, more vulnerable households benefit from the high share of social housing provided by public entities and from nonprofit cooperative housing (58% of rented main residences in Vienna[8]). Social housing substantially reduces the need for vulnerable households to borrow in order to achieve acceptable housing conditions.

The share of nonperforming loans in overall real estate loans to domestic borrowers remained low at 1.6% in the fourth quarter of 2016, down from 2.1% one year earlier. Mortgage loans in Austria in relation to the capitalization of Austrian banks are low (167% of consolidated common equity tier 1 in the third quarter of 2016) compared to other EU economies and declined further in 2016.

The OeNB remains vigilant and has launched a sustainability initiative together with the Financial Market Stability Board (FMSB) and the Financial Market Authority (FMA). This initiative has at its heart sustainable loan-to-value (LTV), debt service-to-income (DSTI) and debt-to-income (DTI) ratios.[9] In this regard, the FMSB recommends that lenders, when granting residential real estate loans, ensure that borrowers provide a minimum down payment and document sufficient buffers of disposable income. This recommendation is aimed at preventing the potential buildup of residential real estate-induced systemic risks and at reducing the necessity to take further macroprudential measures.

Lenders have broadly adhered to sustainable lending standards so far, though some occurrences warrant heightened supervisory vigilance: an OeNB survey indicates that a nonnegligible part of new mortgage lending was granted with LTV, DSTI and DTI ratios beyond of what the notion of sustainable

FMSB promotes sustainability of lending standards

Residential real estate lending standards warrant increased attention

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[8] *Source: Statistics Austria.*

[9] *See for example the FMSB press release after its ninth meeting:*
https://www.fmsg.at/en/publications/press-releases/2016/Ninth-meeting.html.

lending standards would suggest. Against the backdrop of record-low interest rates, these developments con- firm the need to reinforce the FMSB's recommendation on sustainable lending standards for housing loans.

Austrian financial intermediaries: banks post strong profits but weaker operating results in 2016

Structural reforms continue

In an environment of low economic growth in Europe and political uncertainty in several regions in the world, Austrian banks continued their structural adjustment process to increase efficiency and to remain competitive over the long-term. The restructuring of UniCredit Bank Austria AG, the merger of Raiffeisen Zentralbank Österreich AG and Raiffeisen Bank International AG, and the further consolidation among Volksbank credit cooperatives are the most prominent examples.[1]

In 2016, the Austrian banking sector generated a consolidated net profit of EUR 5 billion. This corresponds to a 5% decline year on year, which was,

however, driven by the restructuring of UniCredit Bank Austria AG. Adjusted for this effect, profits increased by nearly 13% year on year. The return on average assets came to 0.6% and the return on average equity was around 8%. Results had been propelled by significantly lower risk provisioning, however, and boosting profitability by lowering risk costs is not a viable long-term solution to restore weakening operating profits. Since 2009, the share of operating profits in average assets has tended to decline, indicating weaker operating efficiency.

In the following paragraphs, the results of UniCredit Bank Austria AG are excluded from the discussion, as the restructuring effect would distort data comparability and economic validity. Since 2014, the recovery of profitability has been driven by a significant reduction in risk provisioning. In 2016, credit risk provisions declined by 63% year on year and by more than 80% against 2014. Credit risk costs for some portfolios are even below pre-crisis levels.

Austrian banks' consolidated operating profit decreased by 16% in 2016, due to weakened operating income (−4%) and rising operating expenses (+3%). As a consequence of smaller business volumes and the low interest rate environment, interest expenses declined by 11% and interest income by 6%, which in turn reduced net interest income by 3%. Despite positive financial market developments and the firming economic recovery in Austrian

Profitability improved due to reductions in risk provisioning

Chart 19

Profitability of the Austrian banking sector

%
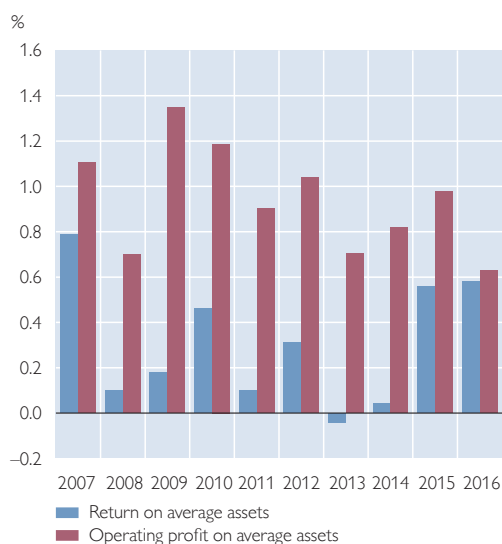
Source: OeNB, consolidated data.

- Return on average assets
- Operating profit on average assets

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[1] For more information on these restructuring measures, please refer to box 1. The restructuring of UniCredit Bank Austria AG is particularly important for analyzing the year 2016, as ownership of the bank's CESEE subsidiaries was transferred to the parent bank in Italy. For the Austrian banking sector, this move resulted in a strong year-on-year decline in absolute consolidated and (subconsolidated) CESEE figures and in changes to the related financial ratios.

Consolidation
process continues

banks' core markets, fee and commission income declined slightly by 2%. This shows how complex it is to compensate lower interest income by higher fee and commission income. On the positive side, trading income went up markedly against the previous year. But given Austrian banks' retail banking model, trading income plays a minor role in terms of profit contribution and was not able to offset negative developments in the other income categories.

Operating expenses increased by 3%, driven mainly by higher write-downs (+16%) – in particular on subsidiaries, joint ventures and associated companies – and a 2% rise in staff costs, while general administrative expenses declined slightly by 0.4%. In addition, banks have been paying into funds for deposit insurance and bank resolution since 2015 to help increase the stability of the banking system. Moreover, the Austrian bank levy has been reduced to around EUR 100 million as of 2017, after having come to EUR 640 million in previous years. As a prerequisite, banks have to make an advance payment of EUR 1 billion (either by making a bullet payment or by spreading payments over four years), which will be used for education and research initiatives.

All in all, the Austrian banking sector's consolidated cost-to-income ratio (CIR) deteriorated to 67% in 2016 from 63% a year earlier.[2] Although Austrian banks benefit from the higher cost efficiency of their CESEE subsidiaries (CIR: 53%), they are still burdened by lower efficiency in the domestic market and thus continue their

cost-cutting efforts. At EU level, the average CIR of the banking sector stood at 66% at end-2016.[3]

For the Austrian banking system, the adjustment process gathered pace in 2016, as reflected in a number of indicators. The total number of credit institutions in Austria declined to 672 (from 738 at end-2015, or down 22% against 2008 figures), driven by the consolidation in the cooperative banking sectors. The total number of branches decreased by 4% to 3,926 (i.e. to their 1995 level), which marks an acceleration in the downsizing of the branch network. Also, the number of bank employees in Austria declined further to 74,543 (–0.7%), the lowest level since 1995.[4] As in previous years, this reduction was below the EU average (–1.4%).[5] Since the outbreak of the financial crisis in 2008, when banking sector employment had peaked, the number of bank employees in Austria decreased by 7.2% (compared with a 14% decrease in bank employee numbers across the EU).

However, headcount figures alone do not reflect the increase in part-time employment in the banking sector, which continued in 2016 while the number of full-time jobs decreased for the fifth year in a row. By end-2016, more than one-quarter (29%) of bank employees were employed part-time, which means the part-time ratio in the banking sector was almost as high as in the overall economy (30%). The Austrian banking sector's share in total employment has been steadily declining since the onset of the crisis. At end-2016, the banking sector accounted for

[2] *Not adjusted for write-downs on subsidiaries, joint ventures and associated companies, Austrian banks' CIR worsened to 74%, up from 63% in 2016.*

[3] *Source: ECB, consolidated banking statistics.*

[4] *Headcount.*

[5] *Source: ECB preliminary data.*

Chart 20

Structural developments in the Austrian banking sector

Number of banks | Number of bank employees

Source: OeNB.

Banks' subsidiaries in CESEE further reduced risk provisioning
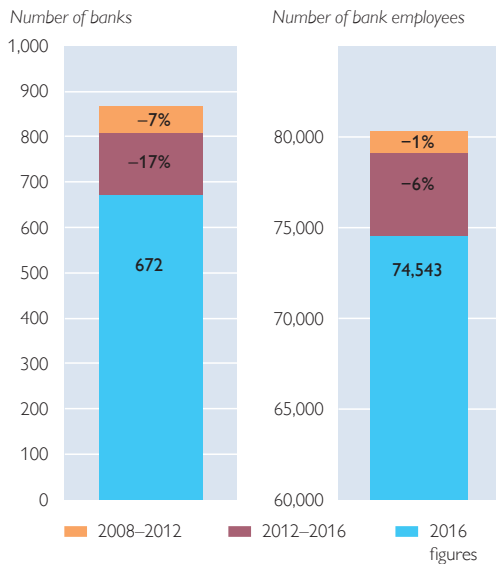
1.9% of all employed persons in Austria (0.3 percentage points less than in 2008).

The consolidated total assets of the Austrian banking sector, which had stood at EUR 1,176 billion in 2008, when the crisis began, and came to EUR 1,057 billion in 2015, decreased by 20% to EUR 946 billion at end-December 2016, which corresponds to 270% of GDP. The decline recorded in 2016 was primarily driven by the restructuring of UniCredit Bank Austria AG. The sector's foreign exposure, especially to the CESEE region, was markedly reduced, but claims against CESEE still account for more than half of Austrian banks' total foreign claims. Within the CESEE region, exposures against EU countries gained further importance (e.g. Czech Republic, Hungary and Romania), while exposures to e.g. Russia and Turkey declined.

The profitability of Austrian banks' subsidiaries in CESEE improved in 2016 as their aggregated net profit increased to EUR 2.4 billion (+15% year on year) – this is the highest reading since 2008 despite the fact that results no longer include those of subsidiaries of UniCredit Bank Austria AG.[6] This rise in aggregated net profit mainly resulted from a further decline in loan loss provisions. Loan loss provisions reached levels unseen since 2007, which leaves limited room for further reductions of loan loss provisions in the region.

In 2016, the highest profit came from banks' subsidiaries in the Czech Republic, Slovakia and Russia. While the net results of subsidiaries in the Czech Republic and Slovakia increased further, operations by subsidiaries in Croatia, Hungary and Ukraine were positive again after losses in 2015. The profits of Austrian banks' subsidiaries in Russia declined slightly as a result of higher loan loss provisions.

Austrian banks' CESEE subsidiaries recorded a reduction in net interest income by EUR 0.4 billion (–6%) to EUR 5.1 billion in 2016. Declines in this important source of income were rather widespread and especially pronounced in Croatia and Russia, and could not be offset by stronger credit growth in the Czech Republic and Slovakia. The second most important income component, which is fee and commission income, weakened by 6% year on year. The composition of operating income has remained almost unchanged in recent years, with net interest income accounting for around two-thirds of operating income. The total operating income of Austrian banks'

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[6] *From October 2016 onward, figures no longer include data on UniCredit Bank Austria AG's subsidiaries. Thus, year-on-year and long-term changes have been adjusted for one-off effects driven by UniCredit Bank Austria AG's restructuring. See footnote 1 and box 1 for further details.*

Chart 21

Profitability of Austrian banks' CESEE subsidiaries

EUR billion

Source: OeNB.

Note: Figures exclude UniCredit Bank Austria AG.

<div style="color: #1a7fc4; font-weight: bold;">

Weaker operating
profits in banks'
domestic business

</div>

subsidiaries in CESEE decreased by 1% against 2016. At the same time, operating expenses shrank by 5%. As a result, net operating profit amounted to EUR 3.7 billion, which corresponds to a 3% increase. Operating efficiency continued to be high with a cost-to-income ratio of 53%; this ratio has remained within a range of between 47% and 57% since 2008.

Overall, Austrian banks' operations in CESEE have been a key contributor to their consolidated profitability and continue to offset their relatively weak profitability in the domestic market. Moreover, in the current low interest rate environment in Western Europe, banks' CESEE operations act as a buffer against interest income pressures, as interest margins in CESEE are still above Western European averages.

Operating profits in Austrian banks' domestic business dropped by nearly 23% in 2016, driven by substantially lower income and only a slight reduction in expenses. Nevertheless, owing to a plunge in risk provisioning, unconsolidated profits increased by 19% against the previous year, coming to EUR 4.4 billion. In the first quarter of 2017, Austrian banks' operating income declined further. However, as operating expenses also went down (at an even stronger pace), operating profits improved by around one-quarter. After having reduced risk provisions significantly in 2016, Austrian banks slightly stepped up their unconsolidated risk provisioning in the first quarter of 2017.

Box 1

Banking sector restructuring in Austria – actions, impact and the supervisor's role

Just like the entire European banking sector, the Austrian banking sector faces significant cost pressure, most notably resulting from exogenous factors such as the low interest rate environment in the euro area and growing investment pressure arising from the continuous trend toward the digitalization of banking services. The majority of Austrian credit institutions have already launched individual efficiency programs and/or conducted selective asset sales to cut costs. Cost-oriented efficiency measures such as staff and branch reductions or the refocusing on core business lines have been pursued. But widespread initiatives to compensate lower interest income by higher provision income or a rise in (domestic) business volumes have not yet fully materialized throughout the system.

Thus, some credit institutions decided to undergo additional and sometimes deep organizational changes to cut structural costs, make use of further synergies and adapt organizational structures to modified business models and regulatory needs. Here are a few prominent examples:

- *The Volksbanken-Verbund has undergone several restructuring steps since 2009. In 2015, for example, the non-core part of its business was split off into a wind-down vehicle. The remaining entities committed to a strict merger plan, reducing more than 50 independent credit institutions to fit into a target structure of eight regional banks and one specialized institution.*
- *Raiffeisen Bank International (RBI) and Raiffeisen Zentralbank (RZB): After major reductions in risk-weighted assets, the RBI and RZB merged to simplify their organizational structure, improve their capital basis (via the regulatory treatment of minority interests) and strengthen their cost basis.*
- *UniCredit Bank Austria AG: Following a fundamental review of their business model, ownership of their CESEE subsidiaries network was transferred to the Italian parent company and a multi-year restructuring plan was initiated for the Austrian entity.*

For both the more gradual and usually "silent" measures and the larger-scale reorganization measures, the banking supervisory authority acts as sparring partner and assessor during the supervisory approval processes. In this role, it scrutinizes in particular the economic aspects of alternative solutions, the plausibility of credit institutions' budget assumptions, the viability and sustainability of the presented business case as well as their compliance with all relevant regulatory requirements following the implementation of measures. Moreover, upon supervisory approval of the respective measures, the banking supervisor closely monitors the implementation of and strict adherence to the envisaged plans as part of the ongoing microprudential assessment process.

In the three cases mentioned above, a smooth and stable restructuring process has been achieved, resulting in either significantly less risky or significantly less complex banking operations, which in turn help improve cost-efficiency.

Credit quality improved both in Europe and in Austria

European banks made progress in alleviating the burden of nonperforming loans (NPLs) from their balance sheets. The formation of new problem loans has slowed down as the economy has started to recover, write-offs have picked up and NPL sales have increased. Nevertheless, the pace of improvement is still slow, reflecting i.a. the weak profitability of the European banking sector. That is why the SSM put forward its work on this topic.

In Austria, the banking system's consolidated NPL ratio improved significantly in 2016, from 6.6% at end-2015 to 4.9% at end-2016. This reduc-

NPL transactions in
CESEE gain
momentum

tion was strongly driven by the trans-
fer of ownership of UniCredit Bank
Austria AG's CESEE subsidiaries[7] to
the parent bank and other credit insti-
tutions' progress in NLP resolution.

When comparing NPL ratios de-
rived from different sources – such as
the EBA, the SSM and national author-
ities – the number and business models
of the banks included in the respective
samples can vary markedly, resulting in
diverging NPL figures (see chart 22).
For the consolidated NPL ratio, for
example, the difference between sig-
nificant Austrian institutions (5.8%)
and the Austrian banking sector as a
whole (4.9%, as computed by the
OeNB) is 90 basis points. Also, smaller
samples are often dominated by large
credit institutions, which in Austria
might feature exposures to CESEE that
are, in many cases, characterized by
weaker loan quality, thus driving the
NPL ratio of smaller bank samples
further up.

The (domestic) loan quality in
Austria also improved in 2016, as the

unconsolidated NPL ratio declined to
3.5% by end-2016 due to NPL reduc-
tions especially at some state mortgage
banks (Landeshypothekenbanken). This
improvement was also driven by higher
loan quality in the corporate loan port-
folio (especially in the sectors trade,
maintenance of automobiles, construc-
tion and real estate), which is in line
with the reduction in the number of in-
solvencies registered in 2016. In the
first quarter of 2017, the NPL ratio in
Austria continued to decline to around
3.4%.

2016 has been the most active year
to date for NPL transactions in CESEE,
with completed or on-going deals ex-
ceeding EUR 10 billion. The surge in
loan sale transactions across the region
largely comes down to a narrowing of
the gap between book values and mar-
ket prices. While sellers are becoming
more realistic in their price expecta-
tions, driven by a mix of increased reg-
ulatory pressure and the acceptance of
market pricing, investors have lowered
their return requirements, which reflects

Chart 22

NPL ratios of selected European countries – comparison of different sources
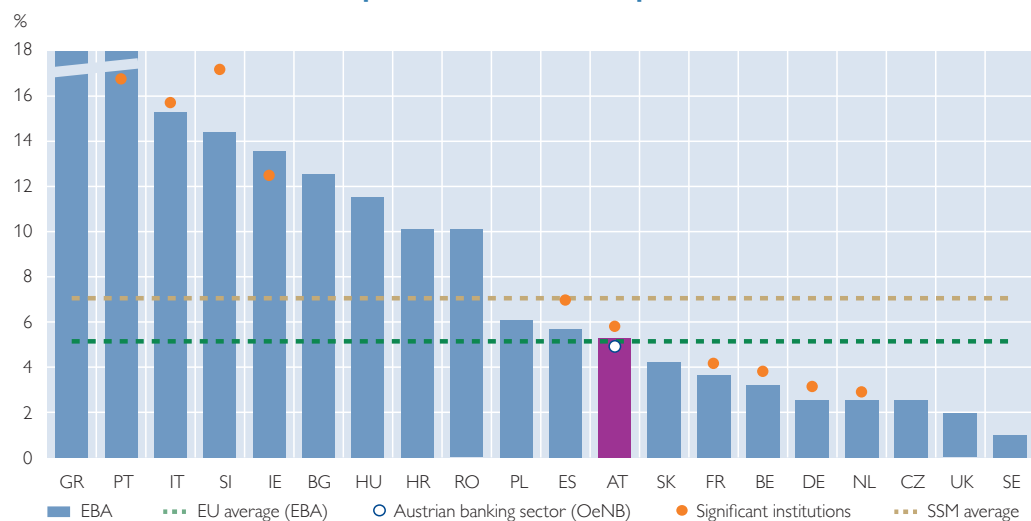
Source: EBA, ECB, OeNB, end-2016 data.

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[7] See footnote 1 and box 1 for further details.

their ongoing hunt for yield and higher willingness to conclude deals. CESEE has seen the highest activity in corporate secured loans, with fewer deals in corporate unsecured and retail loans, where debt recovery specialists tend to buy relatively small portfolios. Most transactions took place in Hungary, Romania, Bulgaria and Slovenia. The most active sellers were AXA, HETA, Bancpost (Eurobank), Erste Group Bank AG and Intesa Sanpaolo.[8]

Since 2014, the NPL ratio of Austrian banks' subsidiaries in CESEE has steadily declined, but it was still elevated at 8.6% by the end of 2016 (end-2015: 11.5%). The ratio of nonperforming foreign currency loans (FCLs) is much higher than that of non-

performing domestic currency loans (13.5% and 6.5%, respectively), but the coverage ratio[9] of nonperforming FCLs has improved markedly to 71% (from 58% at end-2015[10]) and is now higher than that of nonperforming domestic currency loans (63%). From a single country perspective, NPL ratios continue to be highly heterogeneous, reflecting different economic developments. In the Czech Republic and Slovakia, the NPL ratios of Austrian banks' subsidiaries are close to Austrian levels at 3.5% and 4.4%, respectively, while in other host markets, such as Romania, Hungary and Croatia, NPL ratios range from 11% to 17%, albeit exhibiting a downward trend over the past three years.

Credit quality of Austrian banks' subsidiaries in CESEE improved further

Box 2

The SSM's targeted review of internal models (TRIM) and its impact on Austrian banks

The objective of the SSM's targeted review of internal models (TRIM) project is to enhance the credibility and confirm the adequacy and appropriateness of internal models currently used by 68 significant institutions to calculate their own funds requirements for hedging against credit risk, market risk and counterparty credit risk. TRIM has been the biggest single project in SSM history so far; it can be considered a follow-up on the Asset Quality Review (AQR) carried out in 2014 and 2015. Its basic principles are

- *to assess the reliability and comparability of internal models with a view to ensuring compliance with regulatory requirements and harmonizing supervisory practices within the SSM,*
- *to verify that risks are modeled correctly and hence capital requirements are calculated adequately,*
- *to publish a guide of harmonized principles and make recommendations to credit institutions that ensure that internal models deliver consistent results across the SSM, and*
- *to make a risk-based ("targeted") selection of a subset of all models to be used for in-depth on-site inspection based on uniform inspection techniques.*

TRIM constitutes an important step toward reducing the unwarranted variability in banks' own funds requirements as induced by the interpretation of the regulatory framework by both banks and supervisors. It creates a level playing field by harmonizing supervisory practices. This is necessary as most of banks' internal models had been approved by the national competent authorities on the basis of their individual supervisory practices before the start of the SSM. In this respect, Austria can look back on many years of high-quality model supervision.

[8] *See the Deloitte Report on Deleveraging Europe 2016–2017 for more details on NPL transaction activities.*

[9] *Defined as risk provisions for NPLs over total NPLs.*

[10] *The substantial improvement of the nonperforming FCL coverage ratio is largely attributable to the restructuring of UniCredit's CESEE operations.*

> *The OeNB actively shared its model-related expertise in the preparatory phase of TRIM, both from a conceptual and organizational point of view. From April 2017 onward, the focus of TRIM will be on on-site model inspections, covering a substantial part of Austrian banks' high default portfolio credit risk models (approximately 60% of all exposures) in 2017 and concentrating on low default portfolio models from 2018 onward. Both the OeNB and Austrian banks involved are investing significant resources in TRIM with the aim of fostering a sound and resilient banking system.*
>
> *There will be challenges for Austrian banks that use internal models. Given the past intensity of model supervision and investigation in Austria, however, banks are already accustomed to in-depth investigation procedures and supervisors are aware of areas that need attention. As internal models are indispensable risk management tools, the OeNB welcomes TRIM as a valuable project that will certainly contribute to strengthening model supervision within the SSM.*

Capitalization of Austrian banks improved markedly in 2016

The long-running strengthening in the solvency of European banks has continued in 2016, with the increase of common equity being the main driver of this improvement.

In the Austrian banking system, the restructuring of UniCredit Bank Austria AG[11] significantly reduced the volume of banks' risk-weighted assets in 2016,[12] while capital declined by less. At the same time, and adjusted for this one-off effect, Austrian banks increased their common equity tier 1 (CET1) capital via the retention of profits, which substantially improved the con-

solidated CET1 ratio to 14.8% (compared with 12.8% at end-2015). This system-wide figure comes close to the European average, which stood at 15.0%.[13] Austria's biggest institutions, however, still lag behind these levels with their CET1 ratio at 12.9% (at end-2016) and should therefore seek to further increase their capitalization in light of their systemic importance.

From a macroeconomic point of view, strengthened capital levels did not burden lending activities, as Austrian domestic loan growth came to 1.5% in 2016, which is well above the growth

Chart 23

CET1 ratios of European banks
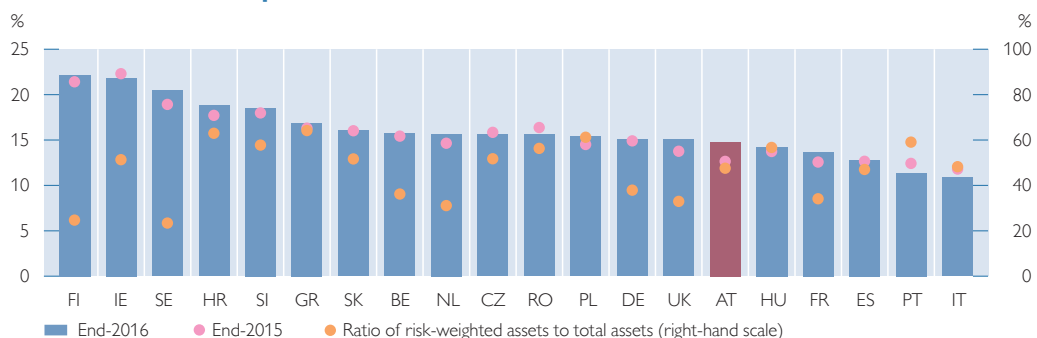
Source: ECB, consolidated banking data.

[11] *See footnote 1 and box 1 for further details.*

[12] *The consolidated risk weight of total assets also decreased (from 51% to 47%). Compared with other European banking systems, this figure is still above average, but it also indicates that Austrian banks apply a more conservative risk assessment to their portfolios (especially regarding mortgages).*

[13] *Source: ECB.*

rates recorded over the past three years. This development should finally dispel fears that more capital might have a negative effect on credit supply.

Austrian banks post solid short-term liquidity positions

The liquidity coverage ratio (LCR) was introduced as a regulatory minimum requirement for all credit institutions at the individual and consolidated level in 2015. It aims to ensure that credit institutions have a sufficient amount of highly liquid assets at their disposal to withstand conditions of severe funding stress for at least 30 days at all times. The LCR minimum requirement is defined as the ratio of high-quality liquid assets (HQLA) relative to stressed net outflows arising over a period of 30 days. It amounts to 80% in 2017 and will increase to 100% in 2018.

