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*Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.*

# Analyses

# Recovery of the Austrian Economy Continues

## Economic Outlook for Austria from 2010 to 2012 (December 2010)

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## 1 Summary: Robust Growth Despite Fiscal Consolidation

In the December 2010 economic outlook, the Oesterreichische Nationalbank (OeNB) expects the Austrian economy to grow by 1.9% in 2010, after it had contracted by 3.7% in 2009. Growth will pick up further in 2011 and 2012, reaching 2.1% and 2.3% respectively. The prospects for growth are now better than expected in the OeNB's economic outlook of June 2010, despite the fiscal consolidation measures that have been adopted in the meantime. On average, the annual growth outlook has been revised upwards by ¼ percentage point p. a. The recovery is being driven mainly by exports. Domestic demand remains subdued, not least on account of the budgetary consolidation measures adopted by the Austrian government. The proposed increases in taxes will temporarily push inflation up

to 2.2%. The budget deficit will rise to 4.1% of GDP in 2010, but the favorable growth prospects and the fiscal consolidation measures will bring it down again, to below the 3% mark by 2012.

The global economic upturn will continue over the forecasting horizon, but the downturn in the inventory cycle, the expiry of fiscal stimuli and the simultaneous onset of intensified efforts to consolidate the budget will make it lose momentum in the next few months. Moreover, the pace of the recovery will vary, which holds true of both global economic activity in general and that in Europe in particular. The increase in heterogeneity of developments across the globe means that Austria's growth prospects remain subject to high macroeconomic risks from abroad.

The main drivers of economic activity in Austria are the global recovery

Chart 1

**Real GDP Growth (Seasonally and Working Day-Adjusted)**

*Quarterly and annual changes in %*



Source: Eurostat, OeNB.

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and, above all, robust economic growth in Germany, Austria's main trading partner. Although, given the above-average importance of trade in machinery and transport equipment, Austria's export industry was affected particularly severely by the crisis in worldwide trade, it was able also to benefit significantly from the current recovery. As a whole, exports in goods and services are thus expected to expand by 10½% in real terms in 2010. In the next few years, however, the upturn will slow down in parallel to the more moderate evolution of global trade, returning to the pre-crisis level of around 7%.

Domestic demand, by contrast, is developing far less dynamically. Given the decline in capacity utilization recorded in the course of the crisis, it was only towards the middle of 2010 that the growth of investment in plant and equipment returned to positive territory, thus far later than in previous periods of upswing. Capacity-enhancing investment in plant and equipment is not to be expected before 2011 and 2012. The outlook for construction investment remains subdued across the whole forecasting horizon. In 2010 as a whole, gross fixed capital formation will continue to decline. Companies' investment activity will not increase until 2011 and 2012, and the pace of expansion will remain slow.

Given the weakness of developments in real wages and salaries, households' expenditure on consumption continued to be subdued in 2010, despite the recovery in business activity. Although households' various kinds of income (compensation of employees, investment income, income from self-employment and operating surpluses) will again rise more markedly in the next two years, the fiscal consolidation measures will impose a burden on their real disposable income, and thus consumer spending. All in all, these measures will reduce private consumption by ¼ to ½ of a percentage point in both 2011 and 2012, so that consumption growth will range between 1% and 1½%.

Given the scale of the slump in business activity, the impact of the economic and financial crisis on the Austrian labor market has been relatively limited. The unemployment rate (Eurostat definition) has risen from 3.8% in 2008 to 4.8% in 2009. And, in the current upswing, the labor market developments are again proving to be a pleasant surprise. The pick-up in economic activity in the course of the year to date has already led to a significant expansion of employment, so that the total number of employed in 2010 as a whole is expected to rise by 35,000, a trend that should continue over the next two years. On account of the clearly procyclical behavior of the labor supply, however, the unemployment rate will decline only slightly to 4.3%.

HICP inflation will amount to 1.7% in 2010, and will rise to 2.2% in 2011. That increase is due primarily to the measures announced within the scope of the fiscal consolidation package, which will have the effect of raising HICP inflation by 0.4 percentage points in 2011.

With the support of the recovery in business activity and assuming that the fiscal consolidation package will be implemented as planned, the general government budget balance will decline to −2.6% of GDP by 2012.

Table 1

## OeNB December 2010 Outlook for Austria – Key Results[1]

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Economic activity** | *Annual change in % (real)* | | | |
| Gross domestic product | −3.7 | +1.9 | +2.1 | +2.3 |
| Private consumption | +1.1 | +1.0 | +1.0 | +1.3 |
| Government consumption | +0.4 | +0.3 | +0.3 | +0.3 |
| Gross fixed capital formation | −9.1 | −3.3 | +2.1 | +3.0 |
| Exports of goods and services | −13.6 | +10.4 | +7.3 | +6.9 |
| Imports of goods and services | −12.5 | +6.8 | +6.0 | +6.2 |
| | *% of nominal GDP* | | | |
| Current account balance | +2.9 | +2.5 | +3.4 | +4.5 |
| **Contribution to real GDP growth** | *Percentage points of GDP* | | | |
| Private consumption | +0.6 | +0.5 | +0.6 | +0.7 |
| Government consumption | +0.1 | +0.1 | +0.1 | +0.1 |
| Gross fixed capital formation | −2.0 | −0.7 | +0.4 | +0.6 |
| Domestic demand (excluding changes in inventories) | −1.3 | −0.1 | +1.0 | +1.3 |
| Net exports | −1.5 | +2.2 | +1.2 | +1.0 |
| Changes in inventories (including statistical discrepancy) | −0.9 | −0.2 | −0.1 | +0.0 |
| **Prices** | *Annual change in %* | | | |
| Harmonised Index of Consumer Prices (HICP) | +0.4 | +1.7 | +2.2 | +1.8 |
| Private consumption expenditure (PCE) deflator | −0.7 | +1.7 | +2.1 | +1.9 |
| GDP deflator | +1.0 | +1.6 | +1.8 | +1.6 |
| Unit labor costs in the total economy | +4.9 | +0.1 | +1.1 | +0.7 |
| Compensation per employee (at current prices) | +1.9 | +1.1 | +2.3 | +2.2 |
| Productivity (whole economy) | −2.8 | +1.0 | +1.2 | +1.5 |
| Compensation per employee (real) | +2.6 | −0.5 | +0.2 | +0.3 |
| Import prices | −1.3 | +3.2 | +2.4 | +1.6 |
| Export prices | −1.5 | +1.4 | +2.7 | +1.8 |
| Terms of trade | −0.2 | −1.8 | +0.3 | +0.1 |
| **Income and savings** | | | | |
| Real disposable household income | −0.1 | +0.7 | +0.7 | +1.4 |
| | *% of nominal disposable household income* | | | |
| Saving ratio | 11.0 | 10.9 | 10.5 | 10.5 |
| **Labor market** | *Annual change in %* | | | |
| Payroll employment | −1.0 | +0.8 | +1.1 | +0.9 |
| | *% of labor supply* | | | |
| Unemployment rate (Eurostat definition) | 4.8 | 4.5 | 4.4 | 4.3 |
| **Budget** | *% of nominal GDP* | | | |
| Budget balance (Maastricht definition) | −3.5 | −4.1 | −3.0 | −2.6 |
| Government debt | 67.5 | 69.6 | 70.4 | 70.6 |

*Source: 2009: Eurostat. Statistics Austria; 2010 to 2012: OeNB December 2010 outlook.*

[1] *The outlook was drawn up on the basis of seasonally adjusted and working-day adjusted national accounts data. Therefore. the historical values for 2009 may deviate from the nonadjusted data released by Statistics Austria.*

## 2 Technical Assumptions

This forecast for Austria is the contribution of the OeNB to the December 2010 Eurosystem staff macroeconomic projections. The forecasting horizon extends from the fourth quarter of 2010 to the fourth quarter of 2012. All assumptions with respect to how the global economy will develop, as well as the technical assumptions relating to interest rates, exchange rates and crude oil prices, take developments up to and including November 15, 2010, into account. The forecast was prepared on

the basis of the OeNB's quarterly macroeconomic model, using seasonally and working day-adjusted national accounts data computed by the Austrian Institute for Economic Research (WIFO), which were fully available up to the second quarter of 2010, as the key source of data. The data for the third quarter are based on GDP flash estimates, which cover only part of the aggregates in the national accounts, however. The short-term interest rates used for the forecasting horizon are based on market expectations for the three-month EURIBOR, namely 0.8% in 2010, 1.4% in 2011 and 1.7% in 2012. Long-term interest rates reflect market expectations for ten-year government bonds, and have been set at 3.2% (2010), 3.4% (2011) and 3.7% (2012). The exchange rate of the euro vis-à-vis the U.S. dollar is assumed to remain at USD 1.39. The projected trend in crude oil prices is based on futures prices. The oil price assumed for 2010 is USD 79.5 per barrel of Brent, while those for 2011 and 2012 are set at USD 88.6 and USD 90.7, respectively. The prices of commodities excluding energy are also based on futures prices over the forecasting horizon.

## 3 Diverging Growth Rates Characterize Global Economic Outlook

Thanks both to huge monetary and fiscal policy support measures and to robust business activity in emerging Asia, the world economy's recovery from the global economic and financial crisis since mid-2009 has been faster than expected. The economic upswing across the globe will continue over the forecasting horizon, although the dynamic growth recorded in past quarters will no longer be equaled. The downturn in the inventory cycle, the expiry of fiscal policy stimuli and the simultaneous intensification of endeavors to consolidate the budgets will cause the pace of the upturn in worldwide economic activity and trade to decline in the next few months. Global economic growth will fall from 4.7% in 2010 to some 4% per annum in both 2011 and 2012, while the rate of increase in global trade will drop from 11½% to around 7½%.

The rather favorable outlook for the global economy should not, however, cause the fact to be overlooked that, given the heterogeneity of developments across the globe, the risks involved remain high. The pace of recovery varies, a fact that holds true both for global economic activity in general and for Europe in particular. At the global level, the dynamism of emerging economies in Asia and Latin America stands in contrast to the many impediments to growth in the industrialized countries. Whereas emerging countries like China tend to face the risk of a possible overheating of the economy, growth in many industrialized countries is curbed by problems on financial and real estate markets, by high government debt and by labor market tensions. In Europe, some countries are feeling the impact of the debt crisis and suffer from inadequate competitiveness, while other countries – with Germany topping the list – are enjoying surprisingly high growth rates and robust developments in the labor market. The diversity of economic developments across the globe is also reflected in imbalances on global markets for goods and foreign exchange, without any sign of these imbalances being dismantled within the period under review.

After the strong recovery recorded in the first half of 2010, the outlook for the *U.S. economy* has recently deterio-

rated again. The necessity for households to save more, losses in asset prices and ongoing difficulties in the U.S. real estate market are proving to be a sustained burden on private consumption. The savings ratio has risen from around 2% in 2007 to currently just under 6%, and is likely to remain at that level across the whole forecasting horizon. Yet another exacerbating factor is the tight situation on the job market. The unemployment rate will reach just under 10% in 2010, a level last recorded at the beginning of the 1980s. Moreover, the now more than 1½ years of persistently high unemployment rates, the above-average proportion of long-term unemployed and the reduced mobility of labor as a consequence of lower real estate prices are all giving rise to vocal fears about a long-term increase in structural unemployment. It was against this background that the U.S. administration adopted a new fiscal stimulus package in the second half of 2010, while the Federal Reserve System (Fed) decided to prolong its purchases of securities (to pursue what is known as "quantitative easing two"). Despite these economic policy stimuli, the annual growth rate in the U.S. economy is likely in the foreseeable future to remain below the long-term average and will probably amount to around 2½% in the period from 2010 to 2012.

In the course of the unprecedented upswing recorded over the past few years, the People's Republic of *China* has replaced not only Japan as the world's second largest economy, but also Germany as the largest exporting country. The dynamism of the Chinese economy was left virtually untouched by the financial crisis. After 9% in 2009, economic growth will again pick up to 10% in 2010. Rising real estate prices, high demand for credit and an investment-to-GDP ratio of almost 50% are indications of a bubble forming on the markets for real estate and capital goods. The government is endeavoring to counter a possible overheating of the economy. To this end, it put in place, inter alia, measures to curb credit growth and has allowed the renminbi yuan to appreciate vis-à-vis the U.S. dollar, but the dampening effect of these measures on growth in China will only be limited. Real GDP will increase by 9% per annum in 2011 and 2012, and the growth expected for India, the second large emerging economy in Asia, is expected to be only moderately less dynamic. The Indian economy is oriented to the domestic market far more strongly than China, so that net exports do not contribute sizeably to growth. With growth rates of 8%, India will continue to be a promising, rapidly expanding market in the period under review.

At the beginning of the year, *Japan* was able to benefit particularly markedly from dynamic demand in neighboring Asian countries. In view of the declining momentum of global trade and the expiry of economic stimulus packages, the growth of the Japanese economy will slow down perceptibly towards the end of 2010. Moreover, the fact that the external value of the yen, which has continued to rise despite the foreign exchange interventions undertaken by the Japanese central bank, will be a burden for the export industry in forthcoming quarters. Public sector debt has increased further as a result of the financial crisis and now already amounts to around 200% of GDP. However, households' high propensity to save has thus far prevented this from having any impact on credit assessments by financial markets. Economic growth will amount to 3½% in 2010 and subsequently decline to 1½% in both 2011 and 2012.

Table 2

## Underlying Global Economic Conditions

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Gross domestic product** | *Annual change in % (real)* | | | |
| World GDP growth outside the euro area | −0.2 | +5.3 | +4.3 | +4.7 |
| U.S.A. | −2.6 | +2.7 | +2.4 | +2.7 |
| Japan | −5.3 | +3.6 | +1.3 | +1.7 |
| Asia excluding Japan | +5.6 | +9.1 | +7.2 | +7.7 |
| Latin America | −1.7 | +5.9 | +3.7 | +3.9 |
| United Kingdom | −5.0 | +1.7 | +1.8 | +1.9 |
| New EU Member States[1] | −2.9 | +1.7 | +2.9 | +3.9 |
| Switzerland | −1.9 | +2.6 | +1.9 | +2.3 |
| Euro area[2] | −4.1 | +1.6 to +1.8 | +0.7 to +2.1 | +0.6 to +2.8 |
| **World trade (imports of goods and services)** | | | | |
| World economy | −11.2 | +11.7 | +7.2 | +7.5 |
| Non-euro area countries | −11.1 | +13.6 | +8.2 | +8.3 |
| Real growth of euro area export markets | −11.6 | +11.3 | +7.2 | +7.2 |
| Real growth of Austrian export markets | −11.9 | +10.9 | +6.7 | +6.4 |
| **Prices** | | | | |
| Oil price in USD/barrel (Brent) | 61.9 | 79.5 | 88.6 | 90.7 |
| Three-month interest rate in % | 1.2 | 0.8 | 1.4 | 1.7 |
| Long-term interest rate in % | 3.9 | 3.2 | 3.4 | 3.7 |
| USD/EUR exchange rate | 1.39 | 1.33 | 1.39 | 1.39 |
| Nominal effective exchange rate (euro area index) | 111.70 | 105.02 | 105.88 | 105.88 |

*Source: Eurosystem.*

[1] *Member States that joined the EU in 2004 and 2007 and have not yet introduced the euro: Czech Republic, Hungary, Poland, Romania, Bulgaria, Estonia, Latvia, Lithuania.*

[2] *2010 to 2012: Results of the Eurosystem's December 2010 projections. The ECB presents the result in ranges based upon average differences between actual outcomes and previous projections.*

As holds true for the global economy, the picture presented by economic developments in *Europe* is likewise highly disparate. In northern countries with a strong orientation towards exports, such as Finland, Sweden, the Netherlands and Germany, economic recovery is making rapid progress. Growth in the United Kingdom and France, by contrast, will be only modest on account of both the fiscal consolidation efforts and subdued domestic demand. The economic upswing expected for Italy will be even weaker, given the country's persistent lack of competitiveness. In addition, not only a number of countries in the southern periphery, such as Greece, Portugal and Spain, but also Ireland are deeply embroiled in the debt crisis and suffer under the consequences of the bursting of real estate bubbles.

The positive development in Europe that is most significant has indisputably taken place in *Germany*. Although the above-average weight of the intermediate and capital goods sectors there caused Austria's most important trading partner to be hit hard by the crisis in global trade, that weight also worked to Germany's benefit during the recovery. In the second quarter of 2010, for instance, the growth rate in Germany reached a historic (quarter-on-quarter) high of 2.3%. In line with the declining momentum of global trade, the third quarter of 2010 saw economic growth slow down (to 0.7%) as expected, but the German economy will continue to expand at above-average rates in both 2011 and 2012, namely by around 2% per annum. The output gap will have been closed by the turn of the year 2011/12 – far faster than had still been

expected in the preceding forecast – with Germany profiting from the unexpectedly robust development of its labor market. The labor market reforms of past years, the possibilities offered by short-time working arrangements and the impact of the lack of skilled labor during the last boom period all contributed to firms laying off fewer staff than would have been expected in a slump as deep as the current one. The hoarding of labor played a major role in the upkeep of production capacities and enabled German companies to respond rapidly and in a timely manner to the rebound in world trade. Germany had moreover generated a current account surplus in the last few years and, even in the crisis, its public sector debt rose only moderately. There was no bubble in the real estate sector. Nor is it likely over the medium term that Germany will have lower growth rates as a consequence of the crisis because there is no need for any sectoral reallocations that have in the past often had longer-lasting dampening effects on growth in the wake of real estate and financial crises.

In contrast to the situation not only in Germany, but also in Sweden, Finland, the Netherlands and Austria, the consequences of the financial crisis will continue to be felt for a longer period in the countries in the *southern periphery,* as well as in Ireland. The painful process of dismantling macroeconomic imbalances, the restoration of price competitiveness and sectoral reallocation will dampen growth prospects throughout the period under review. The magnitude of the sectoral reallocations necessary can be seen from current developments in *Ireland.* Many years of boom activity in the real estate market had pushed the share of real estate investment in real GDP up to 14% in 2006. After the real estate

bubble had burst, that share dropped to 4½% at the end of 2009 and will decline further to around 2% by 2012. Last but not least, real estate loan defaults were such a severe drain on the financial sector that it took government support measures and international assistance to prevent a financial meltdown. The government debt-to-GDP ratio rose from 25% in 2007 to just under 100% in 2010. Similar developments were observed in Greece and Portugal – although they differed in magnitude – as well as, to a lesser degree, in Spain. All in all, the euro area as whole will start out on a path of moderate growth in the period under review.

This characteristically heterogeneous pattern is also to be found in *Central, Eastern and Southeastern Europe* (CESEE), countries that are of major importance to Austria. These countries were affected by the crisis to differing degrees, depending on the importance of the export industry, the proportion of foreign currency loans, the size of the current account deficit and the level of government debt. While some countries, such as Hungary, Ukraine and Romania, were dependent on international rescue programs of the IMF and the EU, Poland was the only country in the EU to record positive growth rates in 2009. All in all, the in some cases high macroeconomic imbalances in this region have led to significantly sharper economic downturns than in the emerging countries of Asia and Latin America. On average, the recovery expected for the Member States that joined the EU in 2004 and 2007 will only be modest. Growth there will gradually pick up from 2% to 4% in the period from 2010 to 2012. While Poland will enjoy persistently strong economic growth across the whole forecasting horizon and the Czech Republic will

be able to recover from the economic crisis relatively quickly, growth in both Hungary and Romania will remain clearly below average in 2010 and will accelerate more noticeably only towards the end of the period under review.

## 4 Austria: Exports Return to Pre-Crisis Levels in the End of 2011

The global economic and financial crisis affected Austrian industry, above all, through a marked slump in exports that began in the second half of 2008. In 2009 alone, goods exports decreased by 20% in nominal terms, with a particularly sharp drop of just under 25% being recorded in exports of machinery and transport equipment. The recovery in global trade that commenced in the second half of 2009 triggered a revitalization of Austrian export activity. The steep downturn in the first two quarters caused real exports of goods and services to decline by 11.9% in 2009 as a whole. The recovery of exports accelerated in the course of 2010, with a real quarter-on-quarter increase of 5.2%

being recorded in the second quarter of the year. Although exports expanded somewhat less strongly in the third quarter of 2010, the growth rates remain above average. For the fourth quarter of 2010, the results of the OeNB's export indicator point towards a fluctuation around the levels of average growth. In 2010 as a whole, exports are expected to increase by 10.4% in real terms.

Austria's export industry has thus recovered from the direct effects of the crisis, but growth rates as high as those currently recorded in Germany cannot be expected in Austrian foreign trade. This is due to differences in both the regional and the sectoral structure of the two countries' exports. German companies play a dominant role on global markets in the mechanical engineering sector, which is highly sensitive to cyclical fluctuations, and in the field of road vehicles. Moreover, the dynamically growing markets in Asia are of greater significance for German exporters than for their Austrian competitors. German exporters are thus less dependent than their Austrian counter-

Table 3

### Growth and Price Developments in Austria's Foreign Trade

|  | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| **Exports** | *Annual change in %* | | | |
| Competitor prices in Austria's export markets | −3.6 | +4.8 | +1.9 | +1.7 |
| Export deflator | −1.5 | +1.4 | +2.7 | +1.8 |
| Changes in price competitiveness | −2.1 | +3.4 | −0.8 | −0.1 |
| Import demand in Austria's export markets (real) | −11.9 | +10.9 | +6.7 | +6.4 |
| Austrian exports of goods and services (real) | −13.6 | +10.4 | +7.3 | +6.9 |
| Market share | −1.8 | −0.5 | +0.6 | +0.6 |
| **Imports** | | | | |
| International competitor prices in the Austrian market | −3.3 | +3.7 | +2.1 | +1.7 |
| Import deflator | −1.3 | +3.2 | +2.4 | +1.6 |
| Austrian imports of goods and services (real) | −12.5 | +6.8 | +6.0 | +6.2 |
| **Terms of trade** | −0.2 | −1.8 | +0.3 | +0.1 |
|  | *Percentage points of real GDP* | | | |
| **Contribution of net exports to GDP growth** | −1.5 | +2.2 | +1.2 | +1.0 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook, Eurosystem.*

Table 4

### Austria's Current Account

|  | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
|  | *% of nominal GDP* | | | |
| **Balance of trade** | 3.9 | 3.9 | 4.4 | 5.4 |
| Balance on goods | −0.9 | −1.1 | −0.7 | −0.2 |
| Balance on services | 4.7 | 4.9 | 5.2 | 5.6 |
| **Balance on income** | −0.3 | −0.5 | −0.4 | −0.3 |
| Balance on current transfers | −0.6 | −0.8 | −0.6 | −0.6 |
| Current account | 2.9 | 2.5 | 3.4 | 4.5 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

parts on the only sluggish process of recovery in both industrialized economies and the CESEE countries.

A slightly less dynamic development of exports must be expected for 2011 and 2012. The already visible slowdown in the recovery of global business activity will have an impact on external trade; Austrian exports will rise by some 7% in both of the forthcoming years.

Austria's current account has improved steadily since the mid-1990s. 2008 saw a record surplus of 4.9% of GDP. Although plunging demand for exports during the crisis led to a deterioration of the balance on current account, it remained in positive territory and will again more or less reach its pre-crisis level by 2012.

## 5 Sluggish Domestic Demand
### 5.1 Divergent Developments in Investment Activity

The (export-oriented) manufacturing industry was hit particularly hard by the crisis. Output in this sector (NACE C) declined by 12.6% in 2009. The

Table 5

### Investment Activity in Austria

|  | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
|  | *Annual change in %* | | | |
| Total gross fixed capital formation (real) | −9.1 | −3.3 | +2.1 | +3.0 |
| *of which: Investment in plant and equipment (real)* | −10.8 | −3.5 | +3.4 | +4.6 |
| *Residential construction investment (real)* | −4.1 | −2.8 | +0.5 | +1.6 |
| *Nonresidential construction investment and other investment* | −5.0 | −3.0 | +1.4 | +2.0 |
| *Government investment (real)* | −0.1 | −1.0 | −1.5 | −1.5 |
| *Private investment (real)* | −9.6 | −3.5 | +2.3 | +3.3 |
|  | *Contribution to total gross fixed capital formation growth in percentage points* | | | |
| Investment in plant and equipment (real) | −4.4 | −1.4 | +1.4 | +1.9 |
| Residential construction investment (real) | −0.8 | −0.6 | +0.1 | +0.3 |
| Nonresidential construction investment and other investment | −1.9 | −1.2 | +0.6 | +0.8 |
| Government investment (real) | +0.0 | −0.1 | −0.1 | −0.1 |
| Private investment (real) | −9.1 | −3.3 | +2.2 | +3.1 |
|  | *Contribution to real GDP growth in percentage points* | | | |
| Inventory changes (real) | −0.8 | +0.6 | +0.1 | +0.0 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

resulting excess capacity, together with uncertain prospects and tighter financing conditions, caused companies to cut back their investment activity considerably. As from mid-2008, *investment in plant and equipment* declined for seven successive quarters, by 15% in all. On account of booming exports, the second quarter of 2010 again saw a first, albeit weak, increase in such investment. In view of stabilizing sales expectations, companies are likely to increase their capacity-enhancing investment in the next few quarters.

The prospects for construction investment, by contrast, are less favorable. Data on the building permits issued allows a stabilization of *residential construction* at a low level to be expected for 2011, but clear signs of a recovery in this sector are still missing. The *civil engineering* sector is profiting from ongoing public sector infrastructure investment, but the relatively stable volume thereof does not give rise to any additional growth stimuli. This is exacerbated by the fact that the financial crisis has left local authorities in a highly precarious financial situation, so

that they are reducing their investment activity.

Total *gross fixed capital formation* again rose on a quarterly basis in the third quarter, for the first time since 2009. Viewed over the entire year, however, capital expenditure will continue to decline. A return to positive annual growth rates can only be expected for 2011.

### 5.2 Consolidation Package Curbs Consumption

As a consequence of high wage settlements, the income tax reform, very low inflation and, last but not least, the car-scrapping premium, consumer spending remained relatively stable despite falling employment levels and rose by 1.1% in real terms in the crisis year of 2009. The sustained growth of consumption was also facilitated by a decline in the savings ratio, which fell from 11.7% in 2008 to 11.0% in 2009. These supporting factors disappeared in the course of 2010, so that (at +1.0%) the increase in consumer spending remained modest despite the recovery in business activity.

Table 6

### Determinants of Nominal Household Income in Austria

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Employees | −1.0 | +0.8 | +1.1 | +0.9 |
| Wages per employee | +1.9 | +1.1 | +2.3 | +2.2 |
| Compensation of employees | +1.0 | +1.9 | +3.4 | +3.1 |
| Property income | −29.0 | −4.2 | +5.2 | +6.6 |
| Mixed income and operating surplus, net | −2.3 | +1.5 | +3.3 | +4.1 |
| | *Contribution to disposable household income growth in percentage points* | | | |
| Compensation of employees | +0.8 | +1.6 | +2.8 | +2.6 |
| Property income | −3.9 | −0.4 | +0.5 | +0.6 |
| Mixed income and operating surplus, net | −0.5 | +0.3 | +0.6 | +0.8 |
| Net transfers minus direct taxes[1] | +2.9 | +0.8 | −1.1 | −0.7 |
| Disposable household income (nominal) | −0.8 | +2.3 | +2.8 | +3.3 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

[1] *Negative values indicate an increase in (negative) net transfers minus direct taxes, positive values indicate a decrease.*

Table 7

**Private Consumption in Austria**

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Disposable household income (nominal) | −0.8 | +2.3 | +2.8 | +3.3 |
| Private consumption expenditure (PCE) deflator | −0.7 | +1.7 | +2.1 | +1.9 |
| Disposable household income (real) | −0.1 | +0.7 | +0.7 | +1.4 |
| Private consumption (real) | +1.1 | +1.0 | +1.0 | +1.3 |
| | *% of nominal disposable household income* | | | |
| Saving ratio | 11.0 | 10.9 | 10.5 | 10.5 |

Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.