The weighted average LCR for all Austrian credit institutions has been stable and well above minimum requirements since it was first reported in

September 2016, reflecting the overall solid liquidity position of Austrian banks. In early 2017, all Austrian credit institutions reported ratios above the regulatory minimum, with the weighted average LCR amounting to 149% at the unconsolidated level.

93% of the liquidity buffer consist of the highest category of eligible Level 1 assets, while the share of Level 1 covered bonds remains at 5%. Level 2a and Level 2b assets account for 1% each. Within Level 1 assets, government bonds and central bank assets account for more than 80%.

An Austrian supervisory guidance adopted by the OeNB and the FMA in 2012 (the so-called "sustainability package")[14] stipulates that the stock and flow loan-to-local stable funding ratios (LLSFRs) of Austrian banks' foreign subsidiaries be monitored. With the transfer of ownership of UniCredit Bank Austria AG's CESEE subsidiaries to its Italian parent bank, the monitoring requirement now only applies to Erste

Stronger local stable funding causes liquidity transfers to CESEE credit institutions to shrink

Chart 24

Liquidity coverage ratio

%

Minimum requirement

Source: OeNB.

Liquidity buffer

%

- Cash
- Central bank reserves
- Assets (e.g. claims on central bank, government, multilateral developement bank)
- Extremely high-quality covered bonds
- Other

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[14] https://www.oenb.at/en/Financial-Stability/Systemic-Risk-Analysis/Sustainability-of-Large-Austrian-Banks--Business-Models.html.
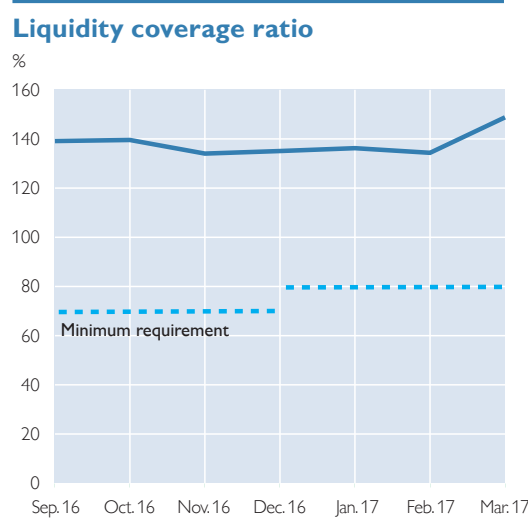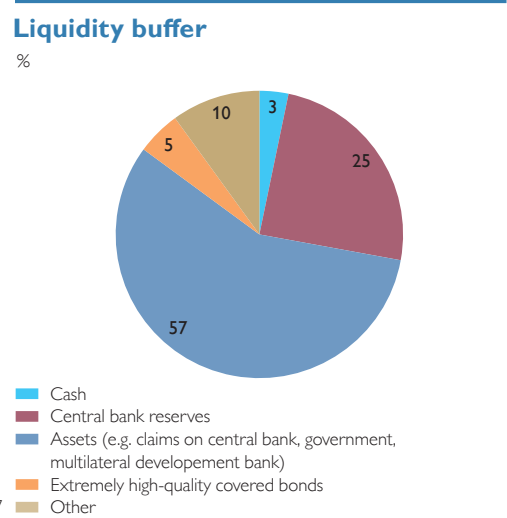
Chart 25

Austrian banks' intragroup liquidity transfers to CESEE institutions

EUR billion

Legend: Romania, Hungary, Slovenia, Croatia, Czech Republic, Other
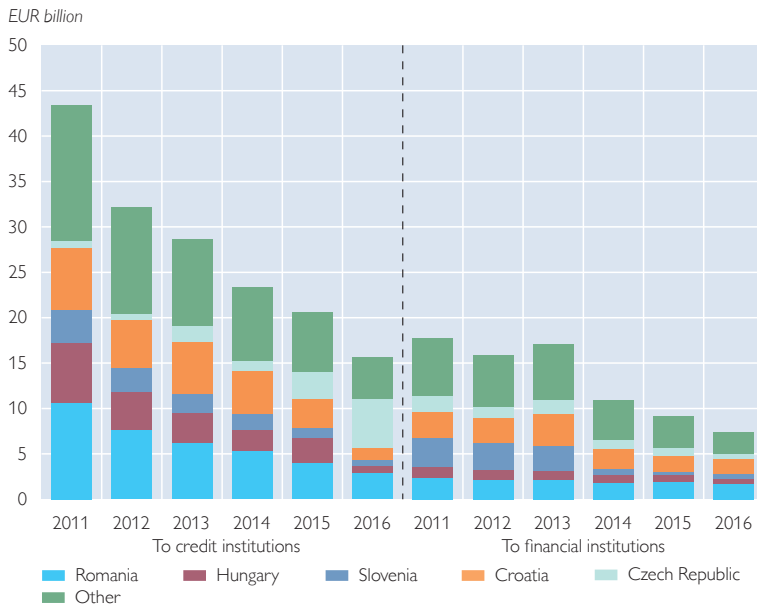
Source: OeNB.

Note: Financial institutions e.g. also comprise leasing companies.

Group Bank's and Raiffeisen Bank International's subsidiaries. At end-2016, all 23 subsidiaries monitored were found to have sustainable business models that comply with the OeNB's and FMA's supervisory guidance.

Stronger local funding and lower LLSFRs have been accompanied by a substantial decrease in the (gross) intragroup liquidity transfers from Austrian banks to CESEE credit institutions. For instance, between 2011 and 2016, the decrease amounted to EUR 28 billion or 64%. The noteworthy outliers are credit institutions in the Czech Republic that received more than one-third of all remaining intra-group liquidity transfers to CESEE at the end of 2016, although their refinancing position is typically strong. Intra-group liquidity

transfers to financial institutions (e.g. leasing companies) also went down significantly from EUR 18 billion at end-2011 to EUR 7 billion by end-2016, but this decline started later and was less gradual as it was strongly affected by the restructuring of Hypo Alpe-Adria-Bank International in 2014.

Foreign currency loan volumes in Austria have dropped considerably in recent years, but risks from the outstanding portfolio remain

In April 2017, foreign currency loans (FCLs) to domestic nonbank borrowers amounted to EUR 28.8 billion, of which EUR 20 billion were granted to households and EUR 4.4 billion to nonfinancial corporations.[15] FCLs to domestic nonfinancial borrowers have declined continuously since October 2008 when the FMA strongly recommended that banks refrain from granting new FCLs to households.[16] Between then and April 2017, FCLs to households and

Chart 26

Drop in foreign currency loans to households and nonfinancial corporations in Austria

EUR billion

−64%
since October 2008
(FMA recommendation)
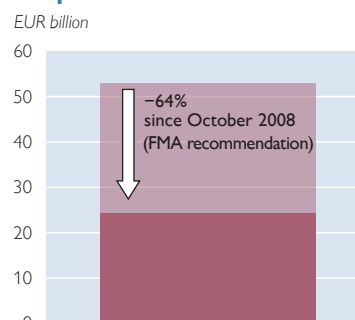
Source: OeNB.

Note: The percentage value indicates the exchange rate-adjusted change in the period from the launch of macroprudential measures in Austria in October 2008 (FMA recommendation) to April 2017.

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[15] The remaining FCLs were extended to the government sector (EUR 2.4 billion) and nonbank financial intermediaries (EUR 2 billion).

[16] FCLs denominated in Swiss francs are by far the most common, accounting for more than 96% of all FCLs to households.

nonfinancial corporations shrank by 64% on an exchange rate-adjusted basis (see chart 26). In the last 12 months alone, the exchange rate-adjusted reduction amounted to about 14%. Based on this steady decline, the share of FCLs in total loans to households and nonfinancial corporations fell as well, coming to 8.3% in April 2017, down from 9.9% one year before.

Although the volume of domestic FCLs has been declining steadily, legacy issues continue to be a concern: While in March 2017, 69% of all outstanding FCLs to households had remaining maturities of more than seven years, these FCLs still entail significant future redemption risks for Austrian banks as about three-quarters of them are bullet loans linked to a repayment vehicle (RPV). In this case, the borrower pays regular contributions into an RPV, usually a life insurance policy or another capital market product, to be used to repay the loan at the end of its term. This implies that borrowers are exposed to two main risks: first, the risk that the amount to be repaid at maturity increases as a result of foreign currency appreciation (exchange rate risk) and second, the risk that the originally assumed performance of the RPV is not reached and the amount saved does not cover the entire loan repayment due at maturity (performance risk). Both risks may lead to a gap between the RPV's final value and the amount outstanding at loan maturity. To constantly monitor the development of RPV loans (especially those denominated in foreign currency) and to gain an overview of the potential shortfall of RPV loans, the OeNB, in cooperation with the FMA, conducted a survey among a representative sample of Austrian banks, with the first results expected in the summer of 2017.[17] A very similar survey launched in mid-2016 showed that the total shortfall was approximately EUR 6.2 billion at the end of 2015. (Please note that due to currency movements and the performance of RPVs, this is a volatile figure.) On average, borrowers' RPVs were found to be underfunded by 29%.

Based on the residual maturity profile of RPV loans, there is still some time to close the shortfall described above. As of March 2017, almost three-quarters of all RPV loans had remaining maturities of more than seven years, with the bulk (39%) maturing in 10 to 15 years (see chart 27). Given that RPV loans may pose problems for Austrian banks and their borrowers in the medium to long term – especially as shortfalls could widen further if downside risks were to materialize – the FMA, in cooperation with the OeNB, enhanced the FMA Minimum Standards with the objective to increase transparency and raise the risk awareness of both banks and borrowers concerning FCLs and RPV loans.[18] Next to extended information obligations for banks toward borrowers and comprehensive public disclosure obligations, the revised standards also encompass guidance on a forward-looking and adequate risk management approach (including risk provisioning). The intention behind this move is to encourage banks and borrowers to intensify their bilateral negotiations over measures that enable sustainable, tailor-made solutions and thereby reduce financial risks. The enhanced FMA Minimum Standards entered into force on June 1, 2017.

Volume of foreign currency loans continues to decline

Foreign currency loans linked to repayment vehicles involve manifold risks

Enhanced FMA Minimum Standards to increase risk awareness and transparency

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[17] The sample covers about 90% of total outstanding domestic RPV loans.

[18] For more details on the revised "FMA Minimum Standards for the Risk Management and Granting of Foreign Currency Loans and Loans with Repayment Vehicles," see https://www.fma.gv.at/download.php?d=2885.

Chart 27

Residual maturity profile of repayment vehicle loans (March 2017)

EUR billion
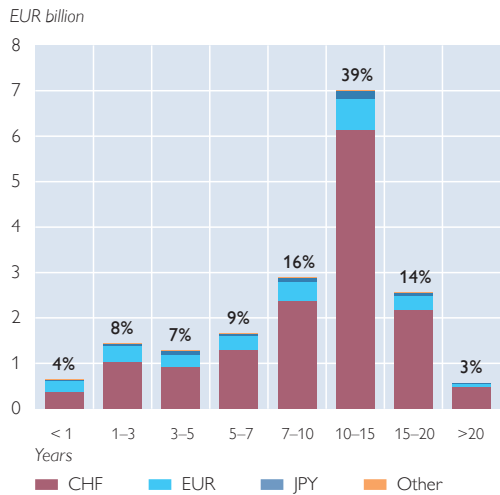
Source: OeNB.

Note: Percentage values indicate the share of each segment in the total volume of outstanding repayment vehicle loans.

Chart 28

Foreign currency loans of Austrian banks' CESEE subsidiaries

EUR billion
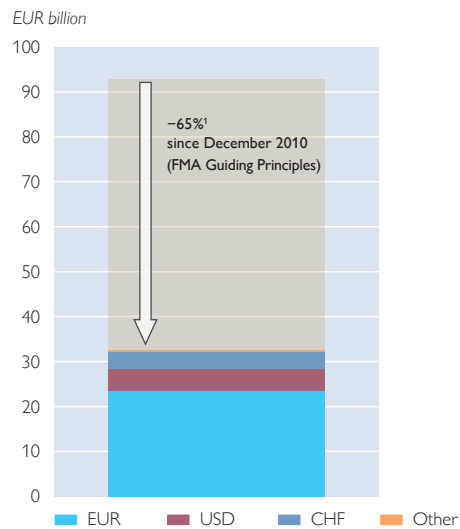
Source: OeNB.

[1] *Loans include loans to households and nonfinancial corporations. The percentage value indicates the exchange rate-adjusted change in the period from the launch of macroprudential measures in CESEE in December 2010 (FMA Guiding Principles) to December 2016.*

FCL volume at Austrian banks' CESEE subsidiaries continues to shrink

Effective policy measures, including the FMA Guiding Principles and local supervisory initiatives, helped reduce the volume of outstanding FCLs of Austrian banks' subsidiaries in CESEE over the last years. In 2016, however, the 53% decline in FCL volumes to EUR 32.6 billion (adjusted for exchange rate effects) and the drop in the share of FCLs in total loans to customers to 30% (end-2015: 38%) was largely attributable to the transfer of ownership of UniCredit Bank Austria AG's CESEE subsidiaries to its parent bank in Italy. Including this effect, the FCL volumes of Austrian banks' CESEE subsidiaries have gone down by 65% (on an exchange rate-adjusted basis) since the Guiding Principles were adopted in 2010 (see chart 28), but even when excluding this substantial one-off effect, the exchange rate-adjusted decline from end-2010 to end-2016 was still 39%. Despite these positive developments for Austrian banks, political and legal uncertainties surrounding FCLs

Chart 29

Composition of outstanding foreign currency loans of Austrian banks' subsidiaries in selected markets (end-2016)

%
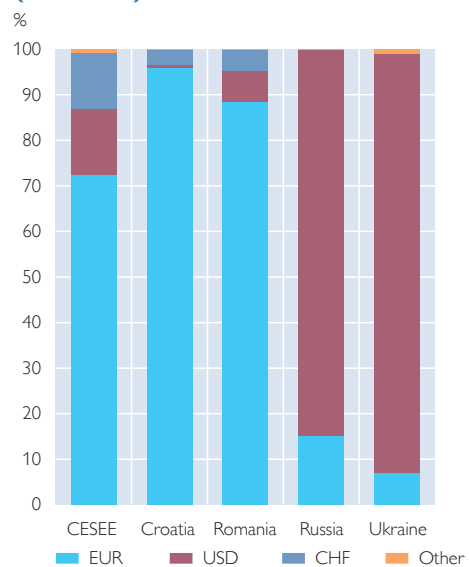
Source: OeNB.

Note: Loans to households and nonfinancial corporations.

remain high across CESEE and could result in a further financial burden for Austrian banks.

Of all FCLs extended by Austrian banks' CESEE subsidiaries to nonfinancial corporations and to households, nearly two-thirds went to nonfinancial corporations, while households account for the remainder. As shown in chart 29, the major currency in the FCL segment is the euro (73% of total FCLs), followed by the U.S. dollar (14%) and the Swiss franc (12%). In recent years, the overall FCL currency composition has become more and more dominated by the euro, while the U.S. dollar overtook the Swiss franc. At the country level, however, the currency split is still highly heterogeneous: At Austrian banking subsidiaries in Croatia and Romania, for example, FCLs are mainly denominated in euro, while the U.S. dollar dominates in Russia and Ukraine.

The substantial decline of outstanding FCLs at Austrian banks' CESEE subsidiaries and the high share of euro-denominated FCLs both indicate a welcome improvement in the financial situation of several Austrian banking subsidiaries in CESEE, but country-specific uncertainties remain and the related risks need to be addressed.

Significant changes for the payments and securities market

The upcoming national implementation of the revised EU Payment Services Directive (PSD2) will entail technical and legal innovations in Austria. The Austrian Federal Act on the Provision of Payment Services (Zahlungsdienstegesetz – ZaDiG) will have to be aligned with EU provisions by end 2017 at the latest. This alignment will enable new market players in the fields of payment initiation and account information services – so-called third-party providers – to enter the regulated payments market by applying for ZaDiG licensing. Credit institutions are expected to develop appropriate strategies to

deal or cooperate with these new competitors, which are often referred to as fintechs. Furthermore, new PSD2 requirements in the area of strong customer authentication, incident reporting or consumer protection are going to improve both safety and competitiveness in the retail payments market. The OeNB has actively contributed to the development of the respective technical standards at EU level and will, in the future, be responsible for the national oversight of these innovative payment services.

In the area of securities transactions, substantial changes are taking place as well. Austria's only central securities depository (CSD.Austria) successfully completed its TARGET2-Securities migration during the fourth migration wave in February 2017. As a next step, CSD.Austria is currently preparing its licensing procedure under the CSD Regulation. As the competent supervisory authority, the OeNB is accompanying this process.

Prolonged period of low interest rates hits life insurance premium growth

Low profitability caused by a prolonged period of low interest rates and weak

Revised framework for payment services will foster innovation and competition

Chart 30

Growth of insurance premiums

Annual growth in %

Legend:
- Overall
- Life
- Property/casualty
- Health

Source: FMA.
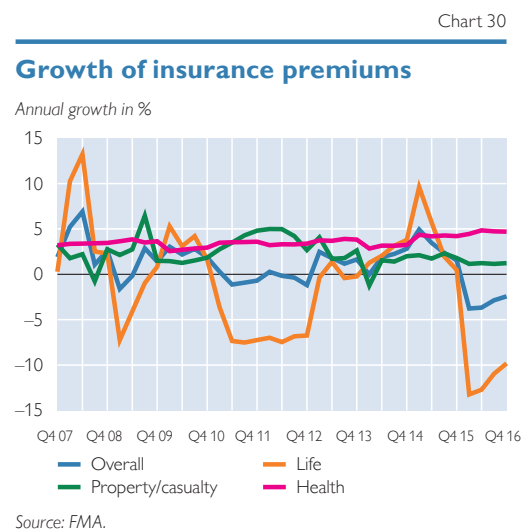
macroeconomic growth remains the key risk for the insurance sector. However, not all insurance sectors are equally concerned. The life insurance sector is particularly affected, with premiums having decreased by about 10% and more in 2016. This reduction is mainly driven by a fall in single premiums.

As a reaction to this challenging environment, the insurance sector is shifting its business mix toward products that are directly linked to market performance and whose investment risk is borne by the policyholder.

Besides adapting to the macroeconomic environment, insurance companies are also adapting to new regulatory rules. Solvency II, the harmonized EU-wide insurance regulatory regime, entered into force in 2016, imposing transitional rules. Chart 31 shows how Austrian insurance companies have modified their investment behavior to adapt to these new rules. From 2009 to 2016, the securities investments of Austrian insurance companies show a

notable shift away from investments in bank securities (−18 percentage points) toward government bonds (+5 percentage points), nonfinancial corporations (+5 percentage points) and insurers (+3 percentage points). There has also been a shift in terms of securities' duration, from short durations (2 to 5 years) toward the 10- to 15- and 15- to 29-year duration band, as the low yield environment makes short-term securities particularly unattractive.

The European Insurance and Occupational Pensions Authority (EIOPA) conducted a stress test for the European insurance sector in 2016. This regular exercise was aimed at assessing the sector's resilience in times of adverse market developments. It focused on two major market risks: the prolonged low yield environment and the so-called "double hit" scenario, which combines low interest rates with a negative shock to asset prices. The exercise covered 236 companies at solo level from 30 different countries.

Chart 31

Considerable changes in the investment behavior of Austrian insurance companies

Asset allocation of insurers' investments in securities

Original maturity of insurers' investments in securities

2009   Q4 2016
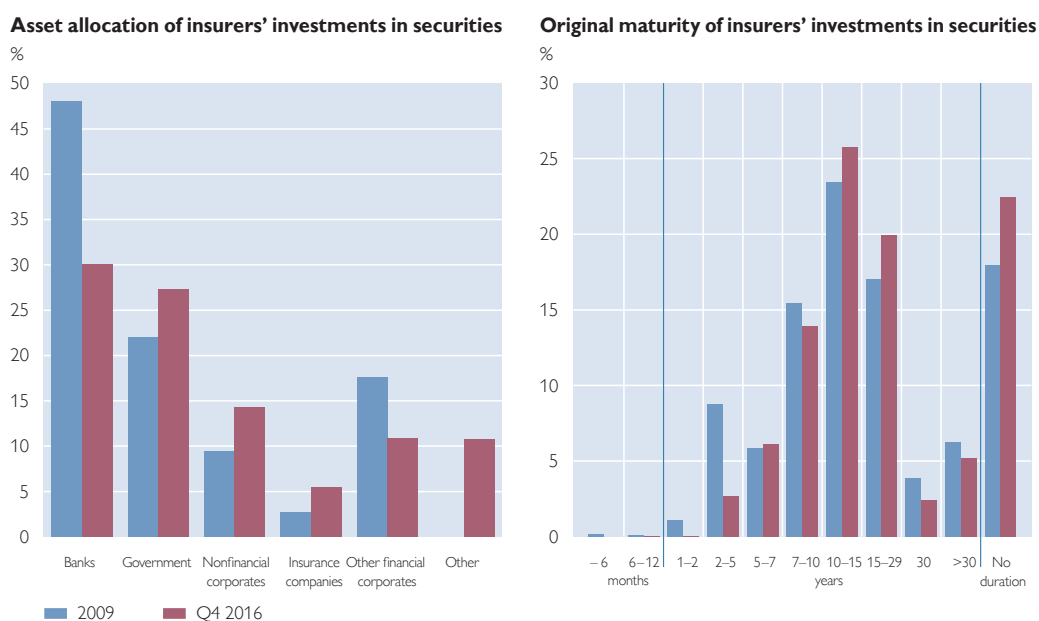
Source: OeNB.

In aggregate, all participating undertakings show an excess of assets over liabilities in the baseline. Tier 1 unrestricted own funds account for 90% of total own funds of the sample companies, indicating that the quality of their own funds is generally high. However, the composition of available own funds varies markedly across companies.

The double hit exercise resulted in a 9.7% decline (almost EUR 610 billion) of total assets in the baseline. As liabilities only declined by 7.8% (EUR 450 billion) of total liabilities in the baseline, this scenario has a negative impact on the balance sheets of stress test participants of 28.9% (close to EUR 160 billion) of the total excess of assets over liabilities in the baseline. In the event of a low-for-long scenario, the impact for the insurance sector would consist of an 18% fall (about EUR 100 billion) in the total excess of assets over liabilities in the baseline. Detailed results have been published by EIOPA.[19]

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[19] *https://eiopa.europa.eu/Publications/Surveys/EIOPA-BOS-16-302 Insurance stress test 2016 report.pdf*

Special topics

Simulating the impact of borrower-based macroprudential policies on mortgages and the real estate sector in Austria – evidence from the Household Finance and Consumption Survey 2014

Nicolás Albacete,
Peter Lindner[1]

In this paper we simulate the impact on house prices and credit available of different macro-prudential restrictions on household mortgages in Austria. We apply the methodology developed in the literature for credit register-based information and extend it to the use of survey data. This allows us to make use of the data gleaned from the most recent wave of the Household Finance and Consumption Survey (HFCS) in Austria to investigate the linkages between macroprudential policy and credit supply. We find that of the three standard credit ratio-based criteria – loan to value (LTV), debt to income (DTI) and debt service to income (DSTI) – for most households, the income-based criteria (DTI followed by DSTI) are the binding ones, while the role of LTV is limited. The relationship between credit supply and house prices is found to be positive, but weak. We simulate various macroprudential scenarios and find that macro-prudential measures may potentially have sizeable effects on the credit available to households for financing real estate. Furthermore, it can be seen that – as expected – macropru-dential policy tends to affect less affluent mortgage holders (although at the median, mortgage holders are more affluent than the general household population). The results also show that the simulated macroprudential policy measures trigger smaller changes of house prices.

The aggregate stock of housing loans in Austria trended upward over the whole period from 2006 to 2015 (see chart 1). Even after the onset of the financial crisis in 2008, housing credit growth has been quite robust, supported by historically low interest rates and the ongoing dynamics in the housing market.

However, the interrelationship between housing loans and house prices seems to be not very strong in Austria. For instance, the surge in house prices during 2012 does not seem to have been driven by increases in the housing debt stock. Possible reasons for the apparently weak interrelationship between housing loans and house prices in Austria could be the dominant role of subsidized low-rent apartments, the fact that family homes are commonly kept for a very long period and therefore are a form of very long-term investment, or the role of inheritances.

Nevertheless, chart 1 clearly shows an increase in real estate prices and also an increase in household mortgage debt levels. In fact, the strongest increase in residential property prices of the whole euro area was measured in Austria between 2007 and 2016. According to the indices available in the ECB Statistical Data Warehouse, nominal prices rose by 60% between the first quarter of 2007 and the third quarter of 2016,

Refereed by:
Conor O'Toole,
Central Bank of
Ireland

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Chart 1

Housing debt and house prices in Austria

Levels, 2006–2015

Housing debt in EUR million   *House price index (100=2006)*

Growth rates, 2006–2015

%

— Housing loans – stock (left-hand scale)
— House price index (right-hand scale)

— Housing loan growth
— House price index growth
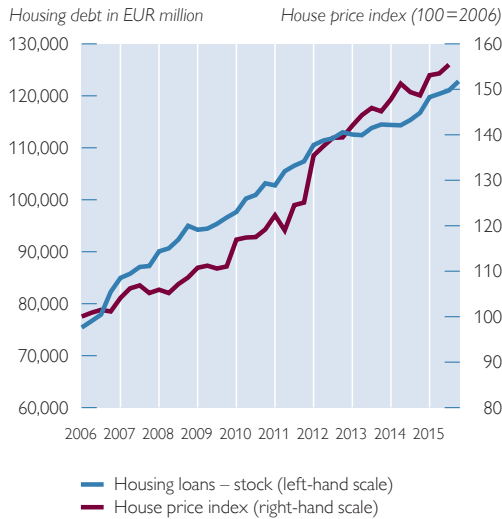
Source: OeNB.

while they stagnated in the rest of the euro area. Albacete et al. (2016a) find that strong increases in available house price indices in Austria are likely to be driven by the upper part of the house price distribution. Although a number of studies have put forward reasons arguing that the mortgage debt of households in Austria is sustainable (see e.g. the analyses in Albacete and Fessler, 2010; Albacete et al. 2012; Beer and Wagner, 2012; Albacete and Lindner, 2013; Albacete et al., 2014; Albacete and Lindner, 2015; and others[2]), in October 2016 the European Systemic Risk Board (ESRB) issued an official warning concerning vulnerabilities in the Austrian real estate sector.[3] Following a discussion of real estate developments and debt sustainability, the Financial Market Stability Board (FMSB) in

Austria issued a statement particularly focusing on vulnerability indicators of households in Austria.[4]

So far all the analyses about the household mortgage market and vulnerability in Austria have focused on the identification of potential weaknesses of the sector (e.g. stress testing or examining the role of foreign currency loans to households). However, in light of the FMSB's official statement, an assessment of the potential impact of macroprudential policy measures on households and the real estate market seems warranted. Macroprudential policy is complementary to monetary policy and can play an important role in limiting the build-up of risks, e.g. in a situation of strong debt-driven house price increases, as, for instance, the Irish experience has shown.[5]

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[2]   *For some more references see also*
    https://www.oenb.at/en/Monetary-Policy/real-estate-market-analysis/publications.html.

[3]   *http://www.esrb.europa.eu/mppa/warnings/html/index.en.html.*

[4]   *https://www.fmsg.at/en/publications/press-releases/2016/tenth-meeting.html.*

[5]   *http://www.centralbank.ie/stability/MacroprudentialPol/Pages/LoantoValueLoantoIncome.aspx.*

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Furthermore, macroprudential policies also aim to limit contagion effects in the financial sector and to create the right set of incentives for market participants.[6]

Until now there has been a lack of information on the potential impact of macroprudential policy measures. However, since understanding the role macroprudential policy could play in limiting the build-up of risks is essential, this study intends to shed some light on this topic. As recommended by the ESRB handbook (ESRB, 2014), the paper takes the borrowers' perspective. We perform an impact analysis of macroprudential intervention in Austria, setting constraints to the loan-to-value (LTV), the debt-to-income (DTI) and the debt service-to-income (DSTI) ratios, with a focus on measuring the effects of such interventions on the real estate sector, i.e. mortgage supply and house prices. We adapt the approach developed by Kelly et al. (2015) and use the best and most recent source of information available, i.e. data from the second wave of the Household Finance and Consumption Survey (HFCS 2014) for Austria. The methodology applied in this study basically consists of four main steps: identifying market conditions, estimating the maximum credit available to consumers, running house price regressions and simulating various macroprudential scenarios. We find a potentially sizeable impact on credit available whereas the impact on house prices is smaller. Additionally, we are able to identify and discuss the group characteristics of affected households.

The study is structured as follows: Section 1 details the methodology applied; section 2 introduces the survey data; and section 3 presents and discusses the results step by step to ensure maximum transparency in the simulation. Within this section, subsections 3.3 and 3.4 in particular lay out and discuss the simulation results and the information obtained about the affected group of households. Section 4 concludes and points toward potential extensions.

1 Estimation strategy

We make use of the methodology proposed by Robert Kelly, Fergal McCann and Conor O'Toole (Kelly et al., 2015) from the Central Bank of Ireland. It basically consists of four main steps, which are discussed in detail below. It has to be stressed that due to data differences (see section 2), our approach is not completely identical to Kelly et al. (2015), but we tried to follow the proposed methodology as closely as possible.

1.1 Determination of the maximum LTV, DTI and DSTI allowed by banks for each period

As a first step we identify the prevailing market conditions in Austria. We infer these credit market conditions by studying the distribution of ratios on credit standards at the time of the origination of a mortgage. We consider three ratios: the loan-to-value (LTV), the debt-to-income (DTI) and the debt service-to-income (DSTI) ratios.

Considering the distribution of these debt burden ratios, it seems obvious that the prevailing market conditions with respect to the most extreme values that are financed by the banking sector are given by relatively high percentiles. Although we do not directly consider the maximum observed value, for the sake of simplicity we refer to

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[6] *https://www.ecb.europa.eu/ecb/tasks/stability/html/index.en.html.*

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these parameters as maximum DTI (DTI_{Max}), maximum LTV (LTV_{Max}), or maximum DSTI ($DSTI_{Max}$) in the remainder of the paper.

1.2 Computation of available credit (i.e. maximum credit amount satisfying the credit standard constraints) at the borrower level

Having identified the prevailing market conditions for the maximum ratios banks are willing to provide,[7] it is possible to calculate the amount of credit each individual household might obtain along each channel, i.e. LTV, DTI, DSTI, based on some relevant characteristics of each household (e.g. wealth and income levels).

We can thus compute the maximum credit amount satisfying these constraints for each borrower household denoted i. Calculating the down payment available to the borrower and denoting it $deposit_i$, we calculate the maximum credit along the LTV channel[8] for a borrower by

$$Loan_{LTV_i} = \frac{deposit_i}{1 - LTV_{Max}} - deposit_i.$$

Based on (initial) income we can calculate the maximum credit along the DTI channel by

$$Loan_{DTI_i} = income_i \times DTI_{Max}.$$

The last channel is a bit more complicated since we need to specify the term of the loan in the market, denoted by $TERM$, as well as the interest rate. Based on a household's income and the prevailing conditions ($DSTI_{Max}$) a maximum repayment per year can be defined, denoted $RepayMax_i$, which can be used, together with the compound interest formula, to calculate the maximum credit available along this channel by

$$Loan_{DSTI_i} = RepayMax_i \times \frac{1 - (1 + r_i)^{-TERM}}{r_i},$$

with $RepayMax_i = income_i \times DSTI_{Max}$.

The concrete specifications chosen for the above formulas are explained in section 2. Obviously, a bank will consider all three channels together as well as additional information available about the mortgage taker. Here we provide the channels one by one in order to be clear and transparent. Thus, putting all the channels together and taking the minimum, we are able to estimate the credit available for each household. It is calculated as follows:

$$Credit\ Available_i = Min(Loan_{LTV_i}, Loan_{DTI_i},\ Loan_{DSTI_i})$$

The measure of available credit represents the amount of funds the bank (the market) is willing to supply to a household after considering the three credit ratio criteria together. Importantly, it is not the amount of credit really given to the household. There might be many reasons why a household may be able to purchase the desired property without taking out the entire available credit, e.g. the availability of sufficient funds from other sources.

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[7] Although it is acknowledged that a relationship between a costumer/household and a bank or other aspects might influence the maximum credit available to an individual household, we take the prevailing market condition derived above as a first best approximation of the maximum credit ratio a household is able to obtain from a bank.

[8] This equality is obtained by definition, expressing LTV as the ratio of loan to price and price as the sum of loan and deposit. Note that $Loan_{LTV_i}$ is not defined for LTV_{Max}=100%. The intuition is that in such cases banks offer unlimited or "infinite" financing of properties through the LTV channel.

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1.3 Estimation of the response of housing prices to the amount of available credit

Once we have computed the amount of credit available at the level of each borrower, we can estimate the relationship between house prices and available credit by performing a regression of house prices on available credit. We can include borrower characteristics and hedonic characteristics of the house as variables of control in this regression. This step consists in the estimation of a linear regression of the following form:

$$House\ Price_i = \beta\ Credit\ Available_i +$$
$$+\gamma' X_i + \varepsilon_i$$

The matrix X_i contains an extensive set of real estate and borrower characteristics in order to control for price differences that are due to other factors than the credit available. Below (see section 2) we explain in detail which control variables we use.

1.4 Simulation of a macroprudential intervention

For the simulation exercise we look at various different scenarios (see schedule 1).

First, in line with international efforts and in order to ensure comparability, we look at the impact of each of the three channels separately identified by the market condition. In particular, we look at a 5 percentage point reduction of the prevailing maximum LTV ratio, a 1-year decrease of the prevailing maximum DTI ratio, and a 5 percentage point decrease of the prevailing maximum DSTI. Looking at each channel separately allows us to inspect the impact of each measure. As all three measures are often implemented together and the FMSB also discussed all three policy rates, we additionally combine the three scenarios.

For each scenario, we compute a new value of available credit for each borrower by using the method described in subsections 1.1. and 1.2. We compare the new value of available credit (offered by the bank (i.e. the market)) with the observed credit (actually given to the household) to describe the borrowers who have to exit the market due to the new constraint (if available credit is smaller than observed credit and one cannot fully finance the desired property).

Additionally, we approach the simulation from a different angle (see right-hand part of schedule 1). Here we perform a grid search of policy measures that lead to a decrease of average credit available of 30%. In contrast to the assumptions on debt burden indicators this part is more backward looking in the sense that it assumes a particular outcome (decrease of average credit available of 30%) and looks for the policies needed to achieve it. In practice, various values of policy thresholds (in schedule 1 denoted x, y and z) are used until the desired outcome is achieved. We implement this approach for each

Schedule 1

Summary of the simulation approach

	LTV channel	DTI channel	DSTI channel	Combined	Grid search LTV channel	Grid search DTI channel	Grid search DSTI channel	Grid search combined
LTV	−5 pp	0	0	−5 pp	x	0	0	x
DTI	0	−1 year	0	−1 year	0	y	0	y
DSTI	0	0	−5 pp	−5 pp	0	0	z	z

Note: pp = percentage points.

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debt burden indicator separately and for all indicators combined. Note that for the combined exercise there are many possible combinations. As we are interested in the impact of tighter credit conditions on the market we only investigate a decrease of this figure.

We use this new measure for credit available together with the estimates of the house price equation described in subsection 1.3 to simulate the counterfactual house price dynamics under the assumed macroprudential intervention. Hence, while the effect on the price dynamics depends on the house price equation, the change in maximum credit available to households only depends on the observed market conditions.

2 Data and model specification

We use data from the Austrian part of the second wave of the Household Finance and Consumption Survey (HFCS), which was conducted in 2014 and 2015, as the basis of our investigation.[9] The HFCS is a euro area-wide project coordinated by the European Central Bank (ECB).[10] The OeNB is responsible for conducting the survey in Austria. HFCS data provide detailed information on the entire balance sheet as well as several socioeconomic and sociodemographic characteristics of households in the euro area. In particular, the survey provides information on the wealth held in a household's main residence (HMR) and other real estate. In addition to the estimated market price of a particular property at the time of the interview, the survey also collects information about the value of each property at the time when the household acquired (or built) this property. Furthermore, information of potentially multiple loans to finance the HMR of each household is collected as well as outstanding and initial loan amounts and information on interest rates and loan terms. All this information is used in the analysis at hand. We additionally use some specific variables for Austria which are not publicly available, such as, in particular, information on payments into the repayment vehicles of bullet loans, which are not part of the core variables of the HFCS; these data are collected in Austria due to the relatively high prevalence and thus importance of this type of credit. We include such payments into the definition of debt service. We also include Austria-specific information on net income (see below) or region where the household is located to estimate the house price equation. The results reported in this study apply to households in Austria only. All estimates are calculated appropriately taking into account the final household weights and the survey's multiple imputation (see Albacete et al., 2016b, for a detailed description of the survey methodology in Austria). The net sample of the HFCS 2014 in Austria contains 2,997 households. Of these households, about half own their main residence and about 400 (i.e. 15.5% of the household population) have outstanding mortgage debt for their main residence.

Overall, the methodology of the second HFCS wave 2014 follows – with

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[9] A credit register reporting threshold of EUR 350,000 is currently in place in Austria. Since most mortgage loans are below this threshold, this source cannot be used for the analysis at hand. Furthermore, the HFCS has the advantage of providing very detailed information on the characteristics of households and their main residence in addition to the balance sheet including debt information.

[10] The first wave of the HFCS in Austria was conducted in 2010 and 2011. As it was implemented with a similar structure, a similar analysis could be conducted with the data from the first wave. It is envisaged that this survey is conducted about every three years and hence the simulation can be updated in the future. The HFCS in Austria has no panel component.

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some improvements — that of the first HFCS wave (2010) and is documented in Albacete et al. (2016b).[11] Thus, for the specifics of the survey the interested reader is referred to the documentation.

For our present analysis, we need to construct three ratios: LTV, DTI and DSTI. For simplicity reasons, we restrict the analysis to mortgages taken out to finance a household's main residence only.[12] As we are interested in these ratios at the time of the origination of the mortgage, we approximate them by using some retrospective information available in the HFCS.

We estimate the LTV by dividing the sum of a household's main residence mortgages at origination by the value of the household's main residence at acquisition.[13] This ratio is called initial LTV and used throughout the analysis. The initial DTI is estimated by dividing the sum of a household's main residence mortgages at origination by the yearly net household income at the time of loan origination. Since the survey only collects information on income for the reference period of the full calendar year preceding the interview (i.e. 2013 or 2014) we use the change of total gross wages from aggregate data[14] between the reference period and the time of loan origination in order to estimate the income at the time of loan origination. This estimation is based on the assumption that the structure of income remains stable. The household's

gross annual income is the agreed income measure in the international HFCS. In the Austrian questionnaire respondents are allowed to provide net income figures (for (self-)employment income, pension income, and income from financial assets) if they do not know their gross income; the net figures are then used to calculate gross income figures.[15] During the post-survey production in the second wave of the HFCS in Austria also all gross income figures are converted into net income figures. These net income figures are used in the study at hand. Therefore, the discussion of the main results is based on yearly net household income at the time of loan origination. We also conducted the complete analysis using yearly net income for the reference period (denoted "current income") as well as yearly gross income for both the reference period as well as the time of loan origination. Due to space constraints, the results are not presented here but are available upon request. The DSTI is estimated by dividing the sum of all annual mortgage payments (including savings for bullet loans) for the household's main residence (at the time of the interview) by the household's net annual income (at the time of loan origination). Thus in light of the retrospective view at the time of the loan origination we implicitly assume — due to the lack of additional information — that the repayment is constant over the repayment period and thus ini-

[11] An extensive methodological documentation of the second wave of the euro area HFCS can be found in ECB (2016).

[12] Since there are few mortgages to finance real estate other than the HMR (i.e. only 1.5% of households hold such liabilities, see e.g. Fessler et al., 2016), the inclusion of these loans should not affect the results to a great extent.

[13] There is the possibility that there is a time difference between loan origination and ownership transfer. In order not to restrict the sample further and make use of all available information, we take all mortgage loans for the HMR into account independent of potential time differences.

[14] More precisely, we use the "compensation of employees" time series since 1954 from the Austrian national accounts statistics, which includes gross wages and salaries plus employers' social contributions.

[15] According to the documentation in Albacete et al. (2016b), the Ministry of Finance's "net-gross calculator" is used for this conversion.

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tial repayment is equal to current repayment.

Furthermore, the maximum credit ratios reflecting the prevailing market conditions with respect to the highest ratios that are financed by the banking sector should be given by relatively high percentiles of their distribution. Kelly et al. (2015) propose to use the 98th percentile from the credit register. Because of the structure of the survey and the relatively small number of observations we take the 75th percentile for LTV[16] and the 95th percentile for the other two ratios. We repeat the whole exercise assuming the 80th percentile for the LTV as the market condition for maximum LTV provided. Qualitatively the results below are robust to this variation.

Finally, for the calculation of available credit as laid out in subsection 1.2 we also need to construct the following additional variables: the household's down payment available to the borrower ($deposit_i$), which is defined as the difference between the value of the main residence at the time it was acquired and the initial amount borrowed at the time the loan was granted (this amount may be negative if the initial LTV is larger than 100% for a specific borrower); the interest rate (r_i), which is measured by the current interest rate paid by the borrower;[17] and the maximum loan term allowed by banks for repaying the mortgages ($TERM$), which is measured by the 50th percentile of the maximum[18] loan term distribution across borrowers.

3 Results

This section provides and discusses all empirical results obtained with the methods described above. Important assumptions for the simulation may be repeated in order to underline their relevance and to provide for complete transparency in the choices that need to be made.

3.1 Credit available

First, we need to look at the general market conditions for the HMR mortgage market in Austria as found in the HFCS. Table 1 provides the prevailing market conditions based on the percentiles[19] specified above, the resulting maximum credit available along each channel and the share of households for which the specific channel is binding. It does not only provide the overall structure but also look at a trend over the last years.

The median volume that banks are willing to supply to a borrower applying the LTV criterion (middle panel in table 1) is given by about EUR 924,000. This relatively large amount is due to the relatively high prevailing maximum LTV that the market allows, as can be seen in the 75th percentile of the LTV distribution in the bottom panel in table 1. For instance, if a borrower has a deposit of about EUR 100,000 and the maximum LTV ratio in the banking

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[16] For the estimate of the initial LTV, in particular, one has to consider various specific topics such as the difference in time between loan origination and ownership transfer, acquiring real estate and refurbishing or rebuilding it at the same time, etc. As mentioned above, we take all observations into account, but instead of considering a more extreme percentile, we look more toward the middle of the distribution.

[17] If a household has several mortgages, we use the median interest rate of all its mortgages. In particular, we assume a constant interest rate for the repayment period, as given by the information provided in the HFCS.

[18] The maximum is only taken if a borrower has taken out more than one mortgage loan for the HMR. This term length of 25 years reflects common practice in Austria.

[19] See Albacete and Lindner (2013) for a discussion of credit ratio distributions in Austria.

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Table 1

Descriptive statistics of the components of credit avaliable and the binding condition

	All	1990 to 1994	1995 to 1999	2000 to 2004	2005 to 2009	2010 and younger (2015)
Share of households (%) for which the binding condition is						
LTV	13.6	11.1	12.6	14.0	16.8	14.7
DTI	49.8	43.7	46.2	44.8	51.0	52.6
DSTI	36.6	45.2	41.2	41.2	32.2	32.7
Conditional median of maximum credit (in EUR thousand) given by						
LTV[1]	924.4	768.5	1,069.5	902.0	1,046.0	1,126.5
DTI	367.8	182.3	327.5	374.4	427.5	492.0
DSTI	379.7	180.5	328.9	395.8	431.6	496.9
Market condition of thresholds						
LTV (P75) (%)	90.5	68.5	79.8	100.5	85.4	102.4
DTI (P95) (years)	12.4	9.3	12.5	12.5	11.8	8.6
DSTI (P95) (%)	66.5	60.3	70.4	63.6	60.3	51.4

Source: HFCS Austria 2014, OeNB.

[1] *The timeline refers to the year when the highest mortgage for the household's main residence was taken out.*

sector is 90%, that borrower will be able to get a mortgage of about EUR 925,000 as indicated above. This figure is regardless of income, age, the prevailing interest rate or credit conditions along the DTI and DSTI channels. Of course, this is a hypothetical exercise because the banking sector would probably not grant such a high loan without considering the other two channels. This is, in fact, what we do when constructing the credit available measure as well.

At the median, the maximum credit along the DTI and DSTI channels is about EUR 370,000 and EUR 380,000, respectively. One has to keep in mind that these results are medians with an underlying complete distribution based on households' individual wealth and income levels (as well as term and interest rate levels for the DSTI channel). Again, these are just hypothetical figures because, of course, the banking sector is unlikely to grant such high loans without considering all three channels together. This is what we do when constructing the credit available measure. This measure is given by the minimum of the three figures in the middle panel of table 1. Thus, at the median overall credit available to a HMR mortgage borrower is about EUR 370,000. Obviously, this figure is well above the median level of initial loan amount at the time of loan origination since not all households need to take out the maximum amount available. In summary, we find in the empirical distributions of the data that the maximum LTV, DTI and DSTI ratios are around 91%, 12 years and 67%, respectively. This does not imply that all potential borrowers may be granted a loan at these ratios. What it does mean can be understood best by considering an example: A household with high and stable income (proven to the bank) may at the maximum reach an LTV of 91% while the other two ratios may be well below the maximum derived from the empirical distribution. On the other hand, a borrower with a very high down payment, e.g. EUR 500,000, may have a relatively high DTI ratio, e.g. 10 years (resulting, for example, from a net income of EUR 20,000 and a mortgage of EUR 200,000). In this

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example, however, the LTV ratio would be around 29%.

Table 1 also shows which of the three possible channels is binding for the borrower. This depends on individual household characteristics regarding income, wealth and interest rates. We see that for most households the binding channel is the DTI ratio followed by the DSTI ratio. This suggests that policies focusing on these measures have a bigger impact compared to the LTV channel. It also indicates that a bank/creditor looks at the income level in order to estimate the maximum credit to be granted to a specific individual or household. The LTV channel is less frequently binding for households.

The table additionally presents the indicators over time in order to inspect potential changes in the impact discussed below. We find that although income-based borrowing conditions tightened slightly over time, the maximum credit available in absolute terms increased and the share of binding conditions remained stable, and thus the underlying structure seems to be relatively stable as well. This might be an indication that over time, the granting of mortgages increasingly shifted to higher-income households in addition to increasing levels of income over time. When interpreting developments over time, care has to be taken especially with regard to the information on mortgage conditions in the 1990s. As the HFCS collects only data on outstanding loans and households pay back their mortgages over time, the number of observations is low early on (i.e. about 25 in the time bracket 1990–1994) but increases over time (i.e. about 120 in 2005–2009).

We have conducted the whole analysis using current net, initial gross and current gross income levels instead of initial net household income for our calculations. Note that by definition, this impacts only DTI and DSTI. We find that the results are qualitatively stable. Due to space constraints, we do not include all the tables in this paper. Additionally, all the calculations were also conducted with a prevailing market LTV condition of close to 100%. (80th percentile). The results are again stable considering this type of robustness check.

3.2 House price equation

Next we turn to the estimation of the house price model for Austria using HFCS data. We restrict the estimation sample to homeowners with an outstanding mortgage taken out to acquire their main residence so that the estimation sample includes about 400 observations. We do this because the measure of credit available based on all three channels is only available for households holding an outstanding mortgage at the time of the interview. We estimate the equation introduced above with various sets of controls (only the regressions with the largest set of controls are reported in the table) and in levels as well as transformed by the logarithm (or inverse hyperbolic sine transformation for variables that may include non-positive values). As control variables we use a broad set of household and real estate characteristics. The former include age (linear and quadratic), income, down payment and, obviously, credit available to the household. The latter are region, HMR size, time since loan origination, time of living in the household and paradata about the real estate such as type and rating of dwelling as well as rating of the surrounding area and also outward appearance of the real estate as recorded by the interviewer. Table A1 in the annex shows the definition of the explanatory variables in more detail.

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Since some of the independent variables are connected we test for multicollinearity. In order to see whether a problem of multicollinearity exists, we have calculated the centered variance inflation factors for the independent variables specified in our linear regression model. Following the rules of thumb used by Chatterjee and Hadi (2012), the only evidence of multicollinearity that we can find in our regression model is the one between age and age squared, which is intended.

The results are presented in table 2. We find a positive, though partly insignificant relationship between credit available and house prices measured at the time of acquisition. Columns 1 and 2 present the results for the full unrestricted sample. According to our findings, a EUR 1 increase in credit available is associated – ceteris paribus – with an increase in the mean main residence price of about 6 cent in our preferred specification (column 1). Moreover, the relationship between age and house prices follows an inverted U-shaped pattern: on average, initial house prices decrease with age[20] until a certain point, and then increase again, ceteris paribus. To a certain extent, this may also reflect house price developments over the last years. Our results are broadly consistent with the Irish results in Kelly et al. (2015). The corresponding log specification of

Table 2

House price regression

	Full sample		Restricted sample		Unweighted regression	
	Level initial house value	Logarithm initial house value	Level initial house value	Logarithm initial house value	Level initial house value	Logarithm initial house value
	I	II	III	IV	V	VI
Credit available (CA)	0.062	0.332***	0.110	0.339***	0.061	0.351***
	(0.074)	(0.101)	(0.082)	(0.108)	(0.067)	(0.108)
Total household initial net income	−0.137	−0.149	−0.263	−0.139	−0.158	−0.176
	(0.898)	(0.130)	(0.840)	(0.124)	(0.965)	(0.137)
Value of down payment	0.835***	0.040***	0.652***	0.027***	0.880***	0.043***
	(0.186)	(0.007)	(0.218)	(0.006)	(0.116)	(0.006)
Age	−4,200.853	−0.013	−1,455.621	−0.007	−5,445.458	−0.021
	(5,891.842)	(0.026)	(4,164.130)	(0.022)	(4,791.668)	(0.020)
Age squared	33,836	0.000	13,071	0.000	43,119	0.000
	−57,930	(0.000)	−41,382	(0.000)	−48,594	(0.000)
Controlled for[1]						
Region	x	x	x	x	x	x
Time brackets of loan originiation	x	x	x	x	x	x
Size of household main residence	x	x	x	x	x	x
Duration of living in the household main residence	x	x	x	x	x	x
Type of dwelling (paradata)	x	x	x	x	x	x
Dwelling rating (paradata)	x	x	x	x	x	x
Dwelling location (paradata)	x	x	x	x	x	x
Outward appearance of dwelling (paradata)	x	x	x	x	x	x

Source: HFCS Austria 2014, OeNB.

[1] Every regression includes a constant.

*Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1; "x": according control variable(s) included.*

[20] *In the specification, we use the current age of the household's financially knowledgeable person.*

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house prices, credit available, income and deposits (column 2) confirms the result, and the estimate on the credit available turns out to be significant. This is due to the lower variability and hence lower standard errors when the log specification of those variables are used. Careful inspection shows that the coefficients of credit available in specifications 1 and 2 translate into relatively similar effects on mean house price.

In order to see how robust the results are against outliers in the LTV, we perform the same regressions dropping the top and bottom percentiles of LTVs in the sample (columns 3 and 4). The general qualitative results of this type of house price equation remain relatively stable. We also show in table 2 a set of additional regressions based on unweighted regressions (columns 5 and 6). Again, the results remain quite stable. The additional robustness checks with current net and gross income as well as initial gross income are not only thought as a general form of robustness checks, but also as a way to provide a broader perspective on the issue under investigation. (All these results cannot be included because of space constraints.) For the same reason we consider various specifications.