Households' various kinds of income (compensation of employees, investment income, income from self-employment and operating surpluses) will again rise more markedly as from 2011, but the fiscal consolidation measures that will take effect in that year (increases in petroleum and tobacco tax, a new tax on airline tickets and cuts in social transfers) will impose a burden on their real disposable income and, later, also on consumer spending. All in all, these measures will reduce consumption growth in both 2011 and 2012 by ¼ to ½ of a percentage point. It is assumed that households will compensate for part of the increased burden by cutting back their savings ratios. The increase in consumer spending in 2011 will be identical to that in 2010, namely 1%, with a slight improvement to 1.3% being expected for 2012.

Box 1

**Impact of Fiscal Consolidation**

*Austria's fiscal position has deteriorated since 2008 as a result of both the effects of automatic stabilizers and the economic stimulus packages. Safeguarding the sustainability of public finances now necessitates extensive consolidation measures.*

*In spring 2010, the Austrian government decided to lower the spending caps in the federal budget in the period from 2011 to 2014 and confirmed previously announced plans for a slight reduction of public sector jobs. This was already taken into account in the OeNB's forecast of June 2010, in which a very low growth of discretionary expenditure and staffing costs had been taken as given.*

*In October 2010, the federal government announced a tax reform package that included the following measures: increases in various excise duties (petroleum tax, tobacco tax, etc.), the introduction of a bank tax (together with the elimination of taxes on bank loan contracts), higher pension insurance contributions for farmers and self-employed, and the elimination of income tax exemptions and loopholes (taxation of private foundations, realized gains arising from sales of securities, etc.). At the same time, the government also decided to cut various social transfers.[1]*

[1] *Other spending cuts are also included in the OeNB's forecast, but they are not considered to be fiscal adjustment measures per se, as they are primarily the result of more favorable macroeconomic conditions. This holds true for, in particular, lower interest payments.*

*The table below shows the volume of the individual measures and their expected impact on GDP growth, the HICP and the general government budget balance.[2] In the OeNB's view, the fiscal consolidation package will reduce economic growth by 0.3 percentage points in 2011, and by 0.2 percentage points in 2012; at the same time, the increase in excise duties will raise the inflation rate expected for 2011 and 2012 by 0.4 and 0.1 percentage points, respectively. The measures will improve the general government budget balance by 0.6 percentage points in 2011 and by 0.9 percentage points in 2012.[3]*

### Impact of the Consolidation Package

| | Volume | | GDP | | HICP | | Budget balance | |
|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| | *% of GDP* | | *Annual change in %* | | | | *% of GDP* | |
| Scenario without any consolidation | | | +2.4 | +2.5 | +1.8 | +1.7 | −3.6 | −3.5 |
| Consolidation | 0.9 | 1.3 | −0.3 | −0.2 | +0.4 | +0.1 | 0.6 | 0.9 |
| Changes in taxation | 0.4 | 0.6 | −0.1 | −0.1 | +0.4 | +0.1 | 0.3 | 0.4 |
| Petroleum tax[1] | 0.2 | 0.2 | | | | | | |
| Other excise duties[1] | 0.1 | 0.2 | | | | | | |
| Bank tax, tax on loan contracts | 0.1 | 0.1 | | | | | | |
| Cuts in social transfers | 0.2 | 0.2 | −0.1 | +0.0 | +0.0 | +0.0 | 0.1 | 0.1 |
| Transfers for families | 0.1 | 0.1 | | | | | | |
| Discretionary spending and staffing costs | 0.3 | 0.6 | −0.1 | −0.1 | +0.0 | +0.0 | 0.2 | 0.3 |
| OeNB forecast (including consolidation) | | | +2.1 | +2.3 | +2.2 | +1.8 | −3.0 | −2.6 |

*Source: OeNB, Ministry of Finance.*

[1] *Including indirect effects on revenue from value added tax.*

[2] *The column Volume indicates the revenue increase and/or spending cut that would result if companies and households do not change their behavior. The column Budget balance, by contrast, gives the ex post effect of the respective measure on the general government budget balance. Through the operation of the automatic stabilizers, the negative growth effects of fiscal consolidation measures reduce the tax revenue, and thus also the impact on the fiscal balance. In the case of cuts to the public sector wage bill and/or pension payments, account needs to be taken of the fact that both items entail payments of social security contributions and wage tax. The improvement in the budget balance is thus smaller than the spending cut even if possible effects on the real economy are left unconsidered.*

[3] *These estimates take account of only short-term demand effects, without any consideration of potential positive medium to long-term effects on confidence, which may – acting through lower interest payments or better expectations – have a favorable impact on growth over the medium to long term.*

### 5.3 Crisis Has No Lasting Impact on Labor Market

Given the scale of the slump in business activity, the impact of the economic and financial crisis on the Austrian labor market has been relatively limited. The number of unemployed rose by just under 50,000 in 2009, pushing the *unemployment rate* (Eurostat definition) up from 3.8% in the preceding year to 4.8%. The effects of the crisis were mitigated in part by a decline in the number of hours worked per employee. In this respect, exceptional provisions, such as short-time work, played an important role in limiting the increase in unemployment. Moreover, the number of individuals undergoing training – persons not deemed to be unemployed – rose by 27,000 in 2009.

The recovery in business activity in the course of 2010 has led to a significant expansion of employment. Most of the growth in employment was accounted for by leased workers (the year-on-year increase in the field of administrative and support services – NACE N – amounted to 26,000 in September 2010) and by the health and social services sectors (NACE Q, where

Table 8

**Labor Market Developments in Austria**

| | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Total employment | −0.9 | +0.9 | +0.9 | +0.8 |
| *of which: Payroll employment* | −1.0 | +0.8 | +1.1 | +0.9 |
| *Self-employment* | −0.5 | +1.4 | +0.1 | +0.6 |
| *Public sector employment* | +0.2 | +0.6 | −0.1 | −0.1 |
| Registered unemployment | +16.4 | −3.1 | −2.1 | −0.5 |
| Labor supply | +0.1 | +0.6 | +0.7 | +0.7 |
| | *% of labor supply* | | | |
| Unemployment rate (Eurostat definition) | 4.8 | 4.5 | 4.4 | 4.3 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

the increase in the number of employed was 22,000). Despite a considerable increase in output (+12.3%, year on year, in August 2010), the manufacturing industry is recruiting hardly any new employees; increased demand for labor there is covered primarily through leased workers. In 2010 as a whole, the number of employed is likely to rise by 35,000 (or 0.9%, year on year), with similar growth rates also being expected for the two subsequent years (0.9% in 2011 and 0.8% in 2012).

Traditionally, there is a highly cyclical pattern to the expansion of the supply of labor. In 2009, for instance, it rose by only 4,000 persons, after having increased by, on average, 35,000 persons per annum between the years 2000 and 2008. The improved labor market prospects will induce some 30,000 persons to enter the Austrian labor market each year from 2010 to 2012. The influx of additional workers from abroad once residents of countries that joined the EU in 2004 gain full access to the labor market in May 2011 is likely to remain small, since free movement is currently already largely given for a number of professions. Demographic developments will have a marginally positive impact on the supply of labor in 2010 and 2011. The effects of

the 2003 pension reform have been tempered significantly by what is known as the "heavy-labor pension rule," an exemption that grants workers with above-average years of contributory service early retirement.

## 6 Fiscal Consolidation Package and Food Prices Drive Inflation

The crisis year 2009 saw inflation slow down significantly, with the HICP rising by only 0.4%. In the course of the current year to date, the rate of inflation has risen steadily to stand at 1.9% in October. That increase was due, above all, to rising energy and food prices. The upward movement of food prices will continue to pick up over the forecasting horizon. This trend will be fueled by, in particular, processed food prices, which are based on those prevailing on global markets for agricultural commodities. Market expectations indicate that international market prices of agricultural raw materials will rise further in the period from September 2010 to the beginning of 2011, before leveling off by the end of the latter year. In the next few months, the base effect emanating from the earlier sharp decline in food price inflation will moreover also contribute to upward movement of prices in the related sector.

Chart 2

## HICP Inflation and Contributions from Subcomponents

*Contributions to growth in percentage points*  *Latest observation: October 2010*



Forecast
2010: 1.7 %
2011: 2.2 %

Food (weighting: 16.1%)  Nonenergy industrial goods (weighting: 28.7%)
Services (weighting: 47.4%)  Energy (weighting: 7.8%)
HICP (annual change in %)  Core inflation (annual change in %)
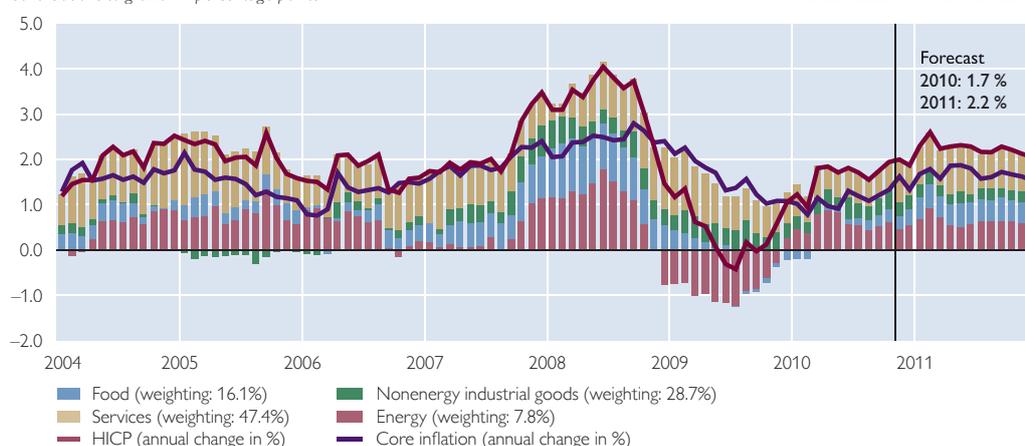
*Source: OeNB, Statistics Austria.*

The measures announced within the scope of the fiscal consolidation package will raise HICP inflation by 0.4 percentage points in 2011, with the increases in petroleum and tobacco tax accounting for 0.26 and 0.13 percentage points, respectively, and the tax on airline tickets for 0.01 percentage points.

Annual HICP inflation in 2010 as a whole will amount to 1.7%, while the corresponding rate for 2011 will be in the order of 2.2%. Core inflation (HICP inflation excluding energy and unprocessed food) will rise as well (from 1.1% in 2010 to 1.6% in 2011), but it will remain clearly below HICP inflation. The increase in core inflation

Table 9

### Selected Price and Cost Indicators for Austria

|  | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|
|  | *Annual change in %* | | | |
| Harmonised Index of Consumer Prices (HICP) | +0.4 | +1.7 | +2.2 | +1.8 |
| HICP energy | −10.4 | +7.4 | +8.1 | +3.0 |
| HICP excluding energy | +1.5 | +1.2 | +1.7 | +1.6 |
| Private consumption expenditure (PCE) deflator | −0.7 | +1.7 | +2.1 | +1.9 |
| Investment deflator | +2.2 | +3.0 | +1.5 | +1.8 |
| Import deflator | −1.3 | +3.2 | +2.4 | +1.6 |
| Export deflator | −1.5 | +1.4 | +2.7 | +1.8 |
| Terms of trade | −0.2 | −1.8 | +0.3 | +0.1 |
| GDP at factor cost deflator | +1.3 | +1.5 | +1.7 | +1.8 |
| Unit labor costs | +4.9 | +0.1 | +1.1 | +0.7 |
| Compensation per employee | +1.9 | +1.1 | +2.3 | +2.2 |
| Labor productivity | −2.8 | +1.0 | +1.2 | +1.5 |
| Collectively agreed wage settlements | +3.4 | +1.6 | +2.1 | +2.2 |
| Profit margins[1] | −3.6 | +1.5 | +0.6 | +1.1 |

*Source: 2009: Eurostat, Statistics Austria; 2010 to 2012: OeNB December 2010 outlook.*

[1] *GDP deflator divided by unit labor costs.*

is due to the development of prices in the categories of processed food and services.

Wage developments are not expected to give rise to any noticeable price pressures over the forecasting horizon. The currently available results of the autumn round of wage negotiations indicate that negotiated wages, viewed in terms of the overall economy, are likely to rise by 2.1%. Reductions of overtime, the elimination of flexible wage components and inter-industry shifts caused compensation of employees to increase perceptibly less than the collectively agreed wages in 2009 and 2010, leading to a negative wage drift of 1.5% and 0.5%, respectively. For 2011, the improvement in business activity allows a modest positive wage drift to be expected. In the period under review, companies will be better able again to push through higher prices; together with a favorable development of labor productivity, this will lead to rising profit margins.

## 7 Downside Risks to Growth Outlook Emanate from Abroad

On the *domestic* side, the risks with respect to *economic growth* are slightly on the upside. In line with Eurosystem rules, this projection is based on the assumption that there will not be any change in policy. This means that only such fiscal policy measures may be considered in the forecast that are already known in sufficient detail at the time it is compiled. In October 2010, the Austrian government announced a fiscal consolidation package (see box 1) that has not yet run through the required process of legislation. Should the announced fiscal consolidation measures be watered down, their inherent effect of curbing growth over the short term would be reduced as well. With respect to domestic de-

mand, a more rapid recovery of, in particular, construction activity cannot be ruled out against the background of rising real estate prices.

The *external* risks surrounding the outlook for economic growth are significantly higher and tilted mainly towards the downside. While it is by no means impossible that the recovery in worldwide economic activity will be stronger than expected in the short term, downside risks predominate over the medium term. The consequences of the debt crisis and the great need across the globe to consolidate public finances could limit economic growth more than expected. Although global imbalances have declined slightly during the crisis, they have not as yet disappeared. In this respect, a risk often discussed is that of economic conflicts emerging that could trigger currency crises and lead to the erection of barriers to international trade. In addition, there are fears of an overheating of the economy in dynamically growing countries like China. Last but not least, further increases in commodity prices constitute a risk for cyclical developments. A renewed surge in commodity prices, in particular in the food sector, is the main upside risk for *inflation*.

## 8 Revisions to Forecast Driven by Better External Environment and Fiscal Consolidation

The underlying assumptions on the growth of global trade have been revised upward since the OeNB's June 2010 economic outlook. Growth expectations with respect to Austria's export markets for 2011 have been revised upwards by 2 percentage points. Crude oil futures prices have risen by just under USD 5, while the exchange rate of the euro is expected to appreciate both against the U.S. dollar and in nominal effective terms. Long-term

Table 10

**Change in the External Economic Conditions since the OeNB June 2010 Outlook**

| | December 2010 | | | June 2010 | | | Difference | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2010 | 2011 | 2012 | 2010 | 2011 | 2012 |
| *Annual change in %* | | | | | | | | | |
| Growth of Austria's export markets | +10.9 | +6.7 | +6.4 | +7.4 | +4.7 | +6.0 | +3.5 | +2.0 | +0.4 |
| Competitor prices in Austria's export markets | +4.8 | +1.9 | +1.7 | +3.9 | +2.0 | +1.4 | +0.9 | −0.1 | +0.3 |
| Competitor prices in Austria's import markets | +3.7 | +2.1 | +1.7 | +3.1 | +1.8 | +1.3 | +0.6 | +0.3 | +0.4 |
| *USD per barrel (Brent)* | | | | | | | | | |
| Oil price | 79.5 | 88.6 | 90.7 | 79.5 | 83.7 | 86.3 | +0.0 | +4.9 | +4.4 |
| *Annual change in %* | | | | | | | | | |
| Nominal effective exchange rate (exports) | +2.2 | −0.1 | +0.0 | +2.3 | +0.5 | +0.0 | −0.1 | −0.6 | +0.0 |
| Nominal effective exchange rate (imports) | +1.5 | +0.1 | +0.0 | +1.4 | +0.2 | +0.0 | +0.1 | −0.1 | +0.0 |
| *%* | | | | | | | | | |
| Three-month interest rate | 0.8 | 1.4 | 1.7 | 0.8 | 1.1 | 1.7 | +0.0 | +0.3 | +0.0 |
| Long-term interest rate | 3.2 | 3.4 | 3.7 | 3.4 | 3.8 | 4.2 | −0.2 | −0.4 | −0.5 |
| *Annual change in %* | | | | | | | | | |
| U.S. GDP (real) | +2.7 | +2.4 | +2.7 | +3.1 | +2.2 | +2.8 | −0.4 | +0.2 | −0.1 |
| *USD/EUR* | | | | | | | | | |
| USD/EUR exchange rate | 1.33 | 1.39 | 1.39 | 1.29 | 1.26 | 1.26 | +0.04 | +0.13 | +0.13 |

*Source: Eurosystem.*

interest rates are expected to be lower in the years ahead, while short-term rates are expected to be higher. The yield curve is thus likely to become flatter than anticipated as recently as in June 2010.

The effects of the new external assumptions were simulated using the OeNB's macroeconomic model. Table 11 provides detailed reasons for revising the outlook. Apart from the impact of changed external assumptions, they are attributable to the impact of new data and a residual. The influence of new data includes the effects of the revisions of both the historical data already available at the time of the previous economic outlook (i.e. data up to the first quarter of 2010) and the forecasting errors of the previous outlook for the periods now published for the first time (i.e. data for the second and

third quarters of 2010). The item Other includes new expert assessments regarding the development of domestic variables, such as government consumption or wage settlements, as well as any changes to the model.

The reason why the economic growth forecast for 2010 is higher than that given in the June 2010 outlook is to be found, first and foremost, in the fact that growth in the second and third quarters of 2010 was stronger than expected, although only slightly so in the second quarter. That higher quarterly growth increases the carry-over effect, and thus also the figure forecast for 2011 by 0.3 percentage points. The more favorable external assumptions raise projected GDP growth by an additional 0.3 percentage points in 2011 and by a further 0.4 percentage points in 2012. The fiscal consolidation mea-

Table 11

## Breakdown of Forecast Revisions

| | GDP | | | HICP | | |
|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2010 | 2011 | 2012 |
| | *Annual change in %* | | | | | |
| December 2010 outlook | +1.9 | +2.1 | +2.3 | +1.7 | +2.2 | +1.8 |
| June 2010 outlook | +1.6 | +1.8 | +2.1 | +1.7 | +1.7 | +1.8 |
| Difference | +0.3 | +0.3 | +0.2 | +0.0 | +0.5 | +0.0 |
| Due to: | *Percentage points* | | | | | |
| External assumptions | +0.0 | +0.3 | +0.4 | +0.0 | +0.0 | +0.0 |
| New data | +0.2 | +0.3 | +0.0 | +0.0 | +0.1 | +0.0 |
| *of which: revision of historical data until Q1 10* | *+0.0* | *+0.0* | *x* | *+0.0* | *x* | *x* |
| *projection errors for Q2 10 and Q3 10* | *+0.2* | *+0.3* | *x* | *+0.0* | *x* | *x* |
| Other[1] | +0.1 | −0.3 | −0.2 | +0.0 | +0.4 | +0.0 |

*Source: OeNB December 2010 and June 2010 outlooks.*

[1] *Different assumptions about trends in domestic variables such as wages, government consumption, effects of tax measures, other changes in assessment and model changes.*

sures adopted by the Austrian federal government, by contrast, have the effect of curbing growth by 0.3 percentage points in 2011 and by 0.2 percentage points in 2012 (see figures given for Other in table 11). Upward revision of the inflation forecast for 2011 is due primarily to the effects of the fiscal consolidation package.

Box 2

### OeNB-BOFIT Outlook for CESEE Countries: Growth Driven by Net Exports and Restocking, Domestic Demand to Remain Weak[1,2]

*Our GDP growth forecast of 1.3% for the CESEE-7[3] region for 2010 remains unchanged compared to our March projections, taking into account major upward (Czech Republic and Hungary) and downward revisions (Bulgaria and Romania) at the country level. Robust growth in Poland and the Czech Republic contrasts with negative GDP growth in Bulgaria and Romania in 2010. Hungary will post modest but positive growth again. Net exports and substantial restocking remain the principal growth drivers. In 2011, investment growth and private consumption will strengthen in all countries, and GDP growth will pick up to 2.8%, implying a marginal downward revision of our March projection of 3.1%. The recovery will continue in 2012, accelerating slightly to 3.4%.*

*The gradual economic recovery in the Central and Eastern European EU Member States continued into the first half of 2010 with highly dissimilar developments in individual countries.*

[1] *Compiled by the Foreign Research Division, julia.woerz@oenb.at.*

[2] *The OeNB and the Bank of Finland Institute for Economies in Transition (BOFIT) compile semiannual forecasts of economic developments in selected CESEE countries (Bulgaria, the Czech Republic, Hungary, Poland, Romania, Russia and Croatia). The OeNB is in charge of the projections for the EU Member States as well as Croatia, BOFIT provides the forecast for Russia. The cutoff date for all projections was September 24, 2010 (Croatia: October 5, 2010). The forecasts are based on a broad range of information, including country-specific time series models for Bulgaria, the Czech Republic, Hungary, Poland and Croatia (for technical details, see Crespo Cuaresma, Feldkircher, Slačík and Wörz. 2009. Simple but Effective: The OeNB's Forecasting Model for Selected CESEE Countries. Focus on European Economic Integration Q4/09. 84–95). The forecast for Romania draws on information from various sources and expert judgment (given that the time series are as yet too short to conduct model calculations). The projections for Russia are based on a SVAR model.*

[3] *Bulgaria, the Czech Republic, Hungary, Latvia, Lithuania, Poland and Romania. Latvia and Lithuania are not covered by our own projections, but are included in the CESEE-7 aggregate based on the most recent IMF projections. As Estonia will become a euro area member at the beginning of 2011, it is no longer covered in the CESEE-7 aggregate.*

Apart from Poland, still the region's growth engine, private consumption will remain subdued as a result of the still rather bleak labor market situation and very moderate or – in the public sector often – negative wage growth. Investments are hampered by low credit growth and low levels of capacity utilization. Thus, the replenishment of stocks remains the only positive growth component that adds substantially to the recovery in 2010. Restocking will continue in all countries over the entire projection period. Its substantial positive growth contribution in 2010 will be only temporary and will become negligible in 2011 and 2012.

Leading indicators point toward a continued recovery. Especially the industrial sector has benefited so far from strengthening external demand and restocking. Industrial production, new orders and sales have generally already surpassed their precrisis levels, and capacity utilization is rising steadily from historically low levels. On the other hand, weak private consumption implies a much more protracted recovery in retail trade and the construction sector compared with industry.

The housing boom in many CESEE-7 countries found an abrupt end in the crisis. Credit conditions will remain tight in the near future, and fiscal consolidation needs have already resulted in tax hikes and other restrictive budgetary measures in some countries. As a result, investment is expected to remain well below the longer-term precrisis average over the projection period, which is further reinforced by low capital utilization rates in many countries. EU-funded projects will represent an important component of investment activity, especially so in Hungary, Bulgaria and Poland.

Domestic demand will revive very hesitantly in 2011, again making a positive contribution to the still moderate growth rate of 2.8% in the region. With little room for maneuver, public consumption will remain weak. Investment growth will pick up somewhat as utilization rates increase, backed by large-scale projects cofinanced by the EU as well as by strengthening output growth in the export-oriented industrial sector. Thus, reviving external demand will support investment growth. Export and import growth are expected to be more dynamic, with net exports turning negative again in 2011 in all countries except for Hungary.

The picture will remain largely unchanged in 2012. Domestic demand and investments will gain momentum, but both will remain well below their long-term precrisis average. Import growth is expected to be buoyant. Net exports will again make a negative contribution despite significant export growth. Restocking will not accelerate further in 2012.

The CESEE-7 region will reach its precrisis output level by the end of 2011. However, it should be noted that Poland, the largest economy in the region, did not experience any output loss in 2009. The Czech Republic will recover its precrisis GDP level in 2011, Bulgaria only in 2012, and Hungary and Romania will need more time to recover to their precrisis output levels.

The risks attached to the external environment are rather balanced, given our already cautious assumptions on EU and euro area GDP and import growth. As in our last forecast, uncertainty continues to prevail with respect to changes in investor confidence (i.e. the development of global risk aversion, in particular vis-à-vis emerging economies). Fiscal consolidation poses a considerable downside risk to our forecast for all countries apart from Romania and the Czech Republic, where reforms have already been passed and are thus included in our forecasts. Serious consolidation efforts would further depress nascent domestic demand; in particular, private and public consumption will be directly affected.

**CESEE-7: GDP Projections for 2010 to 2012 and Revisions to OeNB March Projections**

| | Eurostat | OeNB | | | Change from March | |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2010 | 2011 |
| | *Year-on-year growth in %* | | | | *Percentage points* | |
| **CESEE-7** | **−3.3** | **1.3** | **2.8** | **3.4** | **−0.0** | **−0.2** |
| Bulgaria | −5.0 | −0.3 | 2.4 | 3.2 | −0.6 | −0.5 |
| Czech Republic | −4.2 | 2.1 | 2.4 | 2.5 | 0.8 | −0.2 |
| Hungary | −6.3 | 0.8 | 2.2 | 3.0 | 1.0 | −0.3 |
| Poland | 1.7 | 3.2 | 3.7 | 4.1 | 0.2 | 0.3 |
| Romania | −7.1 | −2.6 | 1.5 | 2.8 | −3.4 | −1.6 |

*Source: OeNB September 2010 forecast, Eurostat.*

**BOFIT-OeNB Forecast for Russia: Consumption-Driven Growth to Continue**

*Russia will exhibit a brisk consumption-driven recovery. For the second half of 2010, growth is expected to be animated, although the exceptionally hot and dry summer will shave a bit off of production volumes. Especially in 2010, growth – materializing at slightly below 5% – is supported by the world market price of oil. Rather weak growth in the first half of 2010 will (as a low base) raise the annual figure for 2011 to over 5.5%, despite a slowdown in early 2011. GDP will reach its pre-recession level of 2008 in mid-2011.*

*Growth will be driven mainly by private consumption. Real wages are anticipated to grow briskly, and the public sector is assumed to stick to its plan to keep the pension and wage ratio virtually constant. Household propensity to save is not expected to rise from its current level, to which it had already risen during the crisis. Unemployment prospects are relatively uncertain, as employment decreased only by a few percentage points in the recession, thus dampening productivity strongly.*

*Investments are forecast to revive with a lag, partly because companies have more idle production capacity than before the crisis. In the first half of 2010, investment growth was zero. It is expected to revive in the second half of the year, but tangible investment growth will take off only in 2011. Deleveraging and the adjustment of banks' balance sheets may have run their course, and banks look poised to expand credit prudently soon.*

*Public consumption is expected to still increase slightly this year due to the remaining anti-crisis measures but to remain unchanged in the period from 2011 to 2012. The public sector is practically free of debt (net), and there is no immediate need to balance public sector finances, although the government and particularly regions and municipalities have scaled down their total real expenditures this year. Significant expenditure cuts are hardly likely, as elections are approaching (Duma elections in December 2011, presidential elections in March 2012).*

*Despite the rapid growth of world trade, Russia's export volume is expected to grow relatively slowly, as export volumes of crude oil, oil products and gas – accounting for 55% to 58% of Russian exports of goods and services in 2009 and in the first half of 2010 – are forecast to increase very modestly because of slow production growth.*

*Seasonally adjusted imports in the first quarter of 2010 fell from the preceding quarter, but rose fast in the second quarter. Import growth is expected to decelerate slightly in the third quarter and to fall further from 2011 to 2012, but is still anticipated to come to over 10%. Imports will be driven by consumption growth, and from 2011, by a pickup of investments.*