3.3 Simulation results

Now we turn to the simulation of macroprudential policy changes (tables 3a and 3b).

The first column in table 3a shows the starting point of the simulation in the baseline scenario with the market conditions found in the HFCS (see also table 1). We first simulate a 5 percentage point decrease of the maximum LTV, followed by a one-year reduction of the DTI and a 5 percentage point decrease of the maximum DSTI. The last column provides the results of the combined scenario, where all the three previously separately analyzed reductions are put into one simulation.

The top panel again (as in table 1) shows the share of binding constraints in each simulation whereas the second panel shows the maximum credit available along each channel in each scenario. The last panel is reserved for the results on the average changes in house prices as well as the maximum credit available due to the change in policy rates.

Table 3a shows that a reduction of the maximum LTV by 5 percentage points reduces the median maximum credit available along this channel to around EUR 550,000 — quite a sub-

Table 3a

Simulation results

	Baseline	LTV 5 pp	DTI 1 year	DSTI 5 pp	Combined I
Share of households (%) for which the binding condition is					
LTV	13.6	23.0	12.9	13.0	20.9
DTI	49.8	43.9	66.2	33.2	46.5
DSTI	36.6	33.2	20.9	53.8	32.6
Conditional median of maximum credit (in EUR thousand) given by					
LTV	924.4	548.8	924.4	924.4	548.8
DTI	367.8	367.8	338.2	367.8	338.2
DSTI	379.7	379.7	379.7	351.1	351.1
Changes in % with respect to					
House prices	.	−0.6	−0.6	−0.3	−1.3
Credit available	.	−5.8	−5.5	−3.2	−12.1

Source: HFCS Austria 2014, OeNB.

Note: pp = percentage points.

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stantial reduction. Also, the share of households for which this channel is binding increases substantially. However, the impact on the overall house price level and the maximum credit available is limited. This general picture is similar also for the other two channels, with the DTI channel having the larger impact on credit available and on house prices. Combining all three measures results in a larger impact since now households are affected along all channels at the same time. Thus, a particular household may, for example, have an income high enough to accommodate a change in the maximum DSTI, but at the same time may well be affected by the change in the maximum LTV. The same may hold for other households the other way round. Overall, the modeled changes imply that the share of households for which the maximum LTV is binding increases whilst the share for which the maximum DTI and DSTI is binding decreases. In summary, all results point

toward a relatively modest impact of the modeled changes.

As mentioned above we also simulate an average decrease of credit available of 30% (a more restrictive case in terms of reduction of credit available), the results of which are shown in table 3b. The idea behind this discussion is to evaluate the size of a policy change needed in order to generate a certain result.

Thus, we see in the last line of table 3b that the change of credit available always amounts to −30%. This would be associated with lower house prices of about 3%. Columns 2 to 4 show the change needed in each of the three policy measures. A grid search yielded this result. We find that along the LTV channel a reduction of 21 percentage points (starting from around 90% in the baseline market condition) would make this threshold binding for close to 60% of borrower households in the HFCS, and the median maximum credit is reduced to about EUR 210,000. The

Table 3b

Simulating a reduction of available credit of 30%

	LTV scenario	DTI scenario	DSTI scenario	Example of a combined scenario II
Change of				
LTV (percentage points)	−21	0	0	−10
DTI (years)	0	−4.3	0	−2.8
DSTI (percentage points)	0	0	−24.5	−18.0
Share of households (%) for which the binding condition is				
LTV	57.2	8.5	8.5	24.8
DTI	22.9	89.4	0.0	32.3
DSTI	20.0	2.1	91.5	42.9
Conditional median of maximum credit (in EUR thousand) given by				
LTV	208.1	924.4	924.4	379.9
DTI	367.8	240.5	367.8	284.9
DSTI	379.7	379.7	239.8	276.9
Changes in % with respect to				
House prices	−3.2	−3.1	−3.2	−3.2
Credit available	−30	−30	−30	−30

Source: HFCS Austria 2014, OeNB.

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same impact in terms of the average change of credit available would be reached over a reduction of the DTI ceiling by 4.3 years or a reduction of the DSTI ratio of almost 25 percentage points. In each case the respective policy rate would be binding for almost all households. In the case of the combined scenario we can see that much smaller reductions in each channel together result in the same decrease in credit available. Note that for the combined scenario we report only one possibility. There are many alternative policy mixes (columns 2 to 4 can be examined, for instance) that might yield the same simulation results.

Again we have conducted robustness analyses with current net and gross income as well as initial gross income. Qualitatively, the results are stable.

3.4 First attempt to analyze potentially affected borrowers

Finally, we provide some first information regarding borrowers that are potentially affected by macroprudential measures. We do that by identifying households that under the combined scenario would no longer be able to finance the full amount actually observed. Since the prevailing market conditions are based not on the maximum observed values but some smaller percentiles, there are a few households (1.5%) that are affected even in the baseline scenario. We define a household as being affected by the scenarios introduced above if the newly derived maximum credit available is below the initial amount of loan taken out.

In table 4 we report some general descriptive statistics of the overall household population, HMR mortgage holders and the group affected by the combined scenario.

We see that households with HMR mortgages are more affluent than the overall population both in terms of wealth as well as current annual gross income and that the ones affected by macroprudential policies are likely to

Table 4

Characteristics of the households affected by macroprudential policy

	All	HMR mortgage holders	Affected households in combined scenario
Share of affected households (%)	100.0	15.5	2.2
Household wealth	EUR thousand		
Gross wealth mean	275.7	644.8	487.1
Gross wealth median	100.4	340.6	318.5
Household income	EUR thousand		
Gross current income mean	43.3	60.5	46.3
Gross current income median	35.7	54.5	41.0
Household financially knowledgable person – sociodemographics			
Mean age	53	48	48
Median age	54	46	47
Household debt structure			
Median current outstanding debt (EUR thousand)	.	63.1	108.2
Share of vulnerable households – DTA[1]>100% (%)	6.3	1.4	3.3
Share of vulnerable households – DTI>300% (%)	6.2	36.0	62.7
Share of vulnerable households – DSTI>40% (%)	2.6	15.1	37.2
Share of vulnerable households – expenses above income (%)	6.9	12.8	11.1

Source: HFCS Austria 2014, OeNB.

[1] Debt-to-asset ratio.

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be households that are more affluent than the overall population as well. Within the group of mortgage holders, however, they are less affluent households in terms of both wealth and income levels. We also check several other sociodemographic characteristics not displayed in table 4, but it turns out that the group of affected households seems – with the exception of income and wealth – not to be much different from the average mortgage holder (in terms of, e.g., age). It can also be confirmed that among the affected households in the combined scenario there is a substantial share of households that is identified as potentially vulnerable according to several standard vulnerability measures (e.g. DTA>100%, DTI>300%, DSTI>40%).

Lastly, table 5 shows by how much aggregated debt would be affected. First, we see that 14% of HMR mortgage holders are affected by the combined scenario. In terms of current outstanding mortgage loans at the aggregate level, these households hold about 23% of all mortgage loans. Under the assumption that these households are not going to be excluded from the credit market completely but are just going to reduce the credit amount taken out, we can see that only about 11% of the aggregate mortgage volume initially taken out would not be financed anymore. The two shares basi-

cally provide some bounds on the affected loan volume depending on the assumption whether a household – if restricted – just reduces credit amount taken out (3rd row in table 5) or cannot finance the real estate completely and thus is excluded from the credit market (2nd row in table 5). Please note that this exercise does not take into account that the affected households might hold other assets in addition to the considered deposits or might get help from family or friends, which would allow them to finance the property completely and which would further lower the shares shown in table 5.

4 Summary and concluding remarks

In this paper, we adapt the approach developed by Kelly et al. (2015) to the Austrian case and to household-level survey data. Instead of credit register data we use data from the second wave of the Austrian HFCS for 2014/15, which allows us to characterize in detail the households affected by the simulated macroprudential policy measures.

In a first step, we estimate the credit supply of banks to households on the basis of the three standard credit ratio criteria LTV, DTI and DSTI. We find that the income-based criteria (DTI and DSTI) are the ones which are most often binding for Austrian households. Hence, a policy focusing on the

Table 5

Share of aggregate debt held by households affected by macroprudential policy

	Baseline	Combined scenario I
	%	
Conditional share of affected households	9.7	14.0
Aggregate share of total current debt held by affected borrowers in total current household debt	16.6	23.4
Aggregate share of excess initial debt held by affected borrowers on total initial household debt	8.3	11.1

Source: HFCS Austria 2014, OeNB.

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LTV ratio is expected to be less effective than limiting the DTI or DSTI.

In a second step, we estimate the house price model and show that the amount of credit that is supplied to each borrower has a positive but small impact on the value of the main residence that is purchased. In other words, mean main residence prices do not seem to be strongly credit driven in Austria. However, it could well be that certain quantiles of the main residence price distribution or main residence prices of certain borrower groups (e.g. foreign currency borrowers) or house prices of other properties than the main residence would still change under such scenarios. This is left for future research.

In a third step, we simulate the impact of macroprudential policy interventions on the Austrian housing market. We consider several scenarios that involve restrictions on each of the following ratios: LTV, DTI and DSTI. According to our findings, in Austria, macroprudential policy interventions would be effective in reducing credit supply to households, but less so in slowing down a rapid increase in house prices. Moreover, the impact on house prices is found to depend on the levels at which LTV, DTI and DSTI limits are set. The analysis just simulates the impact on credit supply and not the impact on the credit actually given to a household or newly granted credit by banks (which would also depend on credit demand and is beyond the scope of this paper).

Finally, we have seen that households who are affected by macroprudential policies in that they would no longer be able to take out the amount of credit that they had originally taken out are less affluent households than the average mortgage holder in terms of both wealth and income levels, but they are still more affluent than the average household in the entire population. Furthermore, these households are more vulnerable in terms of several standard vulnerability measures.

It is left for future research to analyze what the impact of macroprudential policies would be on rental prices. In Ireland, for example, rental prices have strongly increased since the implementation of macroprudential policies (see RTB, 2016). Furthermore, future analyses of this kind for Austria could be extended further if credit register data covering Austrian households' mortgage loans in their entirety or at least to a large extent, including appropriate information on mortgage holders, were available. This would provide a much larger sample and more precise information on the origination of loans and could help inform the process.

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Annex

Table A1

Definition of explanatory variables

Variable name	Variable definition	Subject
Initial house value	Property value at the time of its acquisition in EUR	Household
Credit available	Minimum of LoanLTV, LoanDTI and LoanDSTI (see subsection 1.2)	Household
Income	Total household net income in EUR at the time when the highest mortgage was taken out	Household
Value of down payment (equity capital, down payment)	Value of household main residence in EUR at the time of ownership transfer minus value of household main residence mortgage at the time the mortgage was taken out	Household
Age	Age in years	Reference person
Age squared	Age in years squared	Reference person
Region	1=Vorarlberg; 2=Tyrol; 3=Salzburg; 4=Upper Austria; 5=Carinthia; 6=Styria; 7=Burgenland; 8=Lower Austria; 9=Vienna.	Household
Time brackets of loan origination	1=up to 1989; 2=1990 to 1994; 3=1995 to 1999; 4=2000 to 2004; 5=2005 to 2009; 6=2010 to 2015	Household
Size of household main residence	Size of the household main residence in square meters	Household
Duration of living in household main residence	Period of time the household has already lived in its main residence	Household
Type of dwelling (paradata)	1=detached house; 2=semi-detached house; 3=flat/apartment; 4=other kind of dwelling	Household
Dwelling rating (paradata)	1=luxury; 2=upscale; 3=mid-range; 4=modest; 5=low-income	Household
Dwelling location (paradata)	1=downtown; 2=area between city center and suburbs; 3=outskirts; 4=isolated area, countryside	Household
Outward appearance of dwelling (paradata)	1=generally clean and sound; 2=some peeling paint or cracks in walls; 3=needs substantial painting, refilling or repair; 4=dilapidated	Household

Source: HFCS Austria 2014, OeNB.

Note: The household's reference person is defined as the financially knowledgeable person in the household.

Ukraine's banking sector: still very weak, but some signs of improvement

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Ukraine has been undergoing a reform process, and the banking sector is certainly among the areas that have seen remarkable progress. The authorities started to tackle related-party lending (a long-standing structural impediment), resolved many undercapitalized banks and managed to restore a degree of confidence in the sector, as witnessed by the stabilization of deposits. As part of the banking sector clean-up, the country's largest credit institution was nationalized. This step contributed to considerable changes in the ownership structure, with the share of the state in total assets rising to about 50%. After the severe recession of 2014–2015, macroeconomic stabilization achieved with international support in 2016, if sustained, could pave the way for a resumption of lending. Yet, nonperforming loans (NPLs) have skyrocketed, credit risk is still very high, related-party lending is still a problem, resistance to reform remains stubborn, and economic recovery fragile, subject to political uncertainty. Further sound economic policies, progress with structural reforms (in particular with regard to the rule of law and corruption) and efforts to reduce NPLs appear essential to make a sustained banking recovery possible.

In this article, we provide an analysis of the current situation in the Ukrainian banking sector against the backdrop of macroeconomic developments. We discuss the main features of the banking sector, major risks facing the sector and its future prospects. The paper is structured as follows: Section 1 gives a brief overview of the political, geopolitical and macroeconomic environment, followed by a detailed account of banking sector developments in section 2. Section 3 assesses current banking sector risks and shock-absorbing factors, and gives an outlook.

1 Political, geopolitical and macroeconomic environment

The military conflict in parts of eastern Ukraine (notably in the oblasts of Donetsk and Lugansk) that started in 2014 hit the economy through direct and indirect channels, such as a loss of industrial export capacity and confi-dence effects, respectively, but economic activity began to recover in 2016. The political and geopolitical environment has remained shaky, however.

1.1 Political and geopolitical environment

The intensity of the military conflict has declined since a conflict settlement package was agreed in Minsk in February 2015. However, the OSCE special monitoring mission has frequently reported ceasefire violations along the contact line. In fact, hardly any progress has been made in implementing the Minsk agreement, which envisaged a complete ceasefire, the withdrawal of heavy weapons and further steps to settle the conflict. Political and other preconditions that would provide for a reintegration of the nongovernment-controlled areas into Ukrainian state structures have not been met. The

trade embargo imposed by the Ukrainian government vis-à-vis the nongovernment-controlled areas and other largely interrelated events (blockage of rail lines by nationalists, seizure of Ukrainian assets by separatists, Russia's decision to recognize identity cards issued in separatist areas, physical attacks on Russian state-owned banks in Ukraine) rather pointed to lingering high tensions in 2017.

1.2 Macroeconomic background

A severe recession started in 2014 (GDP contraction of 6.6%) and deepened in 2015 (GDP contraction of 9.8%). The Ukrainian hryvnia depreciated sharply until the first quarter of 2015, but depreciation pressures lessened afterwards. The weakening of the hryvnia and administered price hikes drove inflation up to 61% in April 2015. Ukraine, moreover, had to correct large fiscal and quasi-fiscal imbalances under these very difficult circumstances.

Nevertheless, the Ukrainian authorities managed to stabilize the economy in tandem with international support efforts. The economy modestly recovered in 2016, when GDP rose by 2.3% supported by a bumper harvest.

The budget deficit amounted to only 2.3% of GDP in 2016 and thus was below the target of 3.7% agreed with the IMF under the Extended Fund Facility (EFF) arrangement. Disinflationary trends allowed the National Bank of Ukraine (NBU) to lower its key policy rate gradually from 30% in March 2015 to 13% in April 2017. However, inflation remains in double digits (end-April 2017: 12.2% year on year). The current account was almost in balance in 2015, but showed a deficit of 4.1% of GDP in 2016.

Notwithstanding delays in finishing the reviews, the EFF has remained on track, providing an important policy anchor. In April 2017, the IMF Executive Board completed the third review, enabling the disbursement of about USD 1 billion. Rebuilding foreign currency reserves (USD 17.2 billion at end-April) remains critical in light of the still high gross external debt stock (USD 113 billion at end-2016). Under the EFF, Ukraine achieved reform progress in various areas (notably in the banking and energy sectors and with regard to fighting corruption), but the momentum slowed down over time, leaving some reforms incomplete and

Table 1

Ukraine: main macroeconomic indicators

	2014	2015	2016
GDP growth (in real terms, %)	−6.6	−9.8	2.3
CPI inflation (end of period, %)	12.1	48.5	14.9
General government budget balance (% of GDP)	−4.5	−2.2	−2.3
Overall balance of public sector[1] (% of GDP)	−10.0	−2.2	−2.3
General government debt (% of GDP)	69.4	79.1	81.0
Current account balance (% of GDP)	−3.5	−0.2	−4.1
Foreign direct investment (net, % of GDP)	−0.3	−3.3	−3.5
Official reserve assets (USD billion)	6.2	12.2	14.7
Gross external debt (% of GDP)	103.6	134	127.6
UAH/USD exchange rate (annual average)	12.0	22.0	25.5
UAH/EUR exchange rate (annual average)	15.9	24.4	28.3

Source: National Bank of Ukraine, State Statistics Service of Ukraine, IMF, wiiw.

[1] *Including the operational deficit of Naftogaz Ukraine.*

others still largely untouched (pension, land, state-owned enterprises, privatizations). In the current program review, the IMF focuses on these areas and calls for further steps and concrete anticorruption results.

2 Banking sector development (2015–2017): deep contraction and incisive reforms

The Ukrainian banking sector has experienced a deep crisis (shrinking lending and deposit-taking, sharply rising proportion of bad loans and recapitalization needs), which triggered some important reform efforts (see below). The Ukrainian banking sector has traditionally been characterized by a big number of "pocket banks" or "agent banks," i.e. banking outfits that actually function as extended financial departments for oligarchic owners or their firms. Accordingly, pocket banks frequently engage in connected or related-party lending and in some cases even in pyramid schemes (Buckley and Olearchyk, 2017).

In recent years, the NBU has been resolutely addressing this deep-seated structural flaw by cleaning the sector of many, typically smaller or medium-sized, problem banks unable or unwilling to recapitalize themselves. Most recently, this issue came to a head with respect to the country's largest commercial bank (see box 1). Overall, one may subdivide the partly dramatic shrinking and reform process that Ukraine's banks have been experiencing since 2014 into a period of severe crisis (essentially 2015), followed by a slowdown of deterioration tendencies, coupled with some elements of improvement.

2.1 Severe crisis (2015)

The severe and deepening recession as well as the additional sharp depreciation of the hryvnia and the resulting acceleration of inflation contributed to a continuing outflow of deposits, which contracted by 39% (in real terms and exchange rate-adjusted) in 2015. This happened despite exchange controls and administrative restrictions on deposit withdrawals introduced the previous year. Lending to the private sector shrank by 46% in 2015 (in real terms and exchange rate-adjusted), and lending to households even by 54%. The credit crunch primarily reflects the deterioration of credit quality rather than reduced liquidity: NPL ratios virtually doubled in the course of 2015, soaring to 28% in a narrow definition and to 46% in a broad definition.[2] Loan-loss provisions expanded too, but remained in a range of about half to two-thirds of the rising NPL levels. With the credit crunch outstripping the deposit crunch, the loan-to-deposit ratio declined from 151% at end-2014 to 138% a year later. Profitability was deeply negative in 2015 (ROE: –71%).

Given banks' extremely difficult situation, regulatory forbearance was introduced and banks were given until the end of 2018 to complete recapitalization, step by step. At the same time, the NBU, under the EFF, committed to a substantial restructuring of the sector, informed by diagnostic studies carried out in two waves (until mid-2015) on the 20 largest credit institutions (accounting for four-fifths of total sector assets). In this context, the NBU agreed recapitalization needs and measures to unwind related-party exposure as well as deadlines with individual

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[2] *Nonperforming loans narrowly defined correspond to the NBU's definition of NPLs as loans in the doubtful and loss categories. NPLs broadly defined and calculated by the IMF also include substandard loans (for more information see table 1).*

banks. Where agreements could not be reached or were later breached, or where other important regulations (e.g. money laundering) were violated, the respective banks saw their licenses repealed.

This courageous, if risky, intervention contributed to cutting the number of banks active in Ukraine in 2015 by about one-fifth, to 117. Banking assets fell from 84% of GDP at end-2014 to 75% a year later. The intervention of course also had a negative statistical impact on banking activity (deposit-taking and lending). Domestic privately owned banks were particularly strongly squeezed; their share in total sector assets shrank by 10 percentage points, to 37%. While the majority of deposi-

tors in failed banks were reimbursed out of the restructured and recapitalized deposit insurance fund, no prosecutions were brought against bank owners and very little of the UAH 335 billion (USD 14.0 billion) of defaulted assets (as of end-2015) was recovered (Fitzgeorge-Parker, 2016, p. 38). Credit exposure to related parties was first officially measured by the NBU in mid-2015 and came to 31% at the end of the year, clearly exceeding the regulatory maximum of 25%.

Recapitalization of credit institutions has often been carried out through debt-equity swaps, particularly in the case of foreign-owned banks, whose share in the sector's total assets rose by 5 percentage points to 35% in 2015.

Table 2

Ukraine: main banking sector stability indicators (2014–2017)

	End-2014	End-2015	End-2016	End-March 2017
Commercial banks (number of active credit institutions)	145	117	96	92
Foreign-owned banks' share in statutory capital (%)	32.5	42.5	51.0	..
Number of banks not complying with selected banking regulations[1]	79	54	56	..
Total banking sector assets (liabilities) (excluding NBU, % of GDP)	87.4	74.4	68.9	..
Annual growth of total assets (in real terms, %)	–10.3	–25.9	–0.9	–7.4
Claims on general government and on NBU (share in total assets, %)	11.7	14.2	21.9	23.6
Private sector deposits (as ratio to GDP, %)	42.3	35.9	34.5	..
Private sector deposits (annual growth, real terms, exchange rate-adjusted, %)	–38.4	–38.9	–6.3	–8.3
Share of foreign currency deposits in private sector deposits (%)	45.5	44.7	45.7	44.9
Lending to the private sector (as ratio to GDP, %)	64.0	49.4	43.7	..
Lending to the private sector (annual growth, real terms, exchange rate-adjusted, %)	–31.2	–45.5	–14.9	–18.3
Share of foreign currency loans in lending to the private sector (%)	46.5	56.0	49.5	47.6
Nonperforming loans (% of total loans, NBU definition)[2]	19.0	28.0	30.5	..
Nonperforming loans (% of total loans, broader definition, IMF calculation)[3]	32.0	46.4	49.4	55.1[4]
Specific narrow provisions (% of NPLs, NBU definition)[2]	63.7	63.8	65.1	..
Specific broad provisions (% of NPLs, broader definition)[3]	42.6	44.8	45.6	..
Ratio of large credit risk exposure to regulatory capital (%)[5]	250.0	364.1	308.3	284.1
Credit exposure to related parties (%)[6]	..	31.2	36.7	28.7
Current liquidity ratio (%)[7]	79.9	80.0	102.1	115.5
Capital adequacy ratio (overall, %)[8]	15.6	12.3	12.7	13.7
Capital adequacy ratio (tier 1, %)	11.2	8.3	9.0	9.8
Return on assets (ROA, %)	–4.0	–5.9	–12.5	0.8
Return on equity (ROE, %)	–30.2	–70.7	–122.7	7.8

Source: NBU, IMF, and authors' calculations.

[1] Refers to all banks not meeting the capital adequacy requirements for tier 1 capital, prudential regulations and/or reserve regulations.

[2] Until May 2017, the NBU defined NPLs as loans in the doubtful and loss categories.

[3] The broader definition (used by the IMF) also includes substandard loans.

[4] Reflecting the NBU's new NPL definition (applicable from May 2017, more in line with internationally accepted standards): loans that are more than 90 days past due as well as loans with a low probability of repayment.

[5] Regulatory maximum: 800%.

[6] Regulatory maximum: 25%.

[7] Regulatory minimum: 40%.

[8] Regulatory minimum: 10%.

This development followed the withdrawal of numerous foreign-owned banks (including all but one majority-owned Austrian bank) from 2009 to 2014 (see Barisitz and Fungačova, 2015). The decline of BIS reporting banks' exposure vis-à-vis Ukraine started to decelerate somewhat from 2015. The asset share of state-owned banks rose from 22% to 28%. Other recapitalization efforts pertained to substantially enhancing loan collateral, and transferring assets to banks' balance sheets to settle loans (IMF, 2016, p. 17). Thus, while capital adequacy fell from 15.6% at end-2014 to 7.1% at end-September 2015, it recovered partly to 12.3% at end-2015.

2.2 IMF-supported fragile stabilization (from 2016)

Successful if fragile macrostabilization helped banks counter contractionary pressures and partly stabilize their financial situation, even if negative profitability has persisted until most recently. The erosion of private sector deposits appears to have come to a standstill in the second half of 2016 and their GDP ratio appears to have stabilized at about 35%, even if private sector deposits still contracted by 8% (in real terms and exchange rate-adjusted) in the year to end-March 2017. The foreign currency share of household deposits remains very high (51%) at end-March 2017. Lending to the private sector continued to shrink (with lending to households still shrinking more than lending to enterprises), but the

contraction rate slowed to 18% (end-March 2017).[3]

Whereas liquidity indicators have recovered, the further slight deterioration of already dismal credit quality (with the narrow NPL ratio increasing to 31% and the broader ratio swelling to 49% at end-2016) may lie at the roots of the persisting weakness of lending.[4] Yet, notwithstanding the diagnostic exercises, not all problematic debt may have been fully recognized (NBU, 2016, p. 19; S&P RatingsDirect, 2017, p. 9). In any case, Ukraine's new law on financial restructuring, drafted with the help of both the EBRD and the World Bank, and effective from October 2016, aims at facilitating voluntary out-of-court debt restructuring in order to help reduce NPLs and support the financial sector (Usov, 2017).