*The forecast is based on the view of brisk but somewhat decelerating growth of the world economy and world trade, and a gradually rising world market oil price. The uncertainties surrounding the forecast are exceptionally large. A drop in the oil price could hit the Russian economy strongly, especially now, as the chances for fiscal stimulus are becoming smaller than in 2008, after which the government had spent half of its reserve funds. In the midst of uncertainty, the direction of capital flows may change easily and strongly, backed by large amounts of liquidity both globally and in the Russian banking sector. Still, positive surprises for Russia are also possible in terms of higher energy prices, foreign finance and bank lending growth. The revival of investment in Russia is subject to considerable uncertainty, which from the perspective of private investors is represented by interference by the state, i.e. politicians and officials, in corporate activities, as well as by short-term reactions to problems arising from the recession. Russian companies' inventory building is fraught with abnormal uncertainty; even in less turbulent times, changes in inventories (mostly growth) have had a considerable impact on Russia's GDP growth.*

### Russia: GDP Projections for 2010 to 2012 and Revisions to BOFIT March Projections

| | Rosstat | BOFIT-OeNB | | | Change from March | |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2010 | 2011 |
| | *Year-on-year growth in %* | | | | *Percentage points* | |
| Russia | −7.9 | 4.9 | 5.6 | 4.7 | −0.6 | 0.6 |

*Source: BOFIT September 2010 forecast, Rosstat.*

### OeNB Projections for Croatia: Weak Domestic Demand Slows Economic Recovery

*Given weak domestic demand, the Croatian economy will continue to contract in 2010. Although the fragile recovery continued in early 2010, the economy still contracted by 2.5% year on year in the first half of 2010 on the back of still depressed domestic demand. The downward trend of the Croatian economy is set to moderate further in the second half of the year, implying a drop of approximately 1.6% in real output for 2010 as a whole and, like in Romania and Bulgaria, a rather sluggish economic recovery.*

*In particular, private consumption is expected to gain some momentum in the latter half of 2010 following the abolition of the crisis tax in two steps (July and November) and the reduction of the level and number of personal income tax rates as of July 2010. However, the full impact of these measures will materialize only in 2011. Similarly, gross fixed capital formation is seen to have bottomed out in the first half of 2010. The main impetus for recovery in investment activity should come from the private sector following the introduction of the government's three-pillar credit/financing scheme in early 2010, which is aimed at stimulating bank lending to the economy. However, like public consumption, public investment is expected to remain listless in light of increasing fiscal constraints. Against the background of firming export growth and a relatively good tourism season (arrivals were up by 12% year on year in July 2010, while nights spent increased by 5%) as well as the ongoing downward adjustment of imports, net exports are forecast to contribute positively to growth also in the second half of 2010.*

*We expect the economy to grow by 1.5% in 2011 and to return to the growth pattern seen before the crisis, with a positive (negative) contribution of domestic demand (net exports). Investment activity is expected to pick up on the back of resuming lending activity and improving consumer and business sentiment. Private consumption should benefit from the tax*

*relief measures mentioned above and possibly also from incipient improvements in labor market conditions. At the same time, no major stimuli can be expected from public consumption as budget expenditures for 2011 and 2012 are frozen at the level of the revised 2010 budget. Given that general elections will be held in 2011, no substantial progress will be achieved with structural reforms, either. Provided the global environment is supportive, export growth is anticipated to accelerate further in 2011, but will be outpaced by import growth in light of strengthening domestic demand.*

*The Croatian economy is forecast to expand by 2.8% in 2012, driven by a further strengthening of domestic demand. In particular, gross fixed capital formation is projected to accelerate on the back of increased FDI inflows ahead of the country's prospective EU entry. Croatia is expected to accede to the EU in 2013 provided membership negotiations are completed on schedule by mid-2011 and the subsequent ratification process in the EU Member States is concluded on time.*

### Croatia: GDP Projections for 2010 to 2012 and Revisions to OeNB March Projections

| | Eurostat | OeNB | | | Change from March | |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2010 | 2011 |
| | *Year-on-year growth in %* | | | | *Percentage points* | |
| Croatia | −5.8 | −1.6 | 1.5 | 2.8 | −1.5 | −0.3 |

*Source: OeNB September 2010 forecast, Eurostat.*

# Annex: Detailed Result Tables

Table 12

## Demand Components (Real Prices)

Chained volume data (reference year = 2000)

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| | EUR million | | | | Annual change in % | | | |
| Private consumption | 139,531 | 140,901 | 142,362 | 144,207 | +1.1 | +1.0 | +1.0 | +1.3 |
| Government consumption | 49,348 | 49,501 | 49,645 | 49,802 | +0.4 | +0.3 | +0.3 | +0.3 |
| Gross fixed capital formation | 52,229 | 50,484 | 51,532 | 53,100 | −9.1 | −3.3 | +2.1 | +3.0 |
| of which: Investment in plant and equipment | 21,020 | 20,276 | 20,973 | 21,947 | −10.8 | −3.5 | +3.4 | +4.6 |
| Residential construction investment | 10,435 | 10,139 | 10,191 | 10,355 | −4.1 | −2.8 | +0.5 | +1.6 |
| Investment in other construction | 21,336 | 20,695 | 20,994 | 21,424 | −5.0 | −3.0 | +1.4 | +2.0 |
| Changes in inventories (including statistical discrepancy) | 1,491 | 891 | 696 | 744 | × | × | × | × |
| Domestic demand | 242,599 | 241,778 | 244,235 | 247,854 | −2.4 | −0.3 | +1.0 | +1.5 |
| Exports of goods and services | 132,130 | 145,871 | 156,451 | 167,319 | −13.6 | +10.4 | +7.3 | +6.9 |
| Imports of goods and services | 118,225 | 126,245 | 133,805 | 142,105 | −12.5 | +6.8 | +6.0 | +6.2 |
| Net exports | 13,905 | 19,626 | 22,646 | 25,214 | × | × | × | × |
| **Gross domestic product** | 256,504 | 261,403 | 266,880 | 273,067 | −3.7 | +1.9 | +2.1 | +2.3 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB June 2010 outlook.*

Table 13

## Demand Components (Current Prices)

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| | EUR million | | | | Annual change in % | | | |
| Private consumption | 148,974 | 152,936 | 157,783 | 162,810 | +0.5 | +2.7 | +3.2 | +3.2 |
| Government consumption | 54,209 | 55,402 | 56,610 | 57,863 | +4.1 | +2.2 | +2.2 | +2.2 |
| Gross fixed capital formation | 57,423 | 57,164 | 59,245 | 62,132 | −7.1 | −0.5 | +3.6 | +4.9 |
| Changes in inventories (including statistical discrepancy) | 1,335 | 2,622 | 2,008 | 1,469 | × | × | × | × |
| Domestic demand | 261,941 | 268,123 | 275,647 | 284,274 | −1.4 | +2.4 | +2.8 | +3.1 |
| Exports of goods and services | 139,904 | 156,630 | 172,423 | 187,664 | −14.9 | +12.0 | +10.1 | +8.8 |
| Imports of goods and services | 128,612 | 141,792 | 153,873 | 166,069 | −13.7 | +10.2 | +8.5 | +7.9 |
| Net exports | 11,293 | 14,837 | 18,550 | 21,595 | × | × | × | × |
| **Gross domestic product** | 273,234 | 282,960 | 294,197 | 305,869 | −2.8 | +3.6 | +4.0 | +4.0 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB June 2010 outlook.*

Table 14

## Deflators of Demand Components

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| | *2000 = 100* | | | | *Annual change in %* | | | |
| Private consumption | 106.8 | 108.5 | 110.8 | 112.9 | −0.7 | +1.7 | +2.1 | +1.9 |
| Government consumption | 109.8 | 111.9 | 114.0 | 116.2 | +3.7 | +1.9 | +1.9 | +1.9 |
| Gross fixed capital formation | 110.0 | 113.2 | 115.0 | 117.0 | +2.2 | +3.0 | +1.5 | +1.8 |
| Domestic demand (excluding changes in inventories) | 108.1 | 110.2 | 112.4 | 114.4 | +0.8 | +2.0 | +1.9 | +1.9 |
| Exports of goods and services | 105.9 | 107.3 | 110.2 | 112.1 | −1.5 | +1.4 | +2.7 | +1.8 |
| Imports of goods and services | 108.8 | 112.3 | 115.0 | 116.9 | −1.3 | +3.2 | +2.4 | +1.6 |
| Terms of trade | 97.3 | 95.6 | 95.8 | 96.0 | −0.2 | −1.8 | +0.3 | +0.1 |
| **Gross domestic product** | 106.5 | 108.2 | 110.2 | 112.0 | +1.0 | +1.6 | +1.8 | +1.6 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

Table 15

## Labor Market

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
| | *Thousands* | | | | *Annual change in %* | | | |
| Total employment | 4,079.5 | 4,114.4 | 4,149.4 | 4,183.3 | −0.9 | +0.9 | +0.9 | +0.8 |
| *of which: Private sector employment* | *3,546.9* | *3,578.9* | *3,614.6* | *3,649.2* | *−1.1* | *+0.9* | *+1.0* | *+1.0* |
| Payroll employment (national accounts definition) | 3,499.3 | 3,527.1 | 3,564.6 | 3,596.4 | −1.0 | +0.8 | +1.1 | +0.9 |
| | *% of labor supply* | | | | | | | |
| Unemployment rate (Eurostat definition) | 4.8 | 4.5 | 4.4 | 4.3 | × | × | × | × |
| | *EUR per real output unit x 100* | | | | | | | |
| Unit labor costs (whole economy)[1] | 63.5 | 63.6 | 64.2 | 64.7 | +4.9 | +0.1 | +1.1 | +0.7 |
| | *EUR thousand per employee* | | | | | | | |
| Labor productivity (whole economy)[2] | 62.9 | 63.5 | 64.3 | 65.3 | −2.8 | +1.0 | +1.2 | +1.5 |
| | *EUR thousand* | | | | | | | |
| Real compensation per employee[3] | 37.4 | 37.2 | 37.3 | 37.4 | +2.6 | −0.5 | +0.2 | +0.3 |
| | *At current prices in EUR thousand* | | | | | | | |
| Gross compensation per employee | 39.9 | 40.4 | 41.3 | 42.2 | +1.9 | +1.1 | +2.3 | +2.2 |
| | *At current prices in EUR million* | | | | | | | |
| Total gross compensation of employees | 139,757 | 142,444 | 147,284 | 151,850 | +1.0 | +1.9 | +3.4 | +3.1 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

[1] *Gross wages divided by real GDP.*
[2] *Real GDP divided by total employment.*
[3] *Gross wages per employee divided by the private consumption expenditure (PCE) deflator.*

Table 16

## Current Account

|  | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|
|  | *EUR million* | | | | *% of nominal GDP* | | | |
| **Balance of trade** | 10,521.0 | 10,979.8 | 12,981.9 | 16,494.3 | 3.9 | 3.9 | 4.4 | 5.4 |
| Balance on goods | −2,328.0 | −3,014.8 | −2,185.6 | −717.6 | −0.9 | −1.1 | −0.7 | −0.2 |
| Balance on services | 12,849.0 | 13,994.6 | 15,167.5 | 17,211.9 | 4.7 | 4.9 | 5.2 | 5.6 |
| **Balance on income** | −823.0 | −1,450.3 | −1,288.5 | −953.7 | −0.3 | −0.5 | −0.4 | −0.3 |
| **Balance on transfers** | −1,722.0 | −2,349.3 | −1,641.1 | −1,708.6 | −0.6 | −0.8 | −0.6 | −0.6 |
| **Current account** | 7,976.0 | 7,180.2 | 10,052.4 | 13,832.1 | 2.9 | 2.5 | 3.4 | 4.5 |