Although economic activity gained momentum in the final quarter of 2016 and continued to expand in the first months of 2017, banks did not appreciably step up lending in late 2016 and early 2017, but instead invested more heavily in government and central bank instruments (mostly by purchasing state bonds and NBU certificates of deposit), benefiting from attractive interest rates.[5] As a result, the share of such instruments in banks' total assets almost doubled from late 2015 to end-March 2017 to around one-quarter – which corresponds to about 40% of total lending.[6] Weak rule of law and creditor rights contributed to holding back lending. The share of foreign cur-

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[3] The category of loans from state-owned banks (SOBs) to state-owned enterprises (SOEs) reportedly revived in the second half of 2016.

[4] Apart from the challenging economic situation, the high level of NPLs also reflects banks' inability to foreclose on assets and lack of incentives to restructure bad loans (IMF, 2017, p. 19).

[5] The increase of banks' government bond purchases was partly related to Privatbank's nationalization in December 2016 (see also box 1).

[6] This rise also reflected the placement of government bonds into Privatbank's portfolio (NBU, 2017a, p. 1, see also below).

rency loans declined somewhat in recent months, but remained at almost half of total lending. Despite a long-standing ban on such lending to households, the share of foreign currency-denominated retail loans only declined very slowly and was still 50% at end-March 2017.[7] The above-mentioned tentative recovery of depositor confidence, coupled with not yet surmounted obstacles for lending, contributed to the further decline of the loan-to-deposit ratio to 123% at end-March 2017.

The NBU's activities to clean up the banking sector led to the closure of another 25 banks in 2016 and further cuts, to 92 banks, in the first quarter of 2017, and most notably, to the nationalization of Privatbank, the country's ailing largest commercial bank (see box 1). Other banks from the group of the 20 largest banks had reportedly brought their capital adequacy ratios to at least 5% of risk-weighted assets, while Privatbank had failed to do so. The diagnostic studies first carried out on the top 20 banks were repeated at the next 20 credit institutions (ranked by assets). These banks have since had to reach a 5% capital adequacy ratio by end-May 2017. Banks' overall credit exposure to related parties stood at 29% at end-April 2017.

Box 1

Banking sector clean-up culminates in nationalization of Privatbank

In December 2016, the Ukrainian authorities decided to nationalize and recapitalize (by issuing sovereign bonds) the country's biggest bank (Privatbank) in light of its systemic role in Ukraine's financial system after it had repeatedly failed to meet capital requirements. The authorities acted in accordance with the national household deposit insurance legislation,[1] which serves as the legal basis for Ukraine's bank resolution framework. The nationalization of the bank, that was majority-privately owned by oligarchs and accounted for more than a fifth of total banking assets, was a required prior action under the EFF. The capital shortfall was estimated at EUR 5.4 billion (6.5% of GDP) at the time of nationalization and mainly stemmed from provisioning needs for related-party loans. According to the NBU, the corporate loan book almost entirely consisted of loans to related parties. This means that Privatbank simply constituted a huge "pocket bank" that accumulated deposits from Ukrainian households and passed most of the money on to companies related to the owners of the institution.

Yet, the liabilities of the bank also included international bonds and debt to related parties, corresponding to about EUR 1 billion (1.2% of GDP). When the bank was nationalized, these funds were bailed in, thus lowering the recapitalization costs for the state. Preliminary results from the post-nationalization audit have since revealed additional recapitalization costs of an amount similar to the bailed-in liabilities. Moreover, the NBU governor accused the former management of having committed fraudulent transactions exceeding EUR 0.5 billion shortly before the nationalization.

To minimize the costs for taxpayers, efforts to collect on related-party loans need to follow. In this regard, IMF conditionality envisages the involvement of an international asset management firm and another reputable audit firm in the process.

[1] *http://www.fg.gov.ua/images/docs/law/new/_DGF_Law_Eng_Updated_2015.pdf*

[7] *Although one could argue that in this way there is no meaningful currency mismatch between deposits and loans, households' high exposure to foreign currency-denominated loans may give rise to particular concern, since many private individuals do not have foreign exchange earnings and thus are unhedged borrowers.*

The takeover of Privatbank pushed the state's share up to about half of total sector assets. The asset share of foreign-owned banks stayed at about 35%, while the share of remaining domestic privately owned banks dwindled to 15%.[8] Meanwhile, the withdrawal of state-owned Russian banks (including Sberbank and VTB, accounting for about 9% of the Ukrainian market) appears likely to accelerate, following physical attacks on branches and restrictions imposed by the authorities prohibiting financial transactions between subsidiaries and their parent banks.[9] All five Russian banks have put up their Ukrainian subsidiaries for sale or are in the process of divesting them (S&P RatingsDirect, 2017, p. 12; Die Presse, 2017).

After two years of hefty losses, negative ROE declined in the course of 2016, before swelling again in the final quarter, due to spiking provisions at Privatbank. Yet the first quarter of 2017 finally witnessed some (modest) profitability (ROE: 8%), reflecting improved results from trade operations and reduced provisioning costs. Meanwhile, sector capital adequacy stabilized at around 13% to 14%.

3 Risk assessment and outlook

3.1 Assessment of current banking sector risks and shock-absorbing factors

Credit risk

Credit risk remains the worst problem for the sector, with the NPL ratio (still) at record levels of 31% (narrow definition) and 49% (broad definition) at end-2016. Following a change in methodology – with the new framework capturing loans that are more than 90 days past due as well as loans with a low probability of repayment (NBU, 2017b) – the NPL ratio stood at 55% at the end of March 2017 (57% at the end of April). The NBU considers these figures to reflect the actual quality of banks' assets. Given lackluster recovery prospects (at least in the short term), credit risk is likely to remain high, and may recede only slowly.

– Connected lending risk

Despite efforts made in recent years to diminish the influence of oligarchs, there is a risk that the further unwinding of related-party loans does not proceed quickly enough, given some lingering transparency and corruption problems. Court rulings, as described in a recent NBU press release (NBU, 2017c), allowing i.a. banks to resume operations (thereby overturning NBU decisions to resolve failed banks) may contribute to this risk. However, this kind of risk is somewhat mitigated by the fact that current legislation does not provide for a mechanism for restoring bank's activity, including through court decisions. At the same time, there may be an increasing risk of directed lending within the expanded sector of state-owned banks.

– Exchange rate risk and other challenges

While exchange rate risk does not appear to be imminent, a further deterioration of Ukraine's twin deficits (current account and budget), possible heightened uncertainties connected to IMF support, populist policies, and a flare-up of tensions in the east could all contribute to weakening the hryvnia, stoke inflation, put renewed pressure

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[8] A sizeable part of FDI inflows to Ukraine continues to constitute bank recapitalization flows.

[9] In 2015–2016, Ukrainian subsidiaries of Russian banks had received partly substantial recapitalization means from their parent institutions (Deuber and Schwabe, 2016, p. 6).

on unhedged borrowers, and delay the recovery of the sector. Other challenges include continued weak rule of law, feeble corporate governance (linked to the lack of successful flagship privatizations), and (as mentioned above) ingrained corruption.

– Shock-absorbing factors

While capital adequacy has improved from crisis levels, banking sector liquidity is satisfactory and monetary reserve assets have recovered from very modest previous levels, the fragile situation of the banking sector (with respect to credit quality and profitability), Ukraine's weak external position (with respect to the current account and foreign debt) and the legacy of Privatbank's sizeable related-party loan portfolio all imply that continued IMF support and international financial commitment ultimately remain the most important shock-absorbing factors for the country's financial sector.

3.2 Outlook

At least in the short term, sluggish banking recovery tendencies, mixed with considerable uncertainty, are likely to persist. The authorities' most recent decision to block trade with rebel areas (from March 2017) is likely to dampen the country's fledgling economic recovery by over 1 percentage point of GDP in 2017 (according to NBU assessments) and may act as a further drag thereafter.

How fast and how successfully the privatization of the recently nationalized Privatbank and the three other large state-owned Ukrainian banks (Oschadbank, Ukeximbank and Ukrgazbank) can proceed in the medium term, will depend on the overall eco-nomic and political development of Ukraine. The smoother the transition toward a transparent and modern economy is, and the more geopolitical tensions recede, the higher the interest of investors will be. Yet, reforms and reformers have also met stubborn resistance from the oligarchic system and intransparent structures. A recent sign of strong pressures against reformers was the resignation of the NBU governor in April 2017, whom the IMF praised for progress made in cleaning up the banking system, but who apparently did not enjoy sufficient political support to carry on.

If the build-up of foreign currency reserves does not proceed well due to further delays in the IMF program, financial risks will increase as the election year 2019 approaches. With presidential and parliamentary elections coming up in 2019, getting reforms through parliament will get increasingly difficult. On top of this, sovereign external debt repayments will spike in 2019, which together with an overall fragile environment could precipitate pressures on the balance of payments.

Overall, the current outlook for the Ukrainian banking sector is for a slow and hesitant recovery, not excluding temporary setbacks – given past reforms and the great further potential for catching up, helped by probably continuing (if not necessarily uninterrupted) IMF assistance; yet tempered by a daunting level of NPLs waiting to be treated, lingering (risks from) related-party lending, the sustained fragility of the macroeconomic environment, persisting structural bottlenecks to reforms, and unresolved security issues in the east affecting the investment climate.

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What drives Austrian banking subsidiaries' return on equity in CESEE and how does it compare to their cost of equity?

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This short study analyzes the relative profitability of Austrian banking subsidiaries in Central, Eastern and Southeastern Europe (CESEE) using two separate approaches. First, we address the subject from an accounting point of view based on a DuPont analysis. We dissect the return on (the book value of average) equity (ROE) to highlight how profit and loss drivers as well as financial leverage affected this profitability metric from 2004 to 2016. This prepares the ground for our second part, where we switch to a market perspective for the period from 2006 to 2016 to deduce the cost of (average) equity (COE) of these subsidiaries from the Capital Asset Pricing Model (CAPM) in order to compare the model-based profits that would be expected (i.e. demanded) by investors to those that have actually been realized. The analysis is complemented by a similar exercise for a peer group consisting of listed CESEE banks.

We find that the ROE dropped substantially during the global financial crisis and only started to recover in 2016. An accounting-based DuPont analysis reveals that – over the entire analyzed time span – this was primarily caused by a rise in risk costs at the onset of the global financial crisis and their strong improvement in 2016, as well as a continuous reduction of financial leverage. The negative contribution of a lower operating income margin and positive effects of an improved cost-income ratio roughly canceled each other out. We also provide a (cautious) medium-term outlook for the future development of the ROE of Austrian banking subsidiaries in CESEE, which is likely to depend on the balance between the weakened net interest income and reduced credit risk costs (that still have to prove their sustainability). When switching to a market perspective and the question of the subsidiaries' COE, we find that the latter is substantially lower than often assumed, but still too high to be fully compensated by realized profits (except in 2016). In aggregate, other CESEE peer banks fared better, which was mostly due to their higher profitability. These results call for continued and persistent efforts to further improve Austrian banking subsidiaries' risk-return profile in CESEE.

In this short study, we analyze the relative profitability of Austrian banking subsidiaries in CESEE. The paper is structured as follows:

In section 1, we use a DuPont analysis to dissect these subsidiaries' ROE to highlight how profit and loss drivers as well as financial leverage affected this profitability metric from 2004 to 2016. In section 2, we switch to a market perspective for the period from 2006 to 2016 to deduce the COE of these subsidiaries from the CAPM. This allows us to compare the model-based profits that would be expected by investors to those that have actually been realized. The analysis is complemented by a similar exercise for a peer group consisting of listed CESEE banks. Section 3 concludes.

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1 Dissecting subsidiaries' ROE based on an adapted DuPont analysis

In order to explain the driving forces behind the ROE from an accounting point of view, we rely on a well-known corporate finance tool: the DuPont analysis, called after the global chemical and life sciences company of the same name. In 1912, a DuPont explosives salesman (Donaldson Brown) used a return on investment formula that decomposed the profitability ratio into several sub-ratios, which can be used to understand the driving forces behind corporate performance.[3] Given the simplicity and wide applicability of the tool, it became highly popular, making it possible to interpret a company's ROE as e.g. the product of its profit margin, asset turnover and financial leverage.

In this short paper, we build on the DuPont analysis' appealing simplicity, but adapt and extend it for our own purposes by dissecting a bank's ROE according to its specific accounting terms:

$$
\begin{aligned}
RoE &= \frac{\text{net profit}}{\text{PBT}} * \frac{\text{PBT}}{\text{OP after risk}} * \frac{\text{OP after risk}}{\text{OP before risk}} * \frac{\text{OP before risk}}{\text{operating income}} * \frac{\text{operating income}}{\text{av. total assets}} * \frac{\text{av. total assets}}{\text{av. equity}} \\
&= \left(1 - \frac{\text{taxes}}{\text{PBT}}\right) * \frac{\text{PBT}}{\text{OP after risk}} * \left(1 - \frac{\text{provisioning}}{\text{OP before risk}}\right) * \left(1 - \frac{\text{operating cost}}{\text{operating income}}\right) * \frac{\text{operating income}}{\text{av. total assets}} * \frac{\text{av. total assets}}{\text{av. equity}} \\
&= (1 - \text{tax rate}) * \text{impact of other profit} * (1 - RC) * (1 - CIR) * OIM * \text{financial leverage} \\
&= OIM * (1 - CIR) * (1 - RC) * \text{impact of other profit} * (1 - \text{tax rate}) * \text{financial leverage}
\end{aligned}
\tag{1}
$$

where PBT is profit before tax, OP is operating profit, av. stands for average, RC are the risk costs, CIR is the cost-income ratio and OIM is the operating income margin.

The equation could be visualized as a funnel that turns the operating income (in relative terms: the OIM) into net profit (linked to the return on assets, ROA), by following the same logic as the bank's profit and loss statement (chart 1): A bank earns operating income from which operating and risk costs are deducted, adjustments for other profits (or losses) are made and taxes paid, which results in its net profit and ROA that will be substantially leveraged to result in the bank's ROE. As a result, we can decompose the ROE into six performance measures (with their respective effects on profitability in brackets):

1. the OIM, which is a measure of a bank's relative operating income generation capacity and – for Austrian subsidiaries in CESEE – strongly depends on their net interest margin (a positive factor);

2. the CIR, which measures the operating efficiency (including staff, administrative and general expenses; a negative factor);

3. the risk costs, which include e.g. costs incurred when nonperforming loans (NPLs) have to be provisioned for (a negative factor);

4. the typically small impact of other profits or losses (an either positive or negative factor);

5. the tax rate (a negative factor);

6. financial leverage, which is an important positive factor for a bank's ROE, given the – by definition – highly leveraged business model (when compared to other economic agents, such as for example industrial companies).

The DuPont analysis thereby allows us to delve deeply into the six factors determining a bank's ROE, to assess how important these factors are and how they have evolved over time.

[3] Please refer to DuPont (2017) for further details.

Chart 1

DuPont analysis and the profit and loss statement

The operating income margin (i.e. operating income over average total assets) is altered by …

Operating income

minus operating costs

Operating profit before risk

minus risk costs

Operating profit after risk

plus/minus other profit/loss

Earnings before tax

minus taxes
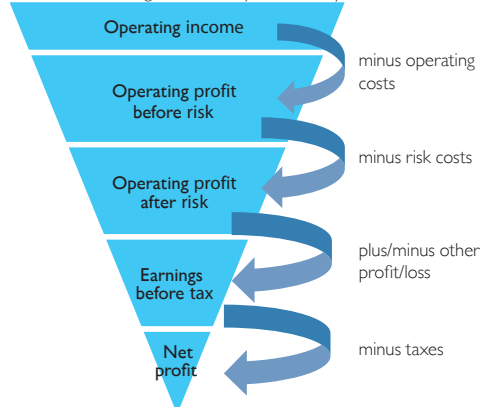
Net profit

… and the resulting ROA (i.e. net profit over average total assets) is multiplied by the financial leverage to yield the ROE.

Source: OeNB.

Chart 2

The most important drivers of ROE (2004–2016)

% x times

- Operating income margin
- Risk costs
- Return on equity (ROE)
- Cost-income ratio (CIR)
- Tax rate
- Financial leverage (right-hand scale)

Source: OeNB.

1.1 ROE affected by reduced financial leverage, volatile risk costs and recent pressure on the net interest margin

In this section, we apply the DuPont analysis to (an adjusted sample of) Austrian banking subsidiaries active in the heterogeneous CESEE region from 2004 to 2016,[4] with a particular focus on the impact of the global financial crisis (GFC).[5]

We note in chart 2 that the ROE was rather stable before the GFC (2004–2008) at around 17%, then dropped substantially to 7% in 2009 and remained at a subdued level until it recovered in 2016, reaching 11%. What caused its dramatic fall during the GFC and what are the factors that explain the intermittently depressed state of profitability and its revival in 2016? Was the sudden collapse of profitability only due to the immediate effects of the GFC in 2009? Or are there other underlying factors that can be unveiled by a DuPont analysis?

First, looking at the entire time span from 2004 to 2016, it is remarkable how banks' financial leverage declined continuously from more than twelve times to bottom out at less than nine times, a reflection of the structurally stronger capitalization of the examined subsidiaries. This trend, however positive from a financial stability perspective, negatively affected the ROE, which is a metric that strongly depends

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[4] In this paper, we use the term CESEE in a very broad sense, including a diverse set of countries (regarding i.a. their size, state of financial development as well as their macroeconomic and regulatory environment): the EU Member States Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Poland, Romania, Slovakia and Slovenia, as well as Albania, Belarus, Bosnia and Herzegovina, Kazakhstan, Kosovo, Kyrgyzstan, the Former Yugoslav Republic of Macedonia, Montenegro, Russia, Serbia, Turkey and Ukraine. We analyze the data of all Austrian banking subsidiaries in CESEE for the period from 2004 to 2016, but the sample is variable over time and required substantial adjustments. In particular, from 2004 to 2007, only IFRS subsidiaries are included due to data availability reasons (they held more than 90% of the total assets of all Austrian banking subsidiaries in CESEE). Also, for the sake of consistency, the sample of banks had to be adjusted to include only those subsidiaries in each year that reported data from the beginning to the end of that year, in order to be able to calculate yearly averages for balance sheet items (e.g. average total assets and average equity).

[5] We use the term GFC for the bank crisis that followed the collapse of the U.S. investment bank Lehman Brothers in September 2008.

on banks' leverage.[6] Second, the GFC had a massive effect on risk costs, causing them to jump from 18% to 67% in just two years (2007 versus 2009); though they displayed a decreasing trend thereafter, they still remained elevated at 52% in 2015, before dropping to a pre-crisis level in 2016 (at 20%). This means that while in 2007 and again in 2016, only about one-fifth of operating profit before risk was used up by risk costs and the remainder was available to pay taxes and dividends and/or to be retained to organically increase capitalization, from 2009 to 2015, more than half and even up to three-quarters of all operating profits were used to cover risks. Third, chart 3 shows that the decline in the OIM in the aftermath of the GFC was the third-largest contributor to the reduction in profitability, as it fell from 5.6% in 2008 to 4.6% in 2016, to which the decline in the net interest margin from 3.6% to 2.8% contributed 80 basis points (or 80%).

Chart 3

Composition of ROA and leverage (2004–2016)
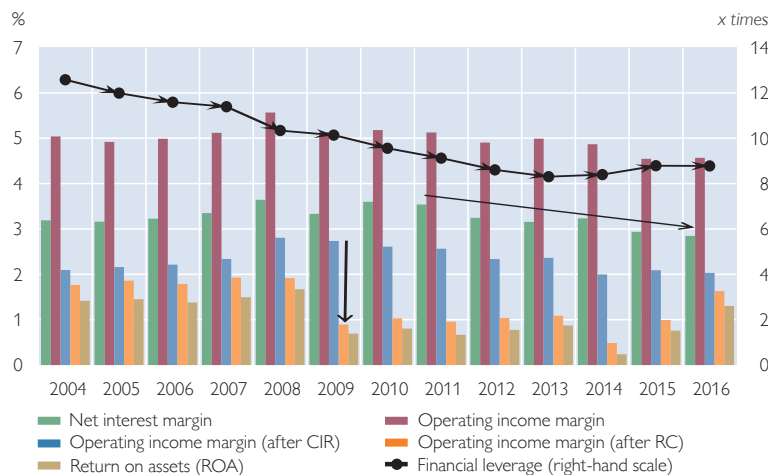
Source: OeNB.

Note: CIR = cost-income ratio; RC = risk costs.

To assess the relative importance of all these factors, we use the DuPont analysis of the ROE, which allows for a ceteris paribus analysis that answers the question of how the ROE would have changed over time if only one isolated factor had changed and all others had been frozen at their 2004 levels. Chart 4 shows that the ROE fell by 36% overall, which was primarily caused by lower financial leverage, which reduced the ROE by 30%. The other noteworthy ceteris paribus impacts:

- −9% due to the lower OIM,
- −5% due to higher risk costs, which, however, showed a substantial improvement in 2016, and
- +7% due to a lower (i.e. better) cost-income ratio that is nonetheless on a worsening trend, since it reached a historic best in 2009 at 47% (see chart 2).[7]

When dividing the timeframe into a pre- and post-GFC period (the "expansion" and "consolidation" phase), several remarkable facts emerge. The stability of the ROE before the GFC — at around

Chart 4

Cumulated ceteris paribus effects of ROE drivers (2004–2016)

Index: 2004 = 100

Source: OeNB.

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[6] This explains why financial stability analysts prefer assessing a banking system's profitability by using the nonleveraged ROA.

[7] Changes in the tax rate (except for 2014) and other profits and losses only had a minor impact.

17% from 2004 to 2008 – masks diverging underlying trends of profitability drivers, as stability was maintained mainly due to improved operating efficiency and a supportive OIM that counterbalanced lower financial leverage and already deteriorating risk costs, which doubled from 16% in 2004 to 32% in 2008. With the GFC in full swing in CESEE in 2009, the ROE dropped to 7% as risk costs doubled once more to 67% and the OIM fell back to 5%. The ROE did not recover until 2016 (11%), as risk costs that had slowly started to improve (except for 2014, when they temporarily peaked at 76%[8]) dropped to 20%. All other major factors had a negative impact: the cost-income ratio increased (by nine percentage points to 55% in 2016), financial leverage was further reduced and the OIM fell to 4.6%, especially in the last years of the analyzed period, caused by a lower net interest margin in the low interest rate environment.

1.2 Net interest income likely to remain under pressure, while improved risk costs have to prove their sustainability

After the historical analysis to unveil the drivers of the ROE of Austrian banking subsidiaries in CESEE over the past 13 years, what are the conclusions that can be drawn and what is the medium-term outlook for profitability from an accounting perspective?

The answers to these questions obviously rely on the four main factors of our DuPont analysis:

1. The OIM proved relatively stable around 5%, but recent pressure on the net interest margin led to a decrease to 4.6% in 2016. Given the strong dependence of Austrian subsidiaries' profitability on their net interest income[9] and the low likelihood of a substantial change in their retail business models, the adverse consequences of the low interest rate environment will be difficult to avoid and net interest income is likely to remain under pressure.

2. The CIR worsened after the GFC, reaching 55% in 2016, as weaker operating income could not be compensated by cutting operating cost, but looking forward, a prediction is difficult. On the one hand, focusing on core markets and those with higher margins, reducing one-off costs and implementing further cost-cutting programs (including digitalization efforts, which will, however, involve short-term costs) may help reduce the CIR. On the other hand, rising wages due to a convergence to costlier Western European levels and other (unexpected) costs may limit the potential for raising operating efficiency.

3. Risk costs dropped to their pre-crisis level in 2016; the coverage ratio has improved substantially and the NPL ratio is on a declining path (albeit the situation remains highly heterogeneous across countries). These positive trends are supported by banks' own and various institutional initiatives to reduce NPLs,[10] as e.g. the Single Supervisory Mechanism lists "credit risk, with a focus on NPLs and concentrations" as one of its three priority areas for 2017.[11] Nonetheless, risk costs at 20% still have to prove their sustainability

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[8] Driven both by higher provisioning and lower operating profits before risk.

[9] Please refer to Kavan, Gruber et al. (2016) for further details.

[10] E.g. the Vienna Initiative's NPL Initiative (http://npl.vienna-initiative.com).

[11] Please refer to ECB (2017a) for further details. Also, the ECB (2017b) published a guidance to banks on NPLs.

over the medium term, as global economic and political uncertainties remain.

4. Higher capital levels have led to a substantial reduction in financial leverage since 2004. Given that higher capital (buffer) requirements have already been fully implemented in several CESEE countries, the main steps seem to have been taken, and financial leverage bottomed out in 2013.

The future development of the ROE of Austrian banking subsidiaries in CESEE is likely to depend on the balance between the weakened operating profitability and reduced risk costs (that still have to prove their sustainability). While changes in the CIR are even more difficult to predict, they may ultimately tip the scales.

2 The model-based cost of equity in comparison to subsidiaries' profitability

After assessing the driving forces behind the accounting ROE of Austrian banking subsidiaries in CESEE, the study now turns to a market perspective in order to compare the subsidiaries' profitability with their average annual cost of equity (COE). The latter is the return expected by shareholders and potential equity investors, which provides an important insight into their perception of a bank's riskiness and their expectations of compensation. The market's demanded COE can therefore be seen as an important yardstick for banks, when they attempt to raise new capital.

One of the motivations for this paper was to assess why recent studies and surveys still estimate banks' COE at close to 10%,[12] if both the return on (supposedly) risk-free assets has declined substantially in the low interest rate environment and the perception of banks' risk could have declined due to increased capital levels, which imply ceteris paribus a lower probability of default. If existing and prospective owners indeed expect such high risk premiums (for example to compensate them for higher credit risks or regulatory uncertainties), several studies conclude that the low profitability of the European banking sector in recent years[13] was insufficient to meet these expectations, which may lead to less demand for bank shares when they are offered to the public.[14]

We provide two angles to this nascent discussion: First, we analyze the situation at nonlisted Austrian banking subsidiaries in CESEE over an extended time period from 2006 to 2016[15] and second, we avoid comparing the return on equity at book value with the cost of equity at market prices (i.e. we switch from the book value of equity used in the first part to its value at market prices). In order to assess whether Austrian banking subsidiaries in CESEE managed to earn their COE, we first estimate their COE based on the Capital Asset Pricing Model (CAPM),

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[12] See e.g. IMF (2017): "investor surveys suggest that banks' cost of equity is at least 8 percent (though some investors indicated that the cost of equity is above 10 percent)" (p. 29); or ECB (2016): "increase in banks' cost of equity (COE) to around 10% in the second quarter of 2016" (p. 67).

[13] See EBA (2017): "The EU banks' profitability remains a concern. The average return on equity (RoE) reached its lowest level (3.3%) in Q4 2016."

[14] See e.g. Bain & Company (2016): "Overall only five percent of around 1,700 [German] banks earn their cost of equity" (p. 4, authors' translation from German); and ECB (2016): "a negative gap [between banks' return on equity and cost of equity] is not sustainable in the long run since it implies that equity investors in banks require a higher return than the return banks are able to deliver. Over time, this will make it difficult for banks to attract capital and finance growth" (p. 11).

[15] The shorter analysis period compared to the DuPont analysis is due to limited data availability before 2006.

which is a long-standing corporate finance tool,[16] and with the help of market proxies. Then, we deduce the profits that would be expected by investors and compare them with those actually realized. We assess the risk-adjusted profitability surplus or shortfall from an owner's long-term point of view with a focus on all profits, which is more relevant to financial stability than short-term and more speculative considerations (e.g. banks' share price movements). To conclude the analysis, we complement it with a peer group analysis of other CESEE banks.

Chart 5

Decomposition of the average annual COE of Austrian banking subsidiaries in CESEE
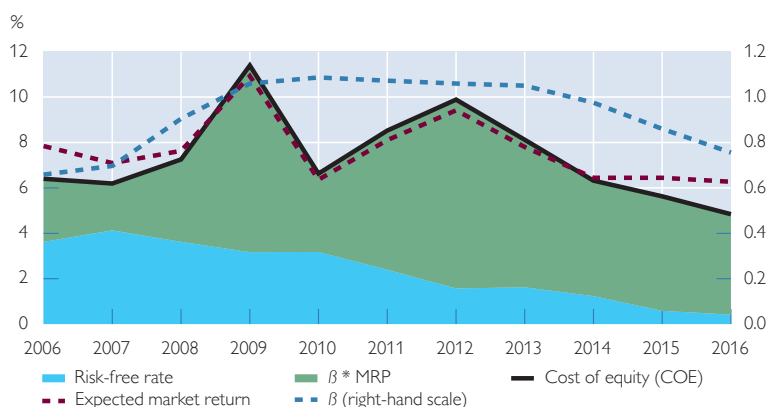
Source: Bloomberg, OeNB (authors' own calculation).

Note: All figures are yearly averages.

2.1 Calculating the cost of equity for nonlisted banking subsidiaries

For the purpose of this study, we use the CAPM to calculate risk-adjusted return expectations for the owners of nonlisted bank subsidiaries (i.e. their COE). According to the CAPM, a share's expected return (COE) should consist of the risk-free rate and an entity-specific additional compensation for accepting risk (the share's risk premium):

$$(2) \quad COE_t = Rf_t + \beta_t * (E[Rm]_t - Rf_t)$$

where *Rf* is the yield on a risk-free asset,[17] beta (*β*) measures the systematic risk of the share price relative to the market portfolio,[18] *E[Rm]* is the expected return of the market portfolio[19] and the term *(E[Rm] – Rf)* is called the market risk premium (MRP).

Chart 5 depicts the development of the model-based COE and its components for Austrian banking subsidiaries in CESEE for each year from 2006 to 2016. As can be seen, Austrian subsidiaries experienced three separate periods in terms of their COE: A pre-crisis period up to 2008 with a COE of around 6% to 7%, followed by two crisis episodes with substantial increases to around 10–11% in 2009 (GFC) and 2011–2012 (sovereign debt crisis)[20] and subsequent reductions. After

[16] International institutions like the IMF and the EBA also use the CAPM to calculate the COE. For further details, see IMF (2014, p. 21ff) and EBA (2015, p. 57ff).

[17] We use the average annual yield of the ten-year German government bond.

[18] A share's beta above one indicates a stronger sensitivity of that share price to general market movements (the diversified market portfolio displays a beta of one). As Austrian banking subsidiaries are not listed on a market exchange, the average beta of each year is the weighted average (by Austrian subsidiaries' average book equity per country) of CESEE country betas, which are themselves the mean of each country's listed banks' beta. The sample of listed CESEE banks consists of peers in Poland (PKO, Pekao, Bank Zachodni WBK, mBank, Bank Handlowy), the Czech Republic (Komerční banka), Romania (Banca Transilvania, BRD – Groupe Société Générale), Russia (Sberbank) and Hungary (OTP Bank).

[19] We use the STOXX Europe 600 index to replicate a diversified market portfolio in line with the CAPM's assumptions (and not the much narrower STOXX Europe 600 Banks index) and Bloomberg Estimates (BEst) for the index's expected earnings-based return (by means of the expected inverse price-earnings ratio).

[20] In 2012, Mario Draghi, President of the ECB, famously declared: "Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough."

its latest easing, the COE ended up below its pre-crisis level, at 5% in 2016.

A more detailed breakdown of the driving forces behind these changes reveals that the risk-free rate continuously declined from 2007, but the onset of the GFC overcompensated this trend in 2009, as it caused both a rise in the beta and especially in the expected MRP. After a year of relative calm in 2010, the European sovereign debt crisis led to another rise in the COE in 2011 and 2012, this time solely driven by the rise in the expected MRP. From 2013 onward, the beta started a steady decline and the expected market return bottomed out at 6%. Factoring in the reduction of the risk-free rate to its historic low of 0.4% in 2016 – 3.7 percentage points below its level of 2007 – the CAPM-based COE for Austrian banking subsidiaries in CESEE is at 5%, substantially below estimates provided in other studies and surveys (see footnote 12).

2.2 Only in 2016 did actual profitability satisfy investors' expectations

Based on the COE of each year, we calculate profits that would have been demanded by investors and compare them to actual profits in order to examine whether Austrian banking subsidiaries in CESEE earned their COE. For this exercise, we assess the profitability from an owner's long-term point of view, i.e. we look at all profits and assume that owners are indifferent regarding their retention or distribution as dividends. (Please note that we calculate the expected profits on the basis of the approximated equity's market price, i.e. the subsidiaries' hypothetical market capitalization, given that this is the price that an investor would have to pay to acquire these subsidiaries.)[21]

The comparison between expectations and reality from 2006 to 2016 reveals that even though our CAPM-based COE estimates are (in part) substantially lower than those assumed in other studies, Austrian banking subsidiaries in CESEE (on an aggregated level) faced considerable challenges in satisfying market-based profitability expectations: Overall, they only earned their COE in one of the past eleven years (i.e. 2016) and clearly missed this yardstick over the entire time frame, as they managed to cover less than two-thirds of their expected profits. However, since 2012, an improvement has been noticeable (with the exception of 2014[22]), and in 2016 realized profits exceeded model-based expectations by more than 50%, helped both by the historically low COE and the substantial reduction in risk costs (see above).

To examine, whether these findings also apply to other banks operating in CESEE, a similar analysis has been conducted for the peer group.[23] The aggregated results for the peer group indicate that peer banks' higher profitability allowed them to earn their higher COE in every year over the entire time span except for 2007 to 2009. As these result are heavily driven by just one bank – Sberbank of Russia, which at some point made up more than half the peer

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[21] As Austrian banking subsidiaries in CESEE are not listed on a market exchange, their hypothetical market capitalization was calculated by means of their peers' price-to-book ratios (please refer to footnote 18 for the list of peer group members). The average price-to-book ratio of each year is the weighted average (by Austrian subsidiaries' average book equity per country) of CESEE country price-to-book ratios, which are themselves the mean of each country's peer banks' price-to-book ratios.

[22] In 2014, Austrian banking subsidiaries in CESEE suffered a significant decline in profits.

[23] Please refer to footnote 18 for the list of peer group members. The data sources for our peer group analysis include Bloomberg, S&P Global Market Intelligence and the authors' own calculations.

group's book equity – we repeat the exercise for the remaining peer group without Sberbank, in which case the peer group exactly covers its expected profits, but nonetheless misses to achieve investors' profitability expectations in seven out of eleven years.

Regarding this second, market-focused part of our study, we conclude that although the analyzed Austrian banking subsidiaries in CESEE[24] generated substantial absolute profits of more than EUR 23 billion from 2006 to 2016 and contributed significantly to the overall profitability of the Austrian banking system, these profits were not enough to fully compensate their owners for the risks taken in the past (represented by their model-based COE). CESEE peers faced a similarly challenging environment, but seem to have performed better on aggregate due to higher profitability. The risk is that, over the medium term, banks that cannot satisfy their (potential) investors' expectations may face little demand when they attempt to raise new capital, unless they are able to convince market participants that their prevailing outlook on risk-adjusted profitability is overly pessimistic. Subsidiaries need to continue their efforts to find additional sources of revenue in a low interest rate environment and to enhance risk-adequate pricing, while improving cost efficiency and resolving the remaining nonperforming loans in order to put the recovery of the ROE seen in 2016 on a sustainable footing. Together with the lower leverage of the subsidiaries' business models, which points toward lower riskiness, the lowered COE of Austrian banking subsidiaries in CESEE and their improved profitability could help to sustainably close their profitability gap with regard to their COE.

3 Conclusions

The analysis of banks' profitability has several dimensions. Apart from measuring absolute profits and stating an ROE, it is equally important to understand their underlying drivers and to compare actual profits to the compensation investors expect for taking ownership risks (the COE). For this purpose, we focused our analysis on Austrian banking subsidiaries in CESEE and examined the period from 2004 to 2016 to complement the work done in Kavan, Gruber et al. (2016). We find that these subsidiaries' ROE dropped substantially during the GFC and only managed to recover in 2016. An accounting-based DuPont analysis reveals that the fall in the ROE was primarily caused by a continuous reduction of financial leverage, a rise in risk costs at the onset of the GFC (the effects of which have mostly been reversed since) and a lower operating income margin. We also provide a (cautious) medium-term outlook for the future development of the ROE, which is likely to depend on the balance between the weakened net interest income and reduced credit risk costs (that still have to prove their sustainability). When switching to a market perspective and the question of the subsidiaries' COE, we find that it is actually lower than often assumed, but still too high to be entirely compensated by realized profits (except in 2016). In aggregate, other CESEE peer banks fared better, which was mostly due to their higher profitability. These results call for continued and persistent efforts to further improve Austrian banking subsidiaries' risk-return profile in CESEE.

[24] *Please refer to footnote 4 for the technical details regarding the required adaptations to the sample.*

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The resilience of households in bank bail-ins

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Potential losses incurred by households holding bail-in-able assets may be an issue in bank resolution matters and restructuring procedures – and are thus a financial stability issue. Yet, the range of households that may be affected by bank defaults is not sufficiently evident from aggregate statistics. Therefore, this paper uses the Eurosystem Household Finance and Consumption Survey (HFCS) to investigate the investment portfolio items of households from selected European countries that could potentially be eligible for bail-in. Doing so allows us to discuss the resilience of possibly affected households to shocks to their portfolio in terms of other household characteristics. Overall, the results show that, in addition to the relatively high resilience of households in terms of shock-absorbing capacity, the relatively few investors that exist are on average more inclined to take risks than the general population.

The global financial crisis led to a number of failures of large banks that were considered as too big to fail. Many of these banks were rescued via large-scale public bail-outs, shifting the costs of bank failure from the banking system, its shareholders and creditors to taxpayers. As a consequence, the European Union introduced a new legislative framework (Bank Recovery and Resolution Directive – BRRD) to equip the authorities with a set of tools to prevent future public bail-outs. One of these tools is the new bail-in regime (Article 46 et seq.) effective from January 1, 2016, unless implemented earlier. It enables resolution authorities to write down and convert into equity liabilities to a failing bank's creditors. The new regime should ensure that shareholders and creditors will bear the losses, thus minimizing the costs for taxpayers.

As the bail-in tool has to be applied to almost all liabilities of a credit institution, in line with the hierarchy of creditors, a range of shareholders and creditors will be affected. This article focuses on the potential impact of a bail-in on households, complementing recent publications (Hüser et al., 2017; Pigrum et al., 2016; Schäfer et al., 2016) that have addressed effects on banks and other investors and on financial markets.

1 The data

We use the second wave of the Household Finance and Consumption Survey (HFCS) conducted essentially in 2014 and 2015 by national central banks and some national statistical institutes in the euro area, and coordinated by the European Central Bank (ECB). HFCS data provide detailed information on the entire balance sheet as well as several socioeconomic characteristics of households in the euro area. In particular, the survey provides information on various financial assets owned by households. ECB (2016a) provides a detailed account of the methodology.[2] The analysis at hand takes into account specific methodological complications that are inherent in the survey, such as

the survey structure and multiple imputation. In analyzing the available data, we look at the euro area (EA)[3] as a whole, Austria (AT), Germany (DE), Italy (IT), France (FR), Spain (ES), Cyprus (CY), Ireland (IE), Greece (GR), Luxembourg (LU), and Portugal (PT). The investigation may be easily extended to the other survey countries (in total 20 countries were included in the second wave of the HFCS). With this selection, we cover the domestic market, some large countries, wealthy countries, and some southern European countries.

In line with the cascade of bail-in-able assets (as mandated in Article 48 BRRD), households may be invested in equity, subordinated debt, senior unsecured debt and/or secured debt. In practice, the actual bail-in sequence may differ, as the ability to bail in individual titles depends on the contract arrangements made between individual banks and investors. This contract-specific information is not evident from the HFCS data. Instead, we can look at specific portfolio categories that might be bail-in-able. As we include all households holding specific types of financial assets, we provide conservative results in the sense that they show an upper bound for the share of households that might be affected by developments in a given financial institution. Eligible asset classes are:

• Bank bonds
  In the bond category, we are able to distinguish whether households hold bonds issued by (a) government entities, (b) banks/other financial intermediaries, (c) nonfinancial corporations

or (d) other. The amount invested in bonds is, however, collected only as a total in the HFCS and not broken down by individual types of bonds. Thus our analysis uses total bond assets for households holding bonds issued by banks/other financial intermediaries. Additionally, there are some – albeit mostly very few, i.e. one or two – households for which the indicator variables for the different bond types are missing in the data for Cyprus, France (where the breakdown into types is completely missing), Ireland and Portugal. For all these households and in the euro area as a whole (some other countries outside of the group of countries under investigation in this paper have missings in this variable) we assume the households to own bank bonds and use the total amount invested in bonds. This implies that our estimates are conservative estimates in the sense that we consider the maximum number of households affected with the maximum amount.

• Deposits in excess of EUR 100,000
  This category of bail-in-able assets (Article 108 BRRD) refers to the sum of sight and savings accounts reported in the HFCS. Since savings are guaranteed up to an amount of EUR 100,000 by deposit guarantee schemes in the EU, we lowered the respective HFCS results by this amount for each household. What remains is either zero in case of lower savings or the amounts in excess of this threshold.[4]

• Investment funds
  Regarding funds, the HFCS gathered

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[3] Note that Hungary and Poland participated in the second HFCS wave while not being members of the euro area; therefore their data are not reflected in the euro area total. Moreover, the euro area total does not include data on Lithuania, which did not participate in the HFCS.

[4] In the results for Austria, savings in the form of life insurance policies are subtracted from the HFCS core variable on savings. The euro area figures, however, include that information in the core variable for Austria for comparability reasons.

information on investment made in funds predominantly investing in (a) equity, (b) bonds, (c) money market instruments, (d) real estate or (e) hedge funds and other fund types.[5] In keeping with our conservative approach, our analysis is based on the data for funds investing in bonds (independent of the type of bonds) and funds investing in the money market. Additionally, if the breakdown in the categories is not imputed, which happened in some cases in Cyprus, Ireland and Portugal, any fund assets held by households are assumed to be eligible for bail-in.[6]

Overall, two key features of the data that are used in the analysis have to be kept in mind while interpreting. On the one hand, the definitions used are based on a conservative approach, covering all assets potentially affected from a bail-in. Hence, if a given bank were to default, the range of households involved and the amount of wealth affected should actually be smaller than implied by this analysis. On the other hand, there is the well-known difficulty of reaching the far-right tail of the wealth distribution with surveys like the HFCS. Therefore, the differences between specific groups of households (as will be seen below, households are split into the top 10% and bottom 90% according to the gross wealth distribution for some results) might be even more pronounced.

Furthermore, another two financial asset classes might be considered as bail-in-able. The HFCS also collects information about shares and private pension funds. However, the data collected on shares cannot be broken down further into the type of shares, and the data collected on private pension funds cover a very heterogeneous range of asset types, so that we refrain from including these results in this analysis. Yet to cross-check our analysis, we repeated the analysis including these types of assets and found the qualitative results to be generally stable.

2 Evidence from microdata

In the following, we use a two-step procedure to analyze all possible asset types. First, we provide general descriptive statistics, also covering the breakdown across the gross wealth distribution. In the second part we analyze households' investment attitude. This pattern should help readers to find specific information quickly. The last subsection rounds off this analysis by adding up the data. Generally speaking, one has to bear in mind that the survey is not an appropriate tool for looking at individual banks; it only provides the aggregate picture for specific asset categories. Thus, the results should be interpreted as an upper bound for the number of households being affected by potential bank bail-ins.

2.1 Holders of bank bonds
2.1.1 Some general descriptives

As evidenced by table 1 the fraction of households who have invested in bank

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[5] Another HFCS category covers various types of investment funds without further specification; these funds are not considered in this analysis.

[6] In the case of Finland and the Netherlands, where all or a substantial number of observations of the breakdown of funds are missing, we assume all these households to hold bail-in-able fund assets, which creates an upward bias for the share of euro area households holding these types of assets. There are very few cases in Slovakia and Germany for which the information on funds is apparently only partly imputed. In keeping with our conservative approach, all of these households are assumed to hold bail-in-able assets.

Table 1

Households holding bank bonds versus all households – general results

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
%											
Bond participation rates	2.4	2.4	5.4	1.2	0.9	0.5	0.6	0.2	1.5	0.3	2.2
Bottom 90% of gross wealth distribution	1.6	1.7	4.2	0.8	0.8	0.4	0.5	0.1	1.2	0.2	1.7
Top 10% of gross wealth distribution	9.1	8.4	16.4	4.7	1.9	1.5	1.6	0.9	4.0	1.3	6.8
EUR thousand											
Conditional mean bank bond holdings of households owning such assets	39.9	42.8	49.3	50.6	43.6	.[1]	30.7	.	99.3	37.8	52.3
Conditional median bank bond holdings of households owning such assets	15.0	13.6	30.0	12.5	12.6	.	20.0	.	70.0	10.0	20.0
Mean net wealth of households owning bank bonds	691.6	616.4	518.0	820.6	513.1	.	454.8	.	1,220.8	548.5	589.6
Median net wealth of households owning bank bonds	393.3	359.7	345.0	377.8	287.0	.	344.5	.	971.2	261.8	355.5
Mean (yearly) gross income of households owning bank bonds	70.9	76.4	60.2	65.7	44.3	.	92.9	.	125.6	48.4	65.2
%											
Median share of bank bond holdings in relation to gross wealth	3.3	3.0	8.8	4.0	4.8	.	4.2	.	7.4	4.0	5.5
Median share of bank bond holdings in relation to financial wealth	24.1	10.8	57.7	11.9	39.8	.	26.1	.	21.0	23.1	28.2
EUR thousand											
Mean net wealth of all households	258.4	214.3	226.4	243.1	273.6	387.3	216.3	104.2	768.4	156.0	223.3
Median net wealth of all households	85.9	60.8	146.2	113.3	159.6	170.1	100.6	65.1	437.5	71.2	104.1
Mean (yearly) gross income of all households	43.3	48.4	33.4	37.6	31.9	30.5	54.6	21.2	87.2	21.5	39.4

Source: HFCS 2014, ECB.

[1] *"." indicates that the results are suppressed because of too few observations.*

bonds is actually very small. Participation rates run from 0.2% (Greece[7]) to about 5.4% (Italy) and translate into a figure of 2.2% for the euro area as a whole. Hence, only some 2% of all households account for the 24% of noncovered debt securities that are held by the residual sector including households (see Pigrum et al., 2016). In the case of Austria, about 2.4% of households holding bank bonds account for the 38% of non-covered debt securities that are held by the nonfinancial sector (including house-

holds).[8] The table also sheds light on how much households holding bank bonds have invested in this particular portfolio item in absolute as well as relative terms. In Germany, for instance the mean level of bank bond holdings is about EUR 43,000, with the median level running to only about EUR 14,000, which goes to show how highly skewed the distribution of bank bonds is even within the small group of bank bond holders. In relative terms, we can see that these German households have

[7] *This result also shows the general quality of the HFCS. We know from the Securities Holdings Statistics (SHS) that in Greece this type of bonds accounts for a tiny share of the amounts invested by the nonfinancial sector, so that the two data sources reinforce and complement each other. Similarly, regarding Italy, both sources confirm the internationally relatively high share of households/aggregate share of the nonfinancial sector in this asset class.*

[8] *These aggregate figures are taken from Pigrum et al. (2016). The "euro area's nonfinancial sector" includes the sectors S.11 (nonfinancial corporations — NFCs), S.13 (general government), S.14 (households), S.15 (nonprofit institutions serving households) (see ibid., p. 112). Households thus hold a lower share.*

put only a small fraction, i.e. about 3% of their gross assets and 11% of their financial assets at the median, into this asset class. As the median share of bank bond holdings relative to gross and financial wealth is in general relatively small even for the group of investors, we expect a high resilience of these households in coping with a negative shock to one type of their financial assets.

Table 1, furthermore, looks at the general income and wealth levels of investors in bank bonds in comparison to all households.[9] We can see that households who invest in bank bonds are more affluent in terms of both wealth and income levels. The euro area mean net wealth level for bond holders is more than double the level of net wealth of all households. When we take the more robust median measure, the factor increases to about 3.5. Not only wealth but also income figures show that bond holders belong to the more affluent stratum of society if one compares EUR 39,400 mean yearly gross household income for all households with EUR 65,200 for investors. With some variation in the extent of these differences, this result holds for each country. Judging from the median level of net wealth in Germany, bond holders are about six times more affluent than the general household population. This holds true also for Italy, where the highest participation rate is observed, and for Luxembourg, which is the country with the highest overall wealth levels. Although not as high – since the distribution of income is less skewed than the distribution of wealth – we

still find significantly higher income figures for households owning bank bonds than for households in general.

Naturally, one may ask whether investment behavior is constant or varies across groups. Thus table 1 also breaks down participation rates for the top 10% and bottom 90% of the gross wealth distribution. We can see (lines 2 and 3 in table 1) that in each country the share of households holding bank bonds is significantly higher in the top 10% of households in terms of gross wealth than in the bottom 90%. Any potential losses from bank bond holdings, therefore, affect a very small fraction of households in the lower 90%, while even within the group of the top 10%, the share of households affected seems to be rather small. Furthermore, the data show that less affluent households also invest less and would hence be affected less severely by any bail-ins. Essentially, the breakdown of assets according to specific groups in the gross wealth distribution provides another piece of evidence suggesting that it is the more affluent households that invest in bank bonds, and that they tend to invest higher amounts into this portfolio item than other households.[10]

2.1.2 Investment behavior

Apart from the ability to invest in financial instruments given income and wealth restrictions (analyzed in section 2.1.1) the willingness of households to take financial risks is another important factor in the current discussion on bailing in investors. The decisions of (wealthy) individuals to buy financial instruments

[9] Note that the estimate for the general household population also includes bank bond holders. That means that if we were to compare bank bond holders with households not owning such assets, the differences would even be more pronounced.

[10] In interpreting these results one has to bear in mind that the survey as a scientific tool for economic research has weaknesses in gathering information about the far-right tail of the wealth distribution. Taking this into account, the results in the table provide a lower bound for the difference between the top 10% and the bottom 90% of households according to the gross wealth distribution.

Households holding bank bonds versus all households – share of risk-inclined investors

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
	%										
Bank bond holders	70.5	54.5	67.1	34.0	22.3	.[1]	47.4	.	52.4	45.1	56.5
All households	41.2	30.8	42.0	13.6	12.1	13.5	22.7	18.4	26.1	7.4	25.5

Source: HFCS 2014, ECB.

[1] *"." indicates that the results are suppressed because of too few observations.*

Note: The HFCS question on which this table is based was: "Which of the following statements comes closest to describing the amount of financial risk that you (and your husband/wife/partner) are willing to take when you save or make investments?" There were four answer categories to choose from: willing to "(1) take substantial financial risks expecting to earn substantial returns; (2) take above-average financial risks expecting to earn above average returns; (3) take average financial risks expecting to earn average returns; (4) not willing to take any financial risk." Here, categories 1–3 are aggregated into a dummy being equal to one for these categories.

are influenced by many factors, including the degree of financial literacy of households, cultural trends and political reforms to promote private investment in financial markets (Mooslechner et al., 2009). It is therefore difficult to estimate to which degree households were fully aware of the investment risk they incurred and whether their investment decisions were obscured by miss-selling practices. Any information in this regard is hard to observe empirically; however, we are able to use the information on investment attitudes of households in the HFCS in this regard. Having identified households who expressed a willingness to take at least some risks in the hope of earning investment returns,[11] we look at the differences in shares of households falling into this category broken down by bond holders and all households (see table 2). In the following, we denote households who are willing to take at least some risks as risk-inclined households.