*Source: 2009: Eurostat; 2010 to 2012: OeNB December 2010 outlook.*

Table 17

## Quarterly Outlook Results

| | 2010 | 2011 | 2012 | 2010 | | | | 2011 | | | | 2012 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| **Prices, wages and costs** | *Annual change in %* | | | | | | | | | | | | | | |
| HICP | +1.7 | +2.2 | +1.8 | +1.3 | +1.8 | +1.7 | +1.9 | +2.4 | +2.3 | +2.2 | +2.1 | +1.8 | +1.8 | +1.7 | +1.7 |
| HICP (excluding energy) | +1.2 | +1.7 | +1.6 | +0.9 | +1.1 | +1.3 | +1.5 | +1.7 | +1.9 | +1.7 | +1.6 | +1.7 | +1.7 | +1.6 | +1.6 |
| Private consumption expenditure (PCE) deflator | +1.7 | +2.1 | +1.9 | +1.3 | +2.0 | +1.7 | +1.7 | +1.8 | +1.9 | +2.5 | +2.3 | +2.0 | +1.9 | +1.8 | +1.8 |
| Gross fixed capital formation deflator | +3.0 | +1.5 | +1.8 | +2.7 | +3.6 | +2.8 | +2.8 | +1.9 | +0.8 | +1.7 | +1.8 | +1.8 | +1.7 | +1.8 | +1.8 |
| GDP deflator | +1.6 | +1.8 | +1.6 | +1.5 | +1.8 | +2.2 | +1.0 | +1.4 | +1.5 | +1.6 | +2.8 | +2.2 | +1.7 | +1.4 | +1.3 |
| Unit labor costs | +0.1 | +1.1 | +0.7 | +1.3 | −0.4 | −0.4 | −0.2 | −0.3 | +1.0 | +1.8 | +1.7 | +1.2 | +0.7 | +0.5 | +0.4 |
| Nominal wages per employee | +1.1 | +2.3 | +2.2 | +1.1 | +1.0 | +1.0 | +1.4 | +1.7 | +2.2 | +2.7 | +2.7 | +2.5 | +2.3 | +2.0 | +1.9 |
| Productivity | +1.0 | +1.2 | +1.5 | −0.2 | +1.4 | +1.4 | +1.6 | +1.9 | +1.2 | +0.9 | +0.9 | +1.4 | +1.6 | +1.6 | +1.5 |
| Real wages per employee | −0.5 | +0.2 | +0.3 | −0.2 | −1.0 | −0.7 | −0.3 | −0.1 | +0.3 | +0.2 | +0.4 | +0.5 | +0.4 | +0.3 | +0.1 |
| Import deflator | +3.2 | +2.4 | +1.6 | +1.8 | +3.4 | +4.1 | +3.6 | +3.6 | +2.7 | +1.8 | +1.7 | +1.6 | +1.6 | +1.6 | +1.6 |
| Export deflator | +1.4 | +2.7 | +1.8 | −1.1 | +0.4 | +2.9 | +3.3 | +3.7 | +3.4 | +1.8 | +1.8 | +1.8 | +1.8 | +1.8 | +1.7 |
| Terms of trade | −1.8 | +0.3 | +0.1 | −2.8 | −2.9 | −1.2 | −0.3 | +0.2 | +0.7 | +0.0 | +0.2 | +0.2 | +0.1 | +0.1 | +0.1 |
| **Economic activity** | *Annual and/or quarterly changes in % (real)* | | | | | | | | | | | | | | |
| GDP | +1.9 | +2.1 | +2.3 | +0.0 | +1.2 | +0.9 | +0.6 | +0.3 | +0.3 | +0.4 | +0.6 | +0.7 | +0.6 | +0.6 | +0.6 |
| Private consumption | +1.0 | +1.0 | +1.3 | +0.2 | +0.2 | +0.2 | +0.3 | +0.3 | +0.3 | +0.3 | +0.3 | +0.3 | +0.4 | +0.4 | +0.4 |
| Government consumption | +0.3 | +0.3 | +0.3 | −0.2 | −0.1 | +0.1 | +1.4 | −0.5 | −0.3 | −0.2 | +0.0 | +0.2 | +0.2 | +0.2 | +0.1 |
| Gross fixed capital formation | −3.3 | +2.1 | +3.0 | −1.8 | −0.6 | +0.6 | +0.5 | +0.4 | +0.6 | +0.8 | +0.9 | +0.8 | +0.7 | +0.6 | +0.7 |
| Exports | +10.4 | +7.3 | +6.9 | +2.0 | +5.2 | +3.4 | +1.3 | +1.1 | +1.3 | +1.4 | +1.7 | +1.9 | +1.7 | +1.8 | +1.8 |
| Imports | +6.8 | +6.0 | +6.2 | +2.2 | +3.3 | +2.6 | +1.1 | +1.0 | +1.3 | +1.4 | +1.5 | +1.6 | +1.5 | +1.6 | +1.6 |
| | *Contribution to real GDP growth in percentage points* | | | | | | | | | | | | | | |
| Domestic demand | −0.1 | +1.0 | +1.3 | −0.3 | +0.0 | +0.3 | +0.5 | +0.1 | +0.2 | +0.3 | +0.3 | +0.4 | +0.4 | +0.4 | +0.4 |
| Net exports | +2.2 | +1.2 | +1.0 | +0.0 | +1.3 | +0.7 | +0.2 | +0.1 | +0.1 | +0.2 | +0.2 | +0.3 | +0.3 | +0.2 | +0.3 |
| Changes in inventories | −0.2 | −0.1 | +0.0 | +0.2 | +0.0 | +0.0 | −0.1 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 |
| **Labor market** | *% of labor supply* | | | | | | | | | | | | | | |
| Unemployment rate (Eurostat definition) | 4.5 | 4.4 | 4.3 | 4.5 | 4.6 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 4.3 | 4.3 |
| | *Annual and/or quarterly changes in %* | | | | | | | | | | | | | | |
| Total employment | +0.9 | +0.9 | +0.8 | +0.3 | +0.3 | +0.3 | +0.3 | +0.2 | +0.2 | +0.2 | +0.2 | +0.2 | +0.2 | +0.3 | +0.3 |
| *of which: Private sector employment* | *+0.9* | *+1.0* | *+1.0* | *+0.3* | *+0.3* | *+0.3* | *+0.3* | *+0.2* | *+0.2* | *+0.2* | *+0.2* | *+0.2* | *+0.3* | *+0.3* | *+0.4* |
| Payroll employment | +0.8 | +1.1 | +0.9 | +0.1 | +0.4 | +0.4 | +0.4 | +0.2 | +0.2 | +0.2 | +0.2 | +0.2 | +0.3 | +0.3 | +0.3 |
| **Additional variables** | *Annual and/or quarterly changes in % (real)* | | | | | | | | | | | | | | |
| Real disposable household income | +0.7 | +0.7 | +1.4 | +0.3 | +0.2 | +0.7 | +0.5 | −0.3 | +0.1 | +0.2 | +0.2 | +0.5 | +0.4 | +0.4 | +0.4 |
| | *% of real GDP* | | | | | | | | | | | | | | |
| Output gap | −0.4 | −0.2 | 0.2 | −1.2 | −0.5 | −0.1 | 0.1 | −0.1 | −0.2 | −0.3 | −0.2 | 0.0 | 0.1 | 0.2 | 0.3 |

*Source: OeNB December 2010 outlook (based on seasonally and working-day adjusted data).*

## Comparison of Current Economic Forecasts for Austria

| Indicator | OeNB | | | WIFO | | IAS | | OECD | | | IMF | | European Commission | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | December 2010 | | | September 2010 | | September 2010 | | November 2010 | | | October 2010 | | November 2010 | | |
| | 2010 | 2011 | 2012 | 2010 | 2011 | 2010 | 2011 | 2010 | 2011 | 2012 | 2010 | 2011 | 2010 | 2011 | 2012 |
| **Key results** | *Annual change in %* | | | | | | | | | | | | | | |
| GDP (real) | +1.9 | +2.1 | +2.3 | +2.0 | +1.9 | +1.8 | +2.0 | +2.0 | +2.0 | +2.0 | +1.6 | +1.6 | +2.0 | +1.7 | +2.1 |
| Private consumption (real) | +1.0 | +1.0 | +1.3 | +1.1 | +0.8 | +1.0 | +1.2 | +0.9 | +1.1 | +1.5 | × | × | +0.9 | +0.8 | +0.9 |
| Government consumption (real) | +0.3 | +0.3 | +0.3 | +0.6 | −0.3 | +0.5 | +0.2 | +0.8 | −0.2 | −0.5 | × | × | +0.8 | +0.0 | +0.5 |
| Gross fixed capital formation (real)[1] | −3.3 | +2.1 | +3.0 | −2.5 | +2.4 | −0.5 | +2.1 | −2.4 | +2.5 | +3.2 | × | × | −2.6 | +2.7 | +2.9 |
| Exports (real) | +10.4 | +7.3 | +6.9 | +9.2 | +6.2 | +9.3 | +6.5 | +8.1 | +7.6 | +5.8 | × | × | +9.0 | +6.3 | +6.5 |
| Imports (real) | +6.8 | +6.0 | +6.2 | +7.3 | +5.4 | +7.7 | +5.5 | +5.5 | +6.6 | +5.3 | × | × | +6.4 | +5.6 | +5.5 |
| GDP per employee | +1.0 | +1.2 | +1.5 | +1.1 | +1.2 | +1.0 | +1.1 | × | × | × | × | × | +1.3 | +1.0 | +1.3 |
| GDP deflator | +1.6 | +1.8 | +1.6 | +1.0 | +1.7 | +1.3 | +1.7 | +1.5 | +1.1 | +1.2 | × | × | +0.6 | +1.6 | +1.3 |
| CPI | × | × | × | +1.8 | +2.1 | +1.7 | +1.8 | × | × | × | +1.5 | +1.7 | × | × | × |
| HICP | +1.7 | +2.2 | +1.8 | +1.8 | +2.1 | × | × | +1.6 | +1.8 | +1.9 | × | × | +1.7 | +2.1 | +1.8 |
| Unit labor costs | +0.1 | +1.1 | +0.7 | +0.3 | +1.0 | × | × | × | × | × | × | × | +0.3 | +1.2 | +0.8 |
| Payroll employment | +0.9 | +0.9 | +0.8 | +0.8 | +0.6 | +0.8 | +0.9 | × | × | × | × | × | +0.7 | +0.7 | +0.8 |
| | *% of labor supply* | | | | | | | | | | | | | | |
| Unemployment rate[2] | 4.5 | 4.4 | 4.3 | 4.4 | 4.3 | 4.4 | 4.2 | 4.5 | 4.4 | 4.3 | 4.1 | 4.2 | 4.4 | 4.2 | 4.0 |
| | *% of nominal GDP* | | | | | | | | | | | | | | |
| Current account | 2.5 | 3.4 | 4.5 | 2.7 | 3.3 | × | × | 2.6 | 3.1 | 3.8 | 2.3 | 2.4 | 3.0 | 3.5 | 4.1 |
| Government surplus/deficit | −4.1 | −3.0 | −2.6 | −4.1 | −3.5 | −4.3 | −3.4 | −4.4 | −3.4 | −3.0 | × | × | −4.3 | −3.6 | −3.3 |
| **External assumptions** | | | | | | | | | | | | | | | |
| Oil price in USD/barrel (Brent) | 79.5 | 88.6 | 90.7 | 76.0 | 80.0 | 75.0 | 75.0 | 80.0 | 80.0 | 80.0 | 76.2 | 78.8 | 79.9 | 88.9 | 90.8 |
| Short-term interest rate in % | 0.8 | 1.4 | 1.7 | 0.8 | 1.0 | 0.8 | 1.2 | 0.8 | 1.1 | 1.8 | 0.8 | 1.0 | 0.8 | 1.4 | 1.7 |
| USD/EUR exchange rate | 1.33 | 1.39 | 1.39 | 1.30 | 1.35 | 1.30 | 1.27 | 1.39 | 1.39 | 1.39 | 1.31 | 1.28 | 1.33 | 1.39 | 1.39 |
| | *Annual change in %* | | | | | | | | | | | | | | |
| Euro area GDP (real) | +1.6 to +1.8 | +0.7 to +2.1 | +0.6 to +2.8 | +1.8 | +1.7 | +1.7 | +1.6 | +1.7 | +1.7 | +2.0 | +1.7 | +1.5 | +1.7 | +1.5 | +1.8 |
| U.S. GDP (real) | +2.7 | +2.4 | +2.7 | +2.7 | +2.0 | +2.7 | +2.3 | +2.7 | +2.2 | +3.1 | +2.6 | +2.3 | +2.7 | +2.1 | +2.5 |
| World GDP (real) | +4.7 | +3.8 | +4.2 | +4.0 | +3.5 | × | × | × | × | × | +4.8 | +4.2 | +4.5 | +3.9 | +4.0 |
| World trade | +11.7 | +7.2 | +7.5 | +18.8 | +8.0 | +16.5 | +5.5 | +12.3 | +8.3 | +8.1 | +11.4 | +7.0 | +12.1 | +7.1 | +6.9 |

*Source: OeNB, WIFO, IAS, OECD, IMF, European Commission.*

[1] For IAS: Gross investment.

[2] Eurostat definition.

# Does a Low Interest Rate Environment Affect Risk Taking in Austria?

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*It has recently been argued that a prolonged period of low interest rates under benign economic conditions tends to produce excessive risk taking in financial markets. The mechanism by which monetary policy affects investors' risk positions has been called the "risk-taking channel" of monetary policy. We discuss this channel and compare it with the more traditional broad credit channel. Furthermore, we provide new evidence on the existence of this channel, using Austrian firm and bank data taken from the OeNB's credit register. In particular, we show that the expected default rates within Austrian banks' business-loan portfolios increased during the period of low refinancing rates from 2003 to 2005. This result is new and important in at least two respects: first, we construct a measure of Austrian banks' portfolio risk on the basis of a matched lender and borrower dataset. Second, we specifically identify the effect of a monetary policy regime which is characterized by interest rates that are held at a low level for too long, as opposed to the more traditional effect of monetary policy "shocks," usually identified through quarter-on-quarter changes in short-term interest rates.*

It has been argued in the recent past that the prolonged period of low interest rates under benign financial and economic conditions from 2003 to 2005 might have produced a sense of overconfidence in financial markets. This overconfidence resulted in higher asset prices and lower volatilities, which boosted collateral values. These then affected risk perceptions and risk attitudes, which increased the supply of credit. Thus, some market observers claim that this period was characterized by a higher risk tolerance of, and "excessive" lending by banks. The concerns about this tendency, however, are related not only to the increased quantity of lending, but more importantly, to the potential deterioration of its quality in terms of riskiness. The channel through which lower interest rates trigger a higher credit supply, together with a deterioration of the amount of risk within portfolios, has recently been labeled the "risk-taking channel" of monetary policy.[2]

This new channel started drawing attention only after its potential repercussions had already materialized. It has been argued that ignoring this channel may have contributed significantly to the buildup of financial imbalances that culminated in the crisis. This implies that monetary policy potentially added to the buildup of financial imbalances via its influence on asset prices, on the volatility in financial markets and, in general, on the perception of risk. The corollary of this hypothesis is that, as long as monetary policy does not actively "lean against the wind," it contributes to the buildup of financial imbalances on account of its interplay with the framework of financial regulations and the pricing of risk in the markets.

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[2] See Borio and Zhu (2008), who were the first to use the term, although Rajan (2006) had already drawn attention to the mechanism.

One goal of this study is to discuss potential mechanisms behind the risk-taking channel. In particular, we try to carefully highlight how it differs from the more traditional broad credit channel, since both are affected by changes in risk and market participants' risk perceptions, albeit in different ways.[3]

Thereafter, we discuss the existing empirical literature on the aforementioned mechanisms and present new empirical evidence on the existence of such a monetary transmission channel. In particular, we address the very specific hypothesis that a prolonged period of low interest rates induces banks to take riskier bets. We employ a unique matched borrower-lender dataset drawn from the OeNB's credit register in order to show that calculated expected default rates within Austrian banks' business-loan portfolios increased significantly during the period of low refinancing rates from 2003 to 2005 (by some 9 basis points from 0.53% to 0.62%). In our empirical analysis, we first take a look at the effect that low interest rates over a period of two years have on the economy, rather than at the effects of quarter-on-quarter changes in refinancing rates. Second, we measure the risk carried within the loan portfolio of the lenders, as opposed to a measure of the risk attached to individual borrowers, by using a unique dataset of matched lenders and borrowers. In doing so, we believe to be able to better capture the risk position taken by the lender as reflected in the dataset. Third, we identify a causal relationship between the level of interest rates and our measure of risk by exploiting a natural experiment.

# 1 The Risk-Taking Channel in the Monetary Transmission Mechanism and Its Implications

## 1.1 The Risk-Taking Channel: What It Is, What It Is Not

The risk-taking channel refers to the reinforcement of (an expansionary) monetary policy on account of a change in banks' attitude toward, or appetite for risk. If this channel is at work, not only will more firms or projects become creditworthy, because of lower interest rates, but banks will also relax their lending standards or increase their risk appetite and "allow" more risk in their portfolios. The risk-taking channel goes beyond the change in the net worth of both lenders and borrowers due to a change in the interest rate. A "procyclical" change in net worth, which operates through changes in collateral values and risk premiums, has been referred to as the broad credit channel (balance sheet and bank lending channel), the precise implications of which differ significantly from those implied by the risk-taking channel.

For a better insight into the risk-taking channel, it is necessary to understand what we mean by risk taking. Within this context, risk taking refers to the amount of uncertainty a lender is willing to hold in his/her portfolio. For a bank, it refers, among others, to the division between risky and risk-free assets in its portfolio, i.e. its balance sheet. This portfolio composition, however, cannot always be observed, so that some alternative measures have been used in the existing empirical literature to measure the degree of a bank's risk tolerance. Some of the measures that have been used are (1) the volatility of bank's profits,[4] (2) banks' own default

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[3] See, for instance, Bernanke and Blinder (1988) or Bernanke and Gertler (1995).

[4] De Nicolò et al. (2010).

risk[5] or (3) the ratio of risk-weighted assets to total assets.[6] The second part of this study introduces the expected default rate within banks' loan portfolios as an alternative measure.

How much risk a given lender is willing to take at a given point in time depends on his/her own expectations about the future, his/her own risk perceptions, and his/her own risk attitude. Changes in the overall interest rate environment, which may result from monetary policy decisions, will affect expectations about the future, as well as risk perceptions in general, and this will affect the real economy not only through the expectations channel, but also through changes in the valuation of assets, which is an important element of the broad credit channel. Therefore, it is important to distinguish between changes in risk positions due to changes in risk perceptions and expectations and those induced by changes in risk attitudes or risk tolerance.[7]

Thus, if the riskiness of a borrower changes because expectations have changed or because the net worth of the collateral has changed, this would trigger the credit channel. Moreover, an increase in interest rates would raise the probability that a borrower will not pay back his/her loans, so that the lender will tend to decrease the supply of loans to this borrower. A decrease in interest rates, on the other hand, will improve risk perceptions, which will increase asset values and thus the collateral or net worth of the borrower. In this case, the rating of the firm or assets improves because more projects become viable at a lower interest rate, so that the new value of the firm or

asset increases. When this occurs, the bank is willing to increase the supply of credit, without having changed its risk tolerance, and will potentially even have improved its risk position.

The risk-taking channel, on the other hand, goes beyond the effects of the interest rate on the riskiness of the borrower, and refers to the fact that the banks' incentive to bear risk related to the provision of loans is affected. In particular, it is assumed that the risk appetite of the bank increases. In other words, banks are willing, *ceteris paribus*, to accept more risk or to increase the supply of credit for the same level of risk.

## 1.2 What Triggers the Risk-Taking Channel?

In order to gain an insight into what triggers the risk-taking channel, it is important to understand the determinants of risk taking. On account of agency problems and informational frictions, risk taking depends on yield expectations, perceived risk and risk attitudes. There is ample evidence that shows that all three of these factors are subjective and heterogeneous across individuals. However, for a single bank, risk perceptions and expected returns will not be totally subjective, given the rating systems in place. Moreover, we believe that changes in risk perception, which alter the asset valuation and expected returns, will affect the broad credit channel, whereas – as mentioned earlier – the risk-taking channel also refers to a change in risk attitude or risk tolerance. The question is, therefore, what triggers a change in risk attitude, in particular for an institution

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[5] *Altunbas et al. (2010).*

[6] *De Nicolò et al. (2010).*

[7] *Here, we distinguish between expectations and risk perceptions, in the sense that the bank may assess general developments in the future and its own situation differently.*

as opposed to an individual, and how can we capture this change.

Borio and Zhu (2008), who were the first to coin the term "risk-taking channel" explain that monetary policy and, in particular, an expansionary monetary policy affects risk taking through three factors: (1) the impact of interest rates on valuations, incomes and cash flows; (2) the search for yield by banks and in general by all financial agents that are faced with small profit margins in a low interest rate environment (search-for-yield effect); and, finally, (3) the effect of communication policies and the reaction function of the central bank. We think that the first factor, as explained above, is a crucial element of the broad credit channel, while the second and third factors are actually new, and are therefore at the heart of the risk-taking channel.

Indeed, the last two triggers mentioned by Borio and Zhu (2008) have not been taken into account in the transmission mechanism before, or at least not explicitly. Banks' search for yield seems to be an important motive behind the increase in excessive lending. If this incentive mechanism is at work, low interest rates make riskier assets more attractive, as banks (and financial institutions in general) are urged to improve their average return on equity. This has the effect that banks will, *ceteris paribus*, invest in riskier assets when interest rates are low, in order to boost their yields. Rajan (2006) argues that this effect is due to "the nature of pre-contracted liabilities" in the form of certain financial institutions promising a given return to both clients and owners. He also introduces the possibility that the way incen-

tives for bank managers are designed influences risk taking.

The third element mentioned by Borio and Zhu (2008) is the credibility of the central bank. In particular, it is believed that there is a moral hazard effect when the reaction function of a central bank tends to be asymmetric with respect to losses, i.e. the central bank reacts more strongly to a fall in asset prices than to a rise (no "leaning against the wind"). Thus, "… encouraging risk-taking by more than equivalent increases would curtail it – an 'insurance effect.'"[8]

Other authors, such as Berger and Udell (2003), introduced the institutional memory hypothesis to explain the procyclicality of bank lending. According to the authors, there is ample evidence that banks take more risk during expansions. The reason for this behavior is "… a deterioration in the ability of a bank to recognize potential loan problems and an easing of credit standards over its own loan cycle".[9] What is interesting about this theory is that it "humanizes" aggregate risk taking in the banking sector and introduces elements of behavioral economics into risk-taking decisions of banks. Indeed, one can think of a series of elements that can trigger an increase in risk taking, such as moral hazard, habit formation,[10] bounded rationality, or just plain animal spirits.

### 1.3 What Are the Implications for Monetary Policy and Financial Stability?

From the point of view of monetary policy, if the risk-taking channel exists, it will potentially reinforce or amplify monetary policy decisions. Thus, an

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[8]  *Borio and Zhu (2008, p. 10).*

[9]  *Berger and Udell (2003, p. 1).*

[10]  *Altunbas et al. (2010).*

expansive monetary policy, for instance, will become even more expansive due to changes in the risk attitude of lenders. In fact, the risk-taking channel could translate into a softening of credit standards, which can lead to excessive lending. This was, in fact, observed at least in some countries during the years of a low interest rate environment that preceded the current crisis.

More important for monetary policy is understanding whether the risk-taking channel reinforces or weakens the other channels of the transmission mechanism. At first sight, it seems that the risk-taking channel reinforces the broad credit channel and, perhaps, the expectation channel, so that the effect of low interest rates on the real economy was underestimated. It remains to be seen whether a symmetric effect will be in place when interest rates are tightened.

The risk-taking channel has been labeled the missing link between monetary policy and financial stability by Borio and Zhu (2008). Indeed, to the extent that monetary policy influences asset prices and their volatilities, monetary policy has an effect on financial stability. Under the risk-taking channel, too successful a monetary policy may be detrimental for financial stability if it encourages excessive lending.

In particular, according to the theory put forward by Berger and Udell (2003), the risk-taking channel can be especially problematic because "banks take significantly more risks during the expansion, but these risks are revealed only later because it takes time for loan performance problems to appear".[11] Thus, the buildup of financial imbalances during the period of low interest rates might not be noticed. Should this

lead to excessive lending, destabilizing effects on the economy may ensue, in particular if the behavior of banks turns out to be correlated.

The corollary of this is that risk might be crucial for the interplay between periods of low interest rates and financial stability. Changes in this overall assessment of risks may, *ceteris paribus*, induce a weakening or strengthening of all the transmission channels of monetary policy (interest rate channel, bank lending channel, balance sheet channel), but will be reinforced by, in particular, the risk-taking channel, so that the effects of an expansive monetary policy may be underestimated. At the same time, monetary policy might contribute to this risk through its influence on asset prices, on the volatility in financial markets and, in general, on the perception of risk. If monetary policy does not or cannot actively (and effectively) "lean against the wind," it could contribute passively to the buildup of financial imbalances.

## 2 Empirical Evidence for Other Countries

Given the novelty of the hypothesis of a risk-taking channel, empirical evidence on the importance of this channel is scarce. In particular, its existence is hard to prove because it is difficult to disentangle its effects from other transmission channels. Moreover, measuring risk is in itself nontrivial. In this section, we briefly review some of the strategies that other authors have used, and summarize their findings.

There are two broad types of studies: those using macro data that try to capture the link between monetary policy and risk, and those using micro data that look at bank behavior.

[11] *Berger and Udell (2003, p. 1).*

Among the macro studies, the analysis by Bekaert et al. (2010) is unique in that it provides the first direct evidence that investors' perceived risk aversion is systematically affected by monetary policy. Using a structural VAR, Bekaert et al. (2010) show that, for the period from January 1990 to July 2007, the expansionary U.S. monetary policy decreased risk aversion (measured using the VIX[12]) in the medium run, while uncertainty – as measured by stock market volatility – appeared to be unaffected by monetary policy. On the other hand, they conclude that periods of high uncertainty are followed by a loosening monetary policy stance.

On the other hand, Angeloni and Faia (2009) show, also using a structural VAR, that a decrease in monetary policy rates has a significant positive influence on bank "balance sheet risk" for about two years, both in the U.S.A. and the euro area.

The list of papers that use micro data to study bank behavior has been increasing rapidly in the recent past. These studies focus mainly on providing micro-level panel evidence for the effect of changes in policy rates on individual banks' lending behavior.

De Nicolò et al. (2010) attempt to find evidence of a negative relationship between monetary policy and risk taking through two different exercises. In the first, they find a negative correlation between the policy rate and two ex ante measures of bank risk, taken from the "Survey of Terms of Bank Lending," namely the average internal risk rating and the spread between loan rates and the effective federal funds rate. In a second exercise, they take data from the financial statements of banks and use the ratio of risk-weighted assets to total assets as a measure of risk.[13] After controlling for bank leverage, macroeconomic performance and expectations (of future economic activity), they find a strong negative relationship between the policy rate and the riskiness of the bank. One qualification is that this result does not hold true for banks with a low level of capitalization.

Delis and Kouretas (2010) come to exactly the opposite result. They analyze 3,628 banks in the euro area in the period from 2001 to 2008 and estimate risk equations after controlling for capital regulation and the supervisory environment. Their measure of risk is the ratio of risk assets[14] to total assets and the ratio of nonperforming loans to total loans. They also find a negative relationship between the interest rate and risk taking, which is robust to different interest rates, to different estimation methods and to the use of annual or quarterly data. They find, however, that risk taking is lower for highly capitalized banks.

Jiménez et al. (2008) analyze data on individual loans from the Spanish credit register from 1984 to 2006 and find, after controlling for banks' balance sheet characteristics, including bank leverage, that there is higher risk taking during periods following a monetary policy loosening. Their test shows that the probability of getting a loan, given that your credit history was bad or nonexistent, increases if policy interest rates were low in the quarter

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[12] The Chicago Board Options Exchange Volatility Index (VIX) is a key measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices.

[13] The higher the risk in the portfolio, the closer this number will be to one.

[14] Risk assets are defined as: all banks' assets except cash, government securities and balances due from other banks.

prior to the loan initiation. They find, however, that the riskiness of banks' overall portfolio decreases with low rates. Thus, this effect would actually point to the credit channel and not to the risk-taking channel.

Altunbas et al. (2010) go a step further and use an extensive and unique database that matches balance sheet data at a quarterly frequency for listed banks in the European Union and the U.S.A. with an array of individual proxies of bank risk. They employ a regression approach very similar to that of Jiménez et al. (2008), but focus specifically on bank risk rather than on the default risk of individual borrowers. Controlling for a wide set of aggregate and bank-level characteristics, they find that low or "too low" (as measured by Taylor rule gaps) monetary policy rates lead to increased risk taking in banks' business lending. Their main measure for the "riskiness" of each bank is the expected default frequency (EDF). EDF is a forward-looking indicator of credit risk – based on the model developed by Merton (1974) to price corporate bond debt – and is provided by Moody's KMV.[15]

Maddaloni and Peydró (2010) highlight another interesting component of the micro foundations of the risk-taking channel. Using data from lending surveys in both the euro area and the U.S.A., they show that banks softened their "lending standards" significantly in response to lower policy interest rates during the period from 2003 to 2005. Although they show the effects of this policy and the subsequent crisis

in different countries, they do not say anything about the riskiness of banks after they had relaxed their lending standards.

The only evidence outside the U.S.A. or Europe is provided by Ioannidou et al. (2009), who find similar results for Bolivian banks' lending behavior in response to U.S. federal funds rate changes. In particular, they cannot reject the hypothesis that the advancement of loans with a subprime credit rating or of loans to riskier borrowers with current or past nonperformance becomes more likely when the federal funds rate is low. A result unique to their study is that the loan spreads do not increase in line with the changes in the monthly probability of default – spreads may in fact decrease in this probability. Consequently, they conclude that banks do not seem to price the additional risk taken. This is an interesting finding since it contradicts the "search-for-yield" mechanism, which has been a popular explanation for the increase in risk taking in the U.S.A. over the last decade.