In Spain for instance, where an estimated 22% of investors are willing to take risks, bond holders are almost twice as likely to fall into the risk-seeking category – compared to only 12% in the general population. In terms of level, the results are higher for almost all other countries, e.g. looking at Italy we see that the majority (67%) of bond holders are willing to take risks. In the two countries where bail-in tools have been tested in practice, namely Italy and Spain, households who invest in bank bonds are also more willing to take risks than the general population. They also have a comparably high capability to take risks due to the relatively high level of wealth and income. Yet, recent developments reflect diverging policies. Overall, at the euro area level the results show that bond holders are more than twice as likely to be willing to take risks in financial investments as the general population. Households which are willing to take risks in order to profit from higher returns should also be expected to appropriately judge the potential loss if a default occurs.

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[11] *The corresponding HFCS question was: "Which of the following statements comes closest to describing the amount of financial risk that you (and your husband/wife/partner) are willing to take when you save or make investments?" There were four answer categories to choose from: willing to "(1) take substantial financial risks expecting to earn substantial returns; (2) take above-average financial risks expecting to earn above-average returns; (3) take average financial risks expecting to earn average returns; or (4) not willing to take any financial risk." We aggregate this information at the household level to a binary variable. This means that we generate a dummy that is equal to one for all households other than those who were not willing to take financial risks.*

Table 3

Households with deposits above EUR 100,000 versus all households – general results

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
%											
Deposit participation rates (deposits above EUR 100,000)	1.6	5.5	1.5	2.6	3.4	4.3	3.6	0.8	17.0	2.3	3.6
Bottom 90% of gross wealth distribution	0.9	3.4	0.6	1.3	1.9	2.8	2.0	0.1	12.9	1.2	2.0
Top 10% of gross wealth distribution	7.7	24.8	9.2	14.6	16.7	17.7	18.0	6.9	53.3	12.8	18.4
EUR thousand											
Conditional mean deposits above EUR 100,000 for households exceeding this limit	123.6	116.1	136.1	82.7	128.3	91.2	156.4	114.7	169.2	76.7	109.4
Conditional median deposits above EUR 100,000 for households exceeding this limit	66.3	81.9	50.0	42.3	71.8	62.8	56.0	88.2	90.7	40.3	61.1
Mean net wealth of households with deposits above EUR 100,000	648.6	907.7	955.1	1,006.3	1,071.8	1,168.3	877.1	496.9	1,955.3	690.3	929.2
Median net wealth of households with deposits above EUR 100,000	532.7	445.4	615.0	646.5	574.2	725.7	598.3	447.8	1,105.6	430.1	530.3
Mean (yearly) gross income of households with deposits above EUR 100,000	69.7	91.3	86.5	86.0	65.9	67.5	111.3	43.7	137.0	50.0	82.7
%											
Median share of deposits above EUR 100,000 in relation to gross wealth	15.1	13.7	8.8	6.5	11.1	5.8	9.7	17.8	6.5	8.4	9.8
Median share of deposits above EUR 100,000 in relation to financial wealth	31.0	31.3	28.6	17.3	33.5	30.9	30.3	45.8	32.1	24.7	27.0
EUR thousand											
Mean net wealth of all households	258.4	214.3	226.4	243.1	273.6	387.3	216.3	104.2	768.4	156.0	223.3
Median net wealth of all households	85.9	60.8	146.2	113.3	159.6	170.1	100.6	65.1	437.5	71.2	104.1
Mean (yearly) gross income of all households	43.3	48.4	33.4	37.6	31.9	30.5	54.6	21.2	87.2	21.5	39.4

Source: HFCS 2014, ECB.

2.2 Deposits above EUR 100,000

2.2.1 Some general descriptives

Next, we turn to deposits exceeding the threshold of EUR 100,000. As mentioned above, savings below this threshold are covered by deposit guarantee schemes (see Article 44(2) and 108 BRRD). Hence our analysis refers only to assets in this category that may be used to absorb potential losses of a given bank. In other words, the mean and median levels of deposits[12] in table 3 reflect only any amounts held in excess of the threshold. Likewise, the participation rate shows the share of households holding more than EUR 100,000 in saving and deposit accounts (includ-ing sight accounts) (hereafter called deposits).

Again, we find only a small fraction of households to hold deposits in this range, which would make them liable for bank losses. There is only one exception to this observation, namely Luxembourg, where 17% of households own deposits in excess of the threshold. Conditional median deposits above the threshold run to about EUR 61,000 at the euro area level, which corresponds to about 10% of the gross wealth of households at the median.

Compared to the general household population, households holding large deposits belong to the more affluent

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[12] One has to keep in mind that the HFCS collects information at the household level, so that the data may be related to several household members and several banks. Therefore, the HFCS provides an upper limit for the funds invested in this category.

Table 4

Households with deposits above EUR 100,000 versus all households – share of risk-inclined investors

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
	%										
Holders of deposits above EUR 100,000	56.9	44.7	58.7	27.6	22.5	25.5	41.3	45.1	35.8	27.4	40.8
All households	41.2	30.8	42.0	13.6	12.1	13.5	22.7	18.4	26.1	7.4	25.5

Source: HFCS 2014, ECB.

strata of society. At the median, net wealth is about five times larger for households with large deposits. Also, their mean income levels are about twice as high in the euro area figure. In general, this finding holds in all countries, subject to variations. We can see that large deposits are even more strongly correlated with relatively high levels of income and wealth than the bank bonds discussed above. It is clear from table 3 that the deposits exceeding the deposit guarantee threshold are almost exclusively held by households in the top 10% of the gross wealth distribution. In all countries except Luxembourg is the participation rate in this level of deposits below 3.5% for the bottom 90% of all households. In the top 10%, on the other hand, participation rates reach levels as high as around 20% in various countries (and more than 50% in Luxembourg). The conditional median levels of investment show that households in the bottom 90% of the gross wealth distribution, if holding more than EUR 100,000 in deposits, do so to a relatively limited extent. The median excess amount in the euro area runs to about EUR 41,000 whereas the median level of the top 10% is more than twice this figure (about EUR 94,000). In Austria, the difference is even more pronounced: EUR 42,000 for the bottom 90%

compares with more than EUR 165,000 for the top 10%, which translates into a ratio of about 1:4.

2.2.2 Investment behavior

Households might hold deposits at more than one bank, so the bail-in-able figures we established are once again close to the maximum amount affected as analyzed above. More prudent investors owning more than EUR 100,000 and holding this sum in bank accounts as deposits may split their deposits across various banks (or even countries if necessary) in order to take full advantage of savings guarantees for amounts up to EUR 100,000. Having said this, we might expect the relatively more risk-averse investors to keep financial wealth in excess of EUR 100,000 in deposit accounts, thus foregoing potential interest income from other forms of potentially riskier investments (such as bank bonds). Table 4 shows what we find in the data.

Indeed, we find a lower discrepancy between investors in bail-in-able deposits and the general population. At the euro area level, the discrepancy is about 15 percentage points, which is relatively closely matched by the individual country results. For investors of both bonds and funds (see below) the discrepancy is at least twice as high.

Table 5

Fund-holding households[1] versus all households – general results

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
%											
Fund participation rates	4.9	4.5	3.6	0.3	1.6	0.4	1.1	0.1	8.3	1.4	3.7
Bottom 90% of gross wealth distribution	3.5	3.9	2.6	0.2	1.1	0.4	0.8	0.1	6.3	1.0	2.9
Top 10% of gross wealth distribution	17.9	9.9	12.7	1.6	5.6	0.5	3.9	0.5	25.7	5.1	10.0
EUR thousand											
Conditional mean fund assets of fund-holding households	36.0	31.5	53.5	27.1	34.0	.[2]	72.2	.	117.4	29.8	40.0
Conditional median fund assets of fund-holding households	14.7	7.8	20.0	10.0	11.2	.	22.5	.	49.7	9.6	10.0
Mean net wealth of fund-holding households	557.7	454.2	563.8	1,421.0	756.6	.	694.1	.	1,870.7	555.1	490.5
Median net wealth of fund-holding households	400.7	250.2	373.5	544.0	413.4	.	353.4	.	1,125.1	240.3	291.5
Mean (yearly) gross income of fund-holding households	65.5	73.2	63.2	67.8	63.4	.	119.4	.	149.7	53.2	66.6
%											
Median share of fund assets in relation to gross wealth	4.6	3.1	6.8	2.2	1.9	.	6.3	.	4.0	3.4	3.7
Median share of fund assets in relation to financial wealth	22.2	10.8	39.2	7.9	20.0	.	33.2	.	18.6	14.0	15.4
EUR thousand											
Mean net wealth of all households	258.4	214.3	226.4	243.1	273.6	387.3	216.3	104.2	768.4	156.0	223.3
Median net wealth of all households	85.9	60.8	146.2	113.3	159.6	170.1	100.6	65.1	437.5	71.2	104.1
Mean (yearly) gross income of all households	43.3	48.4	33.4	37.6	31.9	30.5	54.6	21.2	87.2	21.5	39.4

Source: HFCS 2014, ECB.

[1] *Funds refer to assets held in funds predominantly investing in bonds and/or in money market instruments.*

[2] *".” indicates that the results are suppressed because of too few observations.*

2.3 Investment funds

2.3.1 Some general descriptives

We now turn to funds predominantly investing in bonds and the money market. Again, the data are not broken down by individual banks, which means that the default of a given bank would affect a considerably smaller range of households. Table 5 reports the results on funds in the same form as above.

With the slight exception of Luxembourg, we can see that – as was the case with bank bonds – the fraction of households investing in funds is rather small. The highest participation rates are found in Luxembourg (8.3%), Austria (4.9%), and Germany (4.5%), with the euro area figure coming to 3.7% of households. The invested amounts are somewhat smaller than the amounts established for bank bonds, running to EUR 40,000 at the mean and EUR 10,000 at the median for the euro area as a whole. Similarly, when looking at the ratio of fund assets to gross assets and financial wealth, we find lower median values than for bank bonds. Again, it is the more affluent households with regard to wealth as well as income which invest in funds.

Also for this type of investment we split all households according to the gross wealth distribution into the bottom 90% and the top 10%. Table 5 (lines 2 and 3) shows the fund participation rates for the two groups of households. Accordingly, most investors belong to the top 10% of the gross wealth distri-

Table 6

Fund-holding households[1] versus all households – share of risk-inclined investors

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
%											
Fund-holding households	65.4	69.0	70.9	35.5	44.7	.[2]	60.9	.	68.2	53.1	62.5
All households	41.2	30.8	42.0	13.6	12.1	13.5	22.7	18.4	26.1	7.4	25.5

Source: HFCS 2014, ECB.

[1] *Funds refer to assets held in money market funds as well as funds predominantly investing in bonds and/or in money market instruments.*
[2] *"." indicates that the results are suppressed because of too few observations.*

bution. In Italy for example, only about 2.6% of households in the bottom 90% group invest in funds whereas this figure is 12.7% for the top 10% according to the gross wealth distribution. If households hold such assets, both the mean and the median levels of investments are substantially higher for households belonging to the more affluent group than for households in the bottom 90%. In the euro area aggregate, for example, fund assets held by the bottom 90% of households average about EUR 18,000 compared to EUR 99,000 for the relatively larger group belonging to the top 10% according to the gross wealth distribution. Overall, we see this general pattern in all countries under investigation.

2.3.2 Investment behavior

Analyzing the question whether households holding funds are more willing to take risk than the overall population, table 6 provides information about the share of households which expressed a willingness to take risks in financial investments.

Again, we see large differences in the share of households answering in the affirmative between fund investors and the general population. In the most extreme case, in Portugal, more than half of all fund holders indicated a willingness to take financial risks compared to an overall share of 7.4% of risk-inclined households. At the euro area level, the difference is not as big, but a large majority of households owning funds is willing to take risks.

2.4 Putting everything together
2.4.1 Some general descriptives

Clearly the most interesting part of the analysis is the question who might be affected in the end, i.e. when the full range of bail-in-able assets is used when a bank is being restructured. Table 7 puts all items of households' investment portfolios as discussed in detail above together to provide an overview of investments and of the general level of affluence of investors. In the euro area we see that 8.3% of households own potentially bail-in-able instruments of some kind. The overall median and mean of these investments is around EUR 30,000 and EUR 80,000, respectively. In relation to gross wealth, these assets account for 7.3% of the balance sheet of potentially affected households at the median. In terms of financial wealth, the relation runs to about 27.9% at the median, showing that in general these investors actually pursue a more broad financial investment strategy, reaffirming the fact from above that these investors are the more risk-inclined households.

With a median and mean net wealth level of about EUR 374,000 and EUR 642,000 in comparison to the respective figures for the entire population of

Table 7

Households holding assets that might be bail-in-able versus all households – general results

	AT	DE	IT	FR	ES	CY	IE	GR	LU	PT	EA
%											
Participation rates for bail-in-able assets	7.9	10.4	9.3	3.9	5.5	5.0	5.1	1.1	22.4	3.6	8.3
Bottom 90% of gross wealth distribution	5.6	7.8	6.8	2.3	3.6	3.4	3.2	0.3	18.0	2.2	6.0
Top 10% of gross wealth distribution	28.9	34.1	32.1	18.3	22.8	19.3	22.1	7.9	61.9	16.4	29.3
EUR thousand											
Conditional mean holdings of bail-in-able assets	58.9	85.1	70.7	74.4	95.1	117.9	129.7	90.6	178.3	64.6	79.1
Conditional median holdings of bail-in-able assets	23.0	29.8	30.0	30.0	41.3	48.4	43.3	39.1	90.6	24.2	28.1
Mean net wealth of households owning bail-in-able assets	570.9	650.8	539.8	932.1	879.2	1.181.2	769.0	438.0	1,761.1	611.8	641.8
Median net wealth of households owning bail-in-able assets	401.0	340.4	369.7	531.9	488.6	650.3	503.4	386.0	1,073.9	332.7	373.6
Mean (yearly) gross income of households owning bail-in-able assets	63.8	80.8	61.4	76.5	60.5	65.1	108.8	42.0	131.3	49.9	70.4
%											
Median share of bail-in-able assets in relation to gross wealth	6.3	7.9	9.1	6.1	7.1	5.6	8.3	13.3	6.9	6.5	7.3
Median share of bail-in-able assets in relation to financial wealth	30.4	22.1	54.2	15.3	33.0	32.4	32.0	40.0	36.4	24.7	27.9
EUR thousand											
Mean net wealth of all households	258.4	214.3	226.4	243.1	273.6	387.3	216.3	104.2	768.4	156.0	223.3
Median net wealth of all households	85.9	60.8	146.2	113.3	159.6	170.1	100.6	65.1	437.5	71.2	104.1
Mean (yearly) gross income of all households	43.3	48.4	33.4	37.6	31.9	30.5	54.6	21.2	87.2	21.5	39.4

Source: HFCS 2014, ECB.

EUR 104,000 and EUR 223,000, these investors are about three times as affluent as the general population in the euro area. This finding holds not only for wealth but also for income figures. Thus, affluent households in terms of wealth and income are the main investors in these types of riskier financial assets. The overall finding for the euro area holds in each country displayed in the table. Specific results vary, however. We see that participation rates for example range from 1.1% in Greece to about 22.4% in Luxembourg. Luxembourg in particular displays the expected pattern, with a higher share of relatively affluent households holding bail-in-able financial assets. Also the factor by which investors are more affluent varies across countries, reaching levels of about 5 to 6 in countries such as Germany, France and Ireland with regard to the median net wealth level.

Table 7 also shows that bail-in-able assets are held by a small fraction of the bottom 90% of the population according to the gross wealth distribution. Even within the group of the most affluent households, such assets are held by a minority (usually below 30%, the euro area figure being 29.3%). Therefore, households holding such assets should display a relatively high resilience concerning a shock stemming from revaluations of bail-in-able assets.

Distribution of bail-in-able investments across all households

1a: Wave 2

EUR

1b: Wave 1

EUR

Austria   Germany   Italy   France   Spain   Cyprus
Ireland   Greece   Luxembourg   Portugal   Euro area
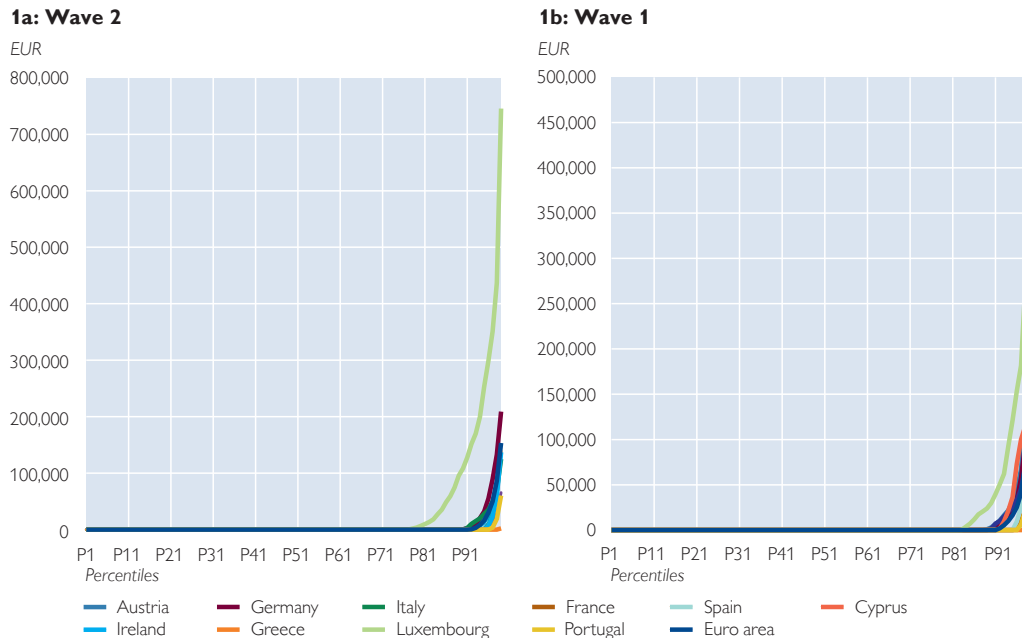
Source: 1a: HFCS 2014, ECB; 1b: HFCS 2010, ECB.

Note: For the first wave of the HFCS, savings in Austria are taken as derived by the ECB (without separation of wealth held in life insurance); one German household and about 160 French households who had missing values in funds were left out.

2.4.2 Distribution of bail-in-able assets

Chart 1a displays the overall distribution of the sum of all bail-in-able assets. This chart is only shown for the total of all bail-in-able assets as this chart looks generally similar for all separate asset types.[13] The displayed distribution takes all households into account in the sense that if households do not have any bail-in-able assets their level of investment is zero. The chart shows that the large majority of households is not prone to any revaluation of such assets since they do not hold any. In almost all countries, it is only the top 10% of bail-in-able investors that own such assets.

This is evident from all the charts except the one for Luxembourg, where a positive amount is already registered around the 80th percentile. Further to

the right, the distribution is relatively steep, indicating that even across owners of this type of assets the distribution is relatively skewed. Greece shows a somewhat different pattern since the positive amount is only relatively small at the far-right tail of the distribution, coming to less than EUR 3,000 for the 99th percentile. Chart 1b adds the results from the first wave of the HFCS[14] conducted in 2010–2011. The results show the stability of findings over the time horizon so that the results for the second wave should be valid not only for the time of the interview, but for a longer time span. In general, the investment behavior of households seems to be very stable.

Chart 2 shows the distribution of the conditional share of investments in

[13] Note that some charts for the specific investment types are more skewed, especially if participation rates are below 1%.

[14] Note that the sample of countries comprising the euro area figure in the first wave is different from the one of the second wave since not all countries took part in the first wave of the HFCS.

Chart 2

Conditional distribution of bail-in-able assets in relation to gross wealth across potentially affected households
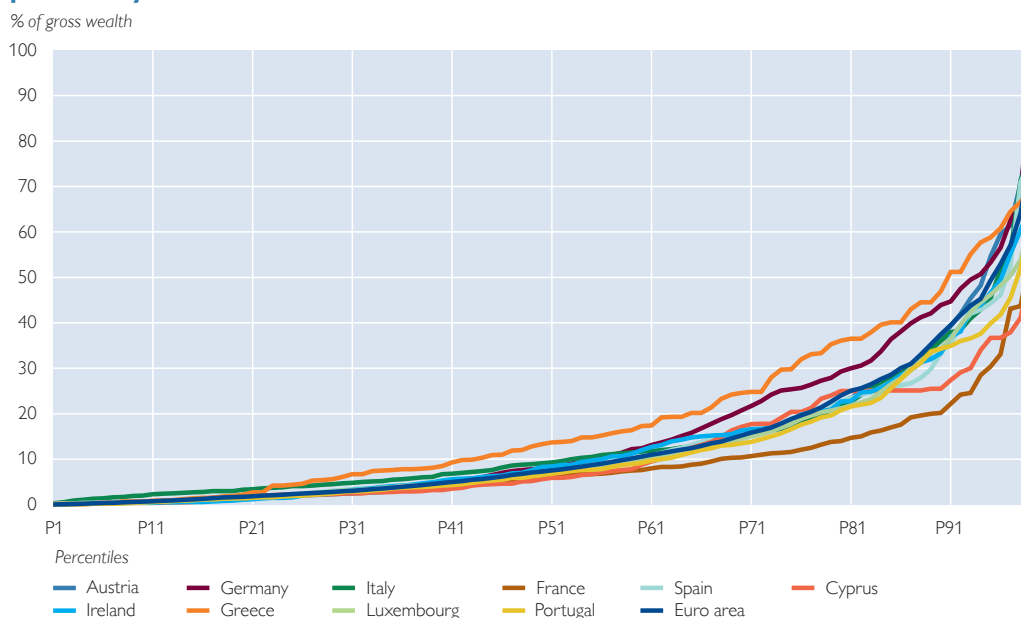
% of gross wealth

Source: HFCS 2014, ECB.

relation to gross wealth. In contrast to the charts above, this chart considers only those households who are invested in bail-in-able funds. All other households – the large majority – are left out from the calculation of this chart.

By definition, this result is bounded between 0% and 100% (vertical axis). The chart shows 99 percentiles of the conditional distribution taking only investors in bail-in-able financial products into account. Thus, in the euro area for example it is based on 8.3% of all households. Within this group of households, chart 2 shows that in all countries most households invest only a small fraction of their assets in these types of products, making the impact of a potential shock to their portfolio less severe. For all countries but Greece, which exhibits relatively few investors, even the 80th percentile is below 30% of gross wealth. Less than 10% of all investors hold more than half of their wealth in bail-in-able vehicles.

3 Summary of the findings – concluding remarks

As households are among the groups potentially affected by bail-in activities of European resolution authorities, it is important to find out whether (partial) impairments of their assets have implications for financial stability. Data from the Eurosystem Household Finance and Consumption Survey show that the participation rate of households in bail-in-able instruments, in particular bank bonds, is rather low, ranging from 0.2% to 5.5% for bank bonds in selected euro area countries. Households owning such instruments earn higher incomes and are more affluent in terms of wealth than the overall population, which means that their financial resilience to absorb shocks from asset devaluation is high. The high loss absorption capacity of the households concerned shows further that direct risks to current financial stability stemming from a bail-in of households assets are economically speaking very low.

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Annex of tables

Annex of tables

Cutoff date for data: June 22, 2017

Conventions used in the tables:

x = No data can be indicated for technical reasons

. . = Data not available at the reporting date

Revisions of data published in earlier volumes are not indicated.

Discrepancies may arise from rounding.

International financial market indicators

Short-term interest rates[1]

	2009	2010	2011	2012	2013	2014	2015	2016
Three-month rates, period average, %								
Euro area	1.23	0.81	1.39	0.57	0.22	0.21	−0.02	−0.26
U.S.A.	0.69	0.34	0.34	0.43	0.27	0.23	0.32	0.74
Japan	0.59	0.39	0.34	0.33	0.24	0.21	0.17	0.08
United Kingdom	1.23	0.74	0.88	0.86	0.50	0.54	0.55	0.49
Switzerland	0.38	0.19	0.12	0.07	0.02	0.01	−0.75	−0.75
Czech Republic	2.19	1.31	1.19	1.00	0.46	0.36	0.31	0.29
Hungary	8.64	5.51	6.19	6.98	4.31	2.41	1.61	0.99
Poland	4.42	3.92	4.54	4.91	3.02	2.52	1.75	1.70

Source: Bloomberg, Eurostat, Thomson Reuters.

[1] Average rate at which a prime bank is willing to lend funds to another prime bank for three months.

Long-term interest rates[1]

	2009	2010	2011	2012	2013	2014	2015	2016
Ten-year rates, period average, %								
Euro area	4.03	3.78	4.31	3.05	3.01	2.28	1.27	0.93
U.S.A.	3.24	3.20	2.77	1.79	2.34	2.53	2.13	1.84
Japan	1.34	1.17	1.12	0.85	0.71	0.55	0.36	−0.05
United Kingdom	3.36	3.36	2.87	1.74	2.03	2.14	1.79	1.22
Switzerland	2.20	1.63	1.47	0.65	0.95	0.69	−0.07	−0.36
Austria	3.94	3.23	3.32	2.37	2.01	1.49	0.75	0.38
Czech Republic	4.84	3.88	3.71	2.78	2.11	1.58	0.58	0.43
Hungary	9.12	7.28	7.64	7.89	5.92	4.81	3.43	3.14
Poland	6.12	5.78	5.96	5.00	4.03	3.52	2.70	3.04

Source: ECB, Eurostat, Thomson Reuters, national sources.

[1] Yields of long-term government bonds.

Table A3

Stock indices

	2009	2010	2011	2012	2013	2014	2015	2016
	Annual change in %, period average							
Euro area: EURO STOXX	−25.29	13.38	−3.60	−6.36	17.53	13.07	11.76	−9.67
U.S.A.: S&P 500	−22.35	20.24	11.27	8.74	19.14	17.58	6.70	1.60
Japan: Nikkei 225	−23.07	7.22	−5.94	−3.37	48.80	14.22	23.83	−11.71
United Kingdom: FTSE 100	−14.86	19.76	3.90	0.96	12.75	3.24	−1.35	−1.77
Switzerland: SMI	−18.15	14.27	−6.96	4.88	24.14	9.26	4.28	−10.14
Austria: ATX	−36.45	19.85	−3.69	−14.79	16.94	−2.36	1.29	−5.32
Czech Republic: PX 50	−29.19	21.72	−5.11	−14.56	2.53	1.62	0.81	−11.49
Hungary: BUX	−18.75	40.13	−8.67	−12.02	3.26	−3.89	17.28	28.94
Poland: WIG	−21.33	33.55	4.36	−6.66	16.07	8.06	−0.31	−9.83

Source: Thomson Reuters.

Table A4

Corporate bond spreads[1]

	2009	2010	2011	2012	2013	2014	2015	2016
	Percentage points, period average							
	Euro area							
AA	2.17	1.35	1.90	1.47	0.89	0.61	0.72	0.80
BBB	5.21	2.94	3.75	3.56	2.25	1.73	1.90	2.11
	U.S.A.							
AA	2.57	1.32	1.68	1.50	1.12	0.88	1.04	0.93
BBB	4.50	2.21	2.34	2.59	2.17	1.76	2.13	2.21

Source: Thomson Reuters.

[1] *Spreads of seven- to ten-year corporate bonds against ten-year government bonds (euro area: German government bonds).*

Financial indicators of the Austrian corporate and household sectors

<div style="text-align: right;">Table A5</div>

Financial investment of households[1]

	2009	2010	2011	2012	2013	2014	2015	2016
	EUR billion							
Currency	0.9	1.0	1.1	0.6	1.2	0.8	0.9	0.6
Deposits	7.6	1.6	4.6	3.8	1.9	3.2	6.5	11.1
Debt securities[2]	−0.4	1.5	1.8	0.2	−1.8	−4.2	−3.5	−2.7
Shares and other equity[3]	1.7	1.7	0.8	1.1	−0.1	1.9	−0.3	1.2
Mutual fund shares	0.9	2.4	−1.4	0.9	2.7	3.5	4.1	3.1
Insurance technical reserves	4.6	3.7	2.1	2.7	2.4	2.2	0.4	0.3
Other accounts receivable	0.2	0.7	1.0	1.0	1.0	2.9	1.9	−0.2
Total financial investment	15.5	12.6	10.0	10.3	7.3	10.3	10.0	13.4

Source: OeNB (financial accounts).

[1] *Including nonprofit institutions serving households.*
[2] *Including financial derivatives.*
[3] *Other than mutual fund shares.*

<div style="text-align: right;">Table A6</div>

Household[1] income and savings

	2009	2010	2011	2012	2013	2014	2015	2016
	EUR billion							
Net disposable income	171.9	172.9	177.9	184.7	185.1	188.9	191.9	198.8
Savings	19.5	16.2	14.1	16.1	13.1	13.3	14.2	16.5
Saving ratio in %[2]	11.3	9.3	7.9	8.7	7	7	7.3	8.2

Source: Statistics Austria (national accounts broken down by sectors).

[1] *Including nonprofit institutions serving households.*
[2] *Saving ratio = savings / (disposable income + increase in accrued occupational pension benefits).*

<div style="text-align: right;">Table A7</div>

Financing of nonfinancial corporations

	2009	2010	2011	2012	2013	2014	2015	2016
	EUR billion							
Debt securities[1]	4.3	1.4	4.2	2.8	1.7	−0.7	0.0	0.7
Loans	−10.1	5.8	6.4	4.5	1.7	1.1	5.4	5.9
Shares and other equity	2.9	0.5	9.7	2.3	4.5	4.0	4.2	5.5
Other accounts payable	−5.8	5.9	3.3	1.1	2.8	3.2	4.0	6.0
Total external financing	−8.7	13.5	23.6	10.7	10.7	7.6	13.7	18.0

Source: OeNB (financial accounts).

[1] *Including financial derivatives.*

Insolvency indicators

	2009	2010	2011	2012	2013	2014	2015	2016
Default liabilities (EUR million)	4,035	4,700	2,775	3,206	6,255	2,899	2,430	2,867
Defaults (number)	3,741	3,522	3,260	3,505	3,266	3,275	3,115	3,163

Source: Kreditschutzverband von 1870.

Note: Default liabilities for 2013 include one large insolvency.

Housing market indicators

	2009	2010	2011	2012	2013	2014	2015	2016
Residential property price index	*2000=100*							
Vienna	133.5	143.9	156.1	180.7	196.3	204.6	209.2	217.2
Austria	119.8	127.3	132.7	149.1	156.0	161.4	168.1	180.4
Austria excluding Vienna	114.8	121.1	124.0	137.4	141.1	145.4	152.9	166.7
Rent prices[1]	*2000=100*							
Vienna: apartments	116.3	117.7	121.0	126.3	129.5	134.9	140.4	149.9
Austria excluding Vienna: apartments	144.7	145.9	148.2	144.1	162.5	158.9	158.3	163.0
Austria excluding Vienna: single-family houses	101.5	101.7	97.1	94.6	95.5	97.4	94.2	95.0
Rents of apartments excluding utilities, according to CPI	96.7	100.0	103.3	107.8	111.2	115.6	120.7	124.4
OeNB fundamentals indicator for residential property prices[2]								
Vienna	−6.2	−2.0	4.0	12.7	17.0	17.9	18.0	19.4
Austria	−12.4	−8.7	−5.4	0.1	−1.1	−1.2	0.6	5.4

Source: OeNB, Vienna University of Technology (TU Wien).
[1] Free and regulated rents.
[2] Deviation from fundamental price in %.

Austrian financial intermediaries[1]

Total assets

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Total assets on an unconsolidated basis	1,029,043	978,559	1,014,278	982,114	927,155	896,424	859,165	832,267
of which: total domestic assets	*691,465*	*659,561*	*693,394*	*678,500*	*645,275*	*611,540*	*605,267*	*604,230*
Total assets on a consolidated basis	1,139,961	1,130,853	1,166,313	1,163,595	1,089,713	1,078,155	1,056,705	946,342
Total assets of CESEE subsidiaries[1,2]	254,356	263,800	270,045	276,352	264,998	285,675	295,557	184,966
Leverage ratio (consolidated, %)[3]	5.2	5.8	5.8	6.1	6.5	6.1	6.3	7.6

Source: OeNB.

[1] *Including Yapı ve Kredi Bankası (not fully consolidated by parent bank UniCredit Bank Austria) since 2014.*
[2] *The transfer in ownership of UniCredit Bank Austria's CESEE subsidiaries to the Italian UniCredit Group limits the comparability of 2016 figures.*
[3] *Definition up to 2013: tier 1 capital after deductions in % of total assets. Definition as of 2014 according to Basel III.*

Sectoral distribution of domestic loans

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
	All currencies combined							
Banks	195,737	169,596	184,789	169,364	147,537	133,342	127,037	122,204
Nonbanks	311,794	321,524	329,912	330,385	326,820	328,324	333,970	338,322
of which: nonfinancial corporations	*132,346*	*135,427*	*138,840*	*140,384*	*140,329*	*136,606*	*137,235*	*136,963*
households[1]	*128,178*	*135,215*	*138,353*	*139,056*	*139,052*	*140,946*	*146,432*	*153,501*
general government	*24,923*	*26,374*	*28,976*	*27,972*	*25,970*	*28,102*	*28,076*	*27,630*
other financial intermediaries	*26,063*	*24,324*	*23,586*	*22,806*	*21,244*	*22,578*	*22,127*	*19,987*
	Foreign currency							
Banks	42,780	25,851	25,288	19,422	16,013	15,181	12,963	12,144
Nonbanks	53,515	58,746	57,231	47,652	40,108	36,288	33,950	30,089
of which: nonfinancial corporations	*11,473*	*12,550*	*12,111*	*9,156*	*6,985*	*6,379*	*5,293*	*4,296*
households[1]	*37,064*	*40,040*	*38,716*	*32,905*	*28,385*	*25,374*	*24,423*	*21,224*
general government	*1,628*	*2,627*	*3,267*	*2,827*	*2,478*	*2,777*	*2,858*	*2,623*
other financial intermediaries	*3,374*	*3,525*	*3,133*	*2,761*	*2,257*	*1,759*	*1,374*	*1,945*

Source: OeNB.

[1] *Including nonprofit institutions serving households.*

Note: Figures are based on monetary statistics.

[1] *Since 2007, the International Monetary Fund (IMF) has published Financial Soundness Indicators (FSIs) for Austria (see also www.imf.org). In contrast to some FSIs that take only domestically-owned banks into account, the OeNB's Financial Stability Report takes into account all banks operating in Austria. For this reason, some of the figures presented here may deviate from the figures published by the IMF.*

Table A12

Loan quality

	2009	2010	2011	2012	2013	2014	2015	2016
End of period, % of claims on nonbanks								
Specific loan loss provisions for loans to nonbanks (unconsolidated)	2.8	3.2	3.2	3.4	3.5	3.3	3.0	2.3
Specific loan loss provisions for loans to nonbanks (consolidated)	3.5	4.1	4.3	4.6	4.8	4.5	4.2	3.2
Specific loan loss provisions for loans to nonbanks (Austrian banks' subsidiaries in CESEE)	5.3	6.5	7.3	7.6	8.0	7.3	7.0	6.1
Nonperforming loan ratio (unconsolidated)[1]	4.2	4.7	4.5	4.7	4.1	4.4	4.3	3.5
Nonperforming loan ratio (consolidated)[1]	6.7	8.0	8.3	8.7	8.6	7.0	6.6	4.9
Nonperforming loan ratio (Austrian banks' subsidiaries in CESEE)[2]	9.6	12.7	14.2	13.9	14.0	11.8	11.5	8.6

Source: OeNB.

[1] Ratio for loans to corporates and households (introduced in Financial Stability Report 24 to better indicate the loan quality in retail business; not comparable with former ratios).
[2] The transfer in ownership of UniCredit Bank Austria's CESEE subsidiaries to the Italian UniCredit Group limits the comparability of 2016 figures.

Table A13

Exposure to CESEE

	2009	2010	2011	2012	2013	2014	2015	2016
End of period, EUR million								
Total exposure according to BIS	203,975	209,352	216,086	209,818	201,768	184,768	186,397	193,273
Total indirect lending to nonbanks[1, 2]	160,248	168,710	171,311	171,117	161,439	177,389	176,728	108,738
Total direct lending[3]	50,665	49,460	52,010	51,539	52,926	43,144	40,866	32,976
Foreign currency loans of Austrian banks' subsidiaries in CESEE[2]	77,396	84,601	88,282	85,382	79,047	76,736	69,317	32,576

Source: OeNB.

[1] Lending (net lending after risk provisions) to nonbanks by all bank subsidiaries in CESEE.
[2] The transfer in ownership of UniCredit Bank Austria's CESEE subsidiaries to the Italian UniCredit Group limits the comparability of 2016 figures.
[3] Cross-border lending to nonbanks and nonfinancial institutions in CESEE according to monetary statistics.

Profitability on an unconsolidated basis

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Operating income	17,850	19,705	19,227	19,115	18,967	19,943	20,813	18,984
of which: net interest income	8,769	9,123	9,622	8,813	8,814	9,306	8,975	8,522
securities and investment earnings	3,328	4,026	3,662	3,670	3,018	3,550	3,443	3,608
fee and commission income	3,605	3,950	3,835	3,848	4,073	4,260	4,410	3,887
trading income	486	664	325	631	495	368	516	322
other operating income	1,662	1,942	1,784	2,153	2,567	2,458	3,469	2,644
Operating expenses	11,080	11,547	11,714	12,193	12,835	13,906	13,770	13,552
of which: staff costs	5,697	5,802	5,998	6,243	6,507	7,384	6,918	6,752
other administrative expenses	3,766	3,940	4,028	4,124	4,301	4,459	4,582	4,683
other operating expenses	1,617	1,805	1,688	1,827	2,027	2,063	2,270	2,118
Operating profit/loss	6,770	8,159	7,513	6,922	6,132	6,037	7,043	5,432
Net profit after taxes	43	4,207	1,211	3,214	−935	−6,692	3,720	4,430
	%							
Return on average assets[1]	0.0	0.4	0.1	0.3	−0.1	−0.7	0.4	0.5
Return on average equity (tier 1 capital)[1]	0.1	5.8	1.6	4.31	−1.2	−9.9	5.9	7.0
Interest income to gross income	49.1	46.3	50.0	46.1	46.5	46.7	43.1	44.9
Cost-to-income ratio	62.1	58.6	60.9	63.79	67.7	69.7	66.2	71.4

Source: OeNB.

[1] *End-of-period result after tax in % of average total assets and average tier 1 capital, respectively.*

Profitability of Austrian banks' subsidiaries[1,2] in CESEE

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Operating income	13,076	12,944	13,070	12,685	12,544	12,159	12,261	7,752
of which: net interest income	8,693	9,333	9,290	8,780	8,414	9,068	8,431	5,135
securities and investment earnings	50	47	67	66	63	27	49	57
fee and commission income	2,916	2,954	3,084	2,992	3,164	3,477	3,358	2,184
trading income	1,180	335	521	739	736	−251	642	681
other operating income[3]	−34	−202	−141	−321	−374	−831	−528	−344
Operating expenses[3]	5,948	6,186	6,325	6,363	6,253	6,413	6,264	4,084
of which: staff costs	2,739	2,870	2,972	2,992	2,922	2,978	2,896	1,956
Operating profit/loss	7,129	6,757	6,744	6,321	6,291	5,746	5,998	3,668
Net profit after taxes	1,775	2,063	1,876	1,999	2,201	672	2,050	2,354
	%							
Return on average assets[4]	0.7	0.8	0.7	0.7	0.8	0.2	0.7	1.3
Return on average equity (tier 1 capital)[4]	8.2	9.2	7.2	8.2	8.4	9.9	9.5	14.27
Interest income to gross income	66	72	71	69	67	75	69	66
Cost-to-income ratio[3]	45	48	48	50	50	53	51	53

Source: OeNB.

[1] *Pro rata data of Yapi ve Kredi Bankasi, a joint venture of UniCredit Bank Austria in Turkey, are included for the period from the first quarter of 2014 until end-2015.*
[2] *The transfer in ownership of UniCredit Bank Austria's CESEE subsidiaries to the Italian UniCredit Group limits the comparability of 2016 figures.*
[3] *Since end-2014, other operating income and other operating expenses have been netted under other operating income.*
[4] *End-of-period result expected for the full year after tax as a percentage of average total assets and average total tier 1 capital, respectively.*

Table A16

Profitability on a consolidated basis[1]

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Operating income	37,850	37,508	37,207	37,673	35,271	28,717	28,064	22,640
of which: net interest income	*19,451*	*20,390*	*20,426*	*19,259*	*18,598*	*19,345*	*18,336*	*14,710*
net fee-based income	*7,160*	*7,678*	*7,592*	*7,260*	*7,590*	*7,741*	*7,730*	*6,566*
net profit/loss on financial operations	*2,560*	*997*	*845*	*1,137*	*670*	*426*	*−50*	*106*
other operating income[2]	*8,679*	*8,443*	*8,344*	*10,016*	*8,413*	*1,205*	*2,048*	*1,258*
Operating expenses	22,230	24,030	26,839	25,582	27,318	19,833	17,612	16,690
of which: staff costs	*9,522*	*9,941*	*10,279*	*10,391*	*10,378*	*9,543*	*8,959*	*8,775*
other administrative expenses	*5,979*	*6,262*	*6,316*	*6,410*	*6,628*	*6,569*	*6,830*	*5,823*
Operating profit/loss	15,620	13,478	10,369	12,090	7,953	8,884	10,452	5,950
Net profit after taxes	1,530	4,577	711	2,966	−1,035	685	5,244	4,979
	%							
Return on average assets[3]	0.2	0.5	0.1	0.3	−0.0	0.0	0.6	0.6
Return on average equity (tier 1 capital)[3]	3.6	8.2	1.7	5.1	−0.7	0.7	8.8	8.3
Interest income to gross income	51.4	54.4	54.9	51.1	52.7	67.4	65.3	65.0
Cost-to-income ratio	52.7	57.9	66.4	61.7	73.0	69.1	62.8	74.5

Source: OeNB.

[1] *The transfer in ownership of UniCredit Bank Austria's CESEE subsidiaries to the Italian UniCredit Group limits the comparability of 2016 figures.*
[2] *Since end-2014, other operating income and other operating expenses have been netted under other operating income.*
[3] *End-of-period result for the full year after tax but before minority interests as a percentage of average total assets and average tier 1 capital, respectively.*

Table A17

Solvency

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Own funds	80,574	86,228	88,071	88,204	88,994	87,584	87,793	80,517
Total risk exposure	633,313	653,313	649,613	621,925	578,425	562,790	537,447	442,883
	End of period, eligible capital and tier 1 capital, respectively, as a percentage of risk-weighted assets							
Consolidated total capital adequacy ratio	12.8	13.2	13.6	14.2	15.4	15.6	16.3	18.2
Consolidated tier 1 capital ratio	9.3	10.0	10.3	11.0	11.9	11.8	12.9	14.9
Consolidated core tier 1 capital ratio (common equity tier 1 as from 2014)	8.5	9.4	9.8	10.7	11.6	11.7	12.8	14.8

Source: OeNB.

Note: Since 2014, figures have been calculated according to CRD IV requirements. Therefore, comparability with previous figures is limited.

Market indicators of selected Austrian financial instruments

	2010	2011	2012	2013	2014	2015	2016	mid-2017
Share prices	*% of end-2010 prices, end of period*							
Erste Group Bank	100	39	67	71	54	81	79	91
Raiffeisen Bank International	100	49	73	59	30	33	43	56
EURO STOXX Banks	100	63	69	86	82	78	72	79
Uniqa	100	64	68	67	56	54	53	56
Vienna Insurance Group	100	81	102	92	94	64	55	62
EURO STOXX Insurance	100	83	108	143	149	172	164	168
Relative valuation: share price-to-book value ratio	*%, end of period*							
Erste Group Bank	1.30	0.48	0.88	1.06	0.72	0.99	0.96	1.12
Raiffeisen Bank International	1.15	0.53	0.83	0.92	0.46	0.46	0.60	0.78
EURO STOXX Banks	0.64	0.36	0.60	0.96	0.72	0.72	0.69	0.75
Uniqa	2.25	1.18	1.13	1.07	0.87	0.85	0.82	0.88
Vienna Insurance Group	1.21	0.90	1.21	1.07	1.12	0.84	0.72	0.81
EURO STOXX Insurance	0.94	0.69	0.81	0.93	1.15	1.02	0.92	0.91

Source: Thomson Reuters, Bloomberg.

Key indicators of Austrian insurance companies

	2009	2010	2011	2012	2013	2014	2015	2016
Business and profitability	*End of period, EUR million*							
Premiums	16,381	16,652	16,537	16,341	16,608	17,077	17,342	16,920
Expenses for claims and insurance benefits	12,348	11,882	12,826	12,973	13,150	14,157	15,514	14,751
Underwriting results	132	373	295	455	592	477	475	560
Profit from investments	2,729	3,203	2,964	3,391	3,354	3,211	3,216	3,051
Profit from ordinary activities	744	1,101	1,162	1,395	1,524	1,421	1,354	1,414
Acquisition and administrative expenses	3,241	3,382	3,541	3,499	3,528	3,573	3,697	3,818
Total assets	99,227	105,099	105,945	108,374	110,391	113,662	114,495	114,707
Investments								
Total investments	92,260	98,300	99,776	103,272	105,496	107,442	107,933	108,897
of which: debt securities	*36,397*	*38,223*	*37,813*	*37,614*	*39,560*	*41,667*	*41,517*	*43,241*
stocks and other equity securities[1]	*12,811*	*12,559*	*12,363*	*12,505*	*12,464*	*12,619*	*12,522*	*12,534*
real estate	*5,246*	*5,703*	*5,236*	*5,371*	*5,689*	*5,858*	*5,912*	*6,022*
Investments for unit-linked and index-linked life insurance	12,822	15,325	15,870	18,330	19,127	20,179	19,776	20,142
Claims on domestic banks	17,168	16,458	16,405	16,872	16,687	15,800	15,492	13,793
Reinsurance receivables	1,218	1,229	1,733	1,933	824	918	971	1,027
	%							
Risk capacity (solvency ratio)	300	356	332	350	368	380	375	x

Source: FMA, OeNB.

[1] *Contains shares, share certificates (listed and not listed) and all equity instruments held by mutual funds.*

Table A20

Assets held by Austrian mutual funds

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Domestic securities	48,765	51,001	50,046	50,963	49,757	52,116	52,970	54,382
of which: debt securities	*16,013*	*15,884*	*16,683*	*17,527*	*16,203*	*15,467*	*13,609*	*13,278*
stocks and other equity securities	*2,863*	*3,696*	*2,991*	*3,637*	*3,610*	*3,345*	*3,530*	*4,283*
Foreign securities	89,845	96,684	87,458	96,854	99,647	110,397	114,833	12,033
of which: debt securities	*61,961*	*61,744*	*58,695*	*63,661*	*62,972*	*69,642*	*70,326*	*69,911*
stocks and other equity securities	*12,663*	*15,540*	*12,097*	*14,208*	*16,278*	*17,910*	*18,521*	*20,145*
Net asset value	138,610	147,684	137,504	147,817	149,404	162,513	167,802	174,712
of which: retail funds	*85,537*	*88,313*	*78,299*	*84,158*	*83,238*	*89,163*	*91,626*	*94,113*
institutional funds	*53,073*	*59,372*	*59,205*	*63,659*	*66,167*	*73,350*	*76,177*	*80,599*
Consolidated net asset value	115,337	123,794	116,747	126,831	128,444	138,642	143,249	148,682

Source: OeNB.

Table A21

Structure and profitability of Austrian fund management companies

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Total assets	642	699	661	644	670	725	745	691
Operating profit	106	142	125	111	131	158	184	157
Net commissions and fees earned	258	302	284	283	310	368	411	402
Administrative expenses[1]	185	199	195	205	219	246	266	284
Number of fund management companies	30	29	29	29	29	29	29	29
Number of reported funds	2,182	2,203	2,171	2,168	2,161	2,118	2,077	2,029

Source: OeNB.

[1] *Administrative expenses are calculated as the sum of staff and material expenses.*

Table A22

Assets held by Austrian pension funds

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Total assets	13,734	14,976	14,798	16,335	17,385	19,011	19,646	20,839
of which: direct investment	*1,239*	*968*	*1,139*	*1,139*	*1,640*	*1,065*	*990*	*835*
mutual funds	*11,235*	*13,944*	*13,626*	*15,278*	*15,745*	*17,946*	*18,656*	*20,004*
foreign currency (without derivatives)	*x*	*x*	*x*	*5,714*	*5,964*	*7,578*	*7,279*	*9,169*
stocks	*x*	*x*	*x*	*4,805*	*5,472*	*6,250*	*6,200*	*6,972*
debt	*x*	*x*	*x*	*8,464*	*7,650*	*9,163*	*9,552*	*9,521*
real estate	*x*	*x*	*x*	*567*	*583*	*576*	*690*	*754*
cash and deposits	*x*	*1,181*	*1,624*	*1,488*	*2,033*	*1,598*	*1,850*	*1,863*

Source: OeNB, FMA.

Table A23

Assets held by Austrian severance funds

	2009	2010	2011	2012	2013	2014	2015	2016
	End of period, EUR million							
Total direct investment	884	1,004	1,393	1,442	1,528	1,415	1,565	1,682
of which: euro-denominated	*866*	*985*	*1,363*	*1,415*	*1,507*	*1,299*	*1,502*	*1,647*
foreign currency-denominated	*17*	*19*	*30*	*27*	*21*	*x*	*63*	*35*
accrued income claims from direct investment	*15*	*16*	*19*	*22*	*21*	*15*	*14*	*15*
Total indirect investment	1,946	2,569	2,891	3,834	4,701	5,912	6,741	7,745
of which: total of euro-denominated investment in mutual fund shares	*1,858*	*2,379*	*2,741*	*3,540*	*4,220*	*5,190*	*5,790*	*6,743*
total of foreign currency-denominated investment in mutual fund shares	*88*	*190*	*151*	*294*	*481*	*722*	*951*	*1,002*
Total assets assigned to investment groups	2,830	3,573	4,284	5,254	6,218	7,306	8,294	9,412

Source: OeNB.

Note: Due to special balance sheet operations, total assets assigned to investment groups deviate from the sum of total indirect investments.

Table A24

Transactions and system disturbances in payment and securities settlement systems

	2009	2010	2011	2012	2013	2014	2015	2016
HOAM.AT	*Number of transactions in million, value of transactions in EUR billion*							
Number	1	1	1	1	1	1	1	1
Value	9,305	9,447	7,667	9,974	5,906	7,438	6,381	4,316
System disturbances	5	4	1	1	3	0	1	4
Securities settlement systems								
Number	2	2	2	2	2	2	2	2
Value	365	398	439	418	369	377	315	335
System disturbances	0	0	0	1	5	2	3	3
Card payment systems[1]								
Number	540	583	591	633	673	856[1]	901	963
Value	41	45	45	48	72	91[1]	97	101
System disturbances	19	25	4	4	2	0	2	4
Participation in international payment systems								
Number	31	31	36	41	53	113	144	166
Value	1,225	1,164	1,306	1,820	1,643	2,463	2,420	3,029
System disturbances	0	0	0	0	0	0	0	0

Source: OeNB.

[1] *In mid-2014, significant changes were implemented in the reporting of card payment data. On-us ATM transactions have been included since then.*