## 3 Empirical Evidence for Austria

In this section, we analyze only a particular aspect of the risk-taking channel as presented above, using a unique dataset that matches lenders and borrowers and that accounts for a major part of Austrian business lending.[16] Our data allow us to assess whether the period of historically low interest rates between June 6, 2003, and December 6, 2005, during which the ECB kept refinancing rates at an, for that time,

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[15] *A well-known indicator of credit risk, Moody's EDF figures are used not only by banks, but also by central banks and regulators (e.g. ECB, 2010). Furthermore, this indicator proved to be a good predictor of default during the recent crisis (Munves et al., 2009).*

[16] *The corporate loans comprised in this dataset account for an average 43% of total Austrian business loans from 2000 to 2008. Over the same period, corporate lending accounted for an average 36% of Austrian banks' balance sheets.*

unprecedented low of 2% p.a.,[17] significantly affected the degree of risk within banks' business-loan portfolios.

Our exercise is most closely related to Altunbas et al. (2010) and De Nicolò et al. (2010), who estimate the effect of policy interest rates on banks' EDF and risk-weighted assets, respectively. While their measure of banks' risk position is closely related to the way we assess the riskiness of banks' business-loan portfolios, we focus on the effect of a particular monetary policy phase as opposed to quarter-on-quarter changes in interest rates. We believe that this is an important exercise since a central part of the hypothesis of Borio and Zhu (2008) of a risk-taking channel refers to periods in which policy interest rates are "too low for too long."

The remainder of this section is structured as follows: In section 3.1, we briefly describe our data sources, while section 3.2 illustrates our measure of banks' loan-portfolio risk and section 3.3 presents our empirical approach and results.

### 3.1 The Dataset

Our data on borrower information is drawn from annual balance sheet and income statements of Austrian firms, collected by the OeNB in the course of its refinancing activities. In addition to the balance sheet data, the OeNB collects monthly data on banks that extend loans of more than EUR 350,000 in its central credit register (GKE).[18] The individual data on both firms and banks are strictly confidential and available to us only in anonymized form. Furthermore, the data have to be aggregated for any publication in order to comply with data confidentiality legislation.

Using these two datasets, we are able to match the characteristics of each borrower to the loans and other forms of bank credit advanced by his/her lenders. Unfortunately, the OeNB's credit department does not record annual balance sheets and income statements for all of the firms whose financial obligations are in the GKE sample. This is due to the fact that GKE reports are mandated by law, while reporting the balance sheet and income statement is voluntary. Thus, our sample of firms is biased toward relatively large and sound businesses and, therefore, any result on risk taking found in this study should be interpreted as an estimate of a lower bound for the true amount of risk taking.

Apart from annual balance sheets and income statements, we also observe whether individual borrowers went bankrupt and, if so, on which date they filed for bankruptcy protection. Within our sample of about 8,000 Austrian firms that were operational in the period from 1994 to 2008, we observe a total of 533 bankruptcies, which we use as our proxy for the event of default. The low number of bankruptcies is not surprising, given that our matched borrower-lender sample consists of relatively large and sound businesses.

### 3.2 Measuring the Risk in Banks' Loan Portfolios

In order to understand the effects of a period of low interest rates on banks' risk-taking behavior, we construct a measure of each bank's risk position at

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[17] Compared to today's low level of interest rates, 2% does no longer seem to be "too low." However, given the fact that the output gap was much more positive then, while inflation was higher, the real interest rate of that period was comparatively lower than today's real interest rate.

[18] Details on the data collection criteria can be found in the official standards for reporting to the central credit register, which are publicly available at http://www.oenb.at/de/img/gke-richtlinie-20080729-e-1_tcm14-88442.pdf.

any given point in time. Most previous studies employing matched borrower-lender data focus on the riskiness of individual loans or assets to construct empirical tests for the risk-taking channel. Thus, the evidence found in those studies reveals an increase in the amount of risk taken in newly extended individual loans due to relatively cheaper refinancing conditions. Such evidence alone, however, is not sufficient to conclude that banks were taking more risk overall. It might very well be that more risky newly extended loans are perfectly hedged by other assets on the lenders' books. Therefore, in close relation to Altunbas et al. (2010) and De Nicolò et al. (2010), we choose to construct a measure of risk for the overall business loan portfolio (as reflected in the dataset) of each bank. Such a measure does not reflect the overall risk position of the lender, since business-lending is only one, albeit important, component of the balance sheet for most Austrian banks.[19]

As a first step, we use the borrowers' annual balance sheets and income statements to estimate a probability of default (PD) for each of the firms in our sample. We proxy the event of default, using the bankruptcies observed within our sample of firms. This is a very conservative proxy for the event of default on a firm's financial obligations, and it would be preferable, in principle, to use a less stringent measure, such as late or insufficient payments on a loan-by-loan basis. Unfortunately, we do not have access to such a measure, and thus

consider our estimates a lower bound for the true PD of a given borrower.

In close alignment with earlier work by Hayden (2003), we estimate logit models for every year from 2000 to 2008, using annual balance sheet and income statement information for every borrower that is available at the time of prediction.[20] In other words, our estimates for the year 2000 employ balance sheet information from 1994 up to 2000, those for 2001 use data up to 2001, etc. These regressions allow us to construct an "ex ante" (out of sample) estimate of the PD for each borrower at each point in time between 2000 and 2008. We employ these estimates as our core measure of each firm's creditworthiness.

In practice, however, when banks and other investors take decisions on where to invest their money, they use ordinal rating scales – such as those published by Standard & Poor's or Moody's – rather than direct estimates of each borrower's PD. Partially, this is because rating scales are easier to interpret than a specific estimate of the PD, but also because rating scales additionally take into account information about firms that is not directly observable from balance sheets or income statements. For this reason the OeNB has developed a rating scale that maps PDs into 21 risk classes in order to assess whether individual banks' valuation of firms complies with the conditions for refinancing eligibility. This rating scale is designed in such a way that the OeNB can map PDs, as

[19] For instance, numerous other balance sheet items – ranging from interbank transactions via securities positions to external assets – are associated with risk and are far more important for the overall risk position of many banks. These and other bank-specific variables are taken into account in the analysis by the inclusion of bank fixed effects.

[20] Hayden (2003) estimates PDs in order to evaluate alternative rating models for Austrian firms on the basis of a sample from 1987 through 1999. For details of our estimation procedure, see Gaggl and Valderrama (2011). The results reported in this article employ PDs that predict the event of default within a three-year horizon. Gaggl and Valderrama (2011) also analyze alternative prediction horizons and show that the effects of bank risk taking in response to long periods of cheap refinancing conditions are the stronger, the longer the prediction horizon.

Chart 1

**The Average Bank's Loan Portfolio and Expected Default Rate (2000 to 2008)**

**Average proportion of credit**

*Average credit in %*
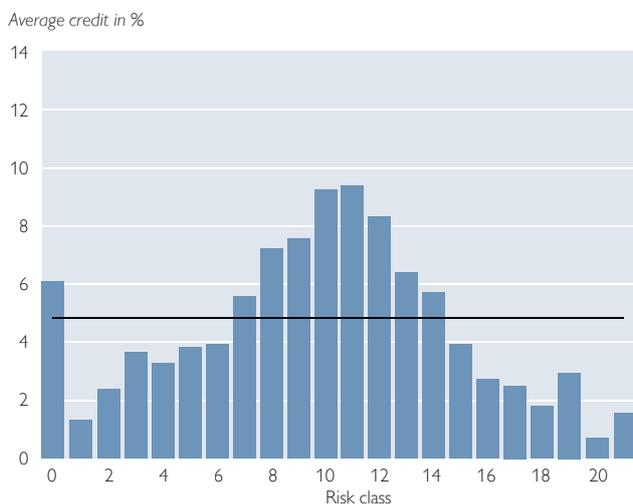
**Average proportion expected to default**

*Average credit in %*
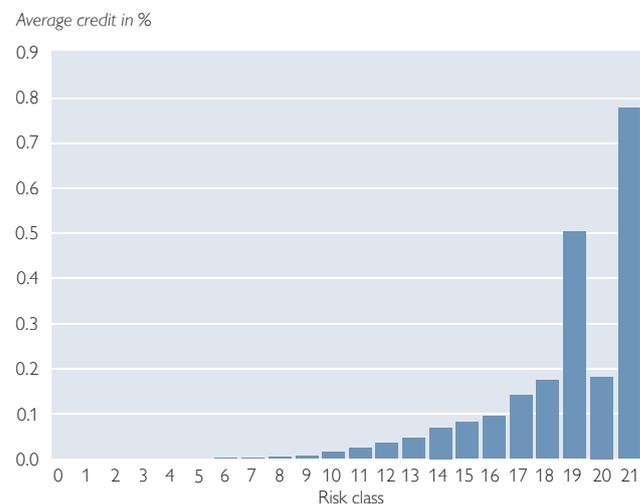


Source: Authors' calculations.

reported by banks on the basis of their individual internal rating models, into a unified rating scheme. Furthermore, each of these risk classes can be mapped into an S&P equivalent rating. In order to illustrate the distribution of Austrian banks' business lending across the risk classes used in practice, we thus employ the OeNB rating scale to map our estimates of each borrower's PD into a risk rating.[21]

Once we have assigned every firm to a risk class, we can illustrate the composition of risk in each bank's business-loan portfolio by looking at the share of credit extended to each risk class at any given point in time. Using our sample of matched bank-firm pairs, we compute these shares with monthly frequency for the period from January 2000 to August 2008.[22]

The left-hand panel of chart 1 plots the aforementioned shares for the average Austrian bank in our sample. As a reference, the horizontal line in the left-hand panel of chart 1 indicates a uniform distribution across risk classes. One can see that the bulk of business lending by the average Austrian bank was extended to firms in risk classes 3 to 15. Nevertheless, there is also a non-negligible proportion of lending within risk class 16 or higher. While this chart illustrates the composition of risk within the average Austrian bank's business-loan portfolio relative to the OeNB's rating scale, this distribution does not represent a cardinal measure of risk. In other words, the left-hand panel of chart 1 does not reveal the relative riskiness of individual risk classes. Thus, it is very difficult to measure

[21] *The precise specification of the OeNB rating scale is confidential and we are not allowed to present it here. However, we only use the OeNB rating scale as an illustrative tool, and none of the central empirical results reported in this paper depend on the precise specification of this rating scale.*

[22] *We restrict our analysis to the period before the failure of Lehman Brothers since we focus on identifying potential causes for the financial crisis thereafter, but we do not seek to analyze the crisis itself. For details on the precise construction of all the risk measures in this study, see Gaggl and Valderrama (2011).*

changes in risk taking on the basis of movements within such a distribution. This is because the shape of the distribution depends heavily on the design of the underlying rating scale.

Therefore, instead of analyzing the shape of the distribution in the left-hand panel of chart 1, we choose to construct a single cardinal measure for the amount of risk carried within a banks' business-loan portfolio. The idea behind this measure is illustrated in the right-hand panel of chart 1. There, we weight the proportion of credit extended to each risk class with the average PD within that risk class. We interpret this measure as the expected default rate within each risk class since it represents the proportion of credit that is expected to be defaulted upon. This alternative illustration highlights that only loans to very high risk classes effectively result in significant expected loss rates, and thus allows a cardinal interpretation.

Furthermore, adding these default rates across all risk classes produces a cardinal measure of the calculated expected default rate within the bank's overall business-loan portfolio.[23] The expected default rate for the average Austrian bank in our sample is 0.52% between 2000 and 2008, based on our estimates of PDs for a three-year bankruptcy horizon.

In what follows, we will employ this statistic to assess whether extensive periods of extremely accommodating monetary policy affect the amount of risk within banks' loan portfolios.

## 3.3 Assessing the Effect of "Too Low Interest Rates for Too Long": A Natural Experiment

In order to test whether interest rates that were "too low for too long" lead to an increase in Austrian banks' risk positions, we adapt an empirical strategy called "difference-in-differences," which enjoys great popularity in applied empirical microeconomics due to the seminal work by Card and Krueger (1994). This empirical strategy is useful whenever one seeks to analyze a discrete policy change and the policy measure under review does not vary at the level of the individuals affected. In our case, the individuals are banks, and the ECB refinancing rate is the policy instrument.

The basic idea behind this method is best explained within the context of a randomized medical experiment. Suppose we wanted to assess the effectiveness of Aspirin in reducing fever for a group of patients showing up at a doctor's office. We would randomly select two groups of patients and take their temperature. In the next step, we would give one group an actual Aspirin and prescribe a sugar pill to the other group.[24] After an hour we would take everybody's temperature for a second time and compute the difference in average temperatures of the treatment group as well as the difference in average temperature of the control group (i.e. sugar pill). The difference between the two differences would tell us the effectiveness of Aspirin in reducing fever. The difficulty with applying this

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[23] *This measure is intended to convey information similar to expected default frequencies (EDFs), as reported by Moody's KMV. Furthermore, this measure is closely related to the ratio of risk-weighted assets to assets used by De Nicolò et al. (2010). It is important to note, however, that the measure employed in our paper is independent of the precise definition of the underlying rating scale.*

[24] *It is important to note that the group of patients that visit the doctor's office is not a random selection (they are all sick). However, who receives the actual drug and who receives the placebo is random, i.e., the doctor flips a coin to assign each patient to one of the two groups.*

method to economics is the construction of pseudo-randomized groups, which is usually referred to as the design of a "natural experiment."

Within the context of this study, we want to analyze the effect of a certain monetary policy regime (Aspirin in the example given above) on the risk-taking behavior of banks (the changes in patients' temperature in the aforementioned example). Using interest rates for the ECB's main refinancing facility makes it easy to identify a unique period of historically low refinancing rates between June 6, 2003, and December 6, 2005. This period can be considered a unique "policy regime" since refinancing rates had until then never been as low and had also never remained unchanged for such a long period of time.[25]

As a first step, we perform a pseudo-randomization by restricting our analysis to periods during which we argue that monetary policy, as measured by the ECB refinancing rate, can be considered exogenous – or, statistically speaking, "random" – to the Austrian economy. We accomplish this by comparing the actual ECB refinancing rate to a hypothetical "reference policy rate" for Austria, in order to gauge whether, from an Austrian perspective, monetary policy had potentially been "too tight" or "too loose." If the chosen reference policy represents the policy actions that would have been chosen based exclusively on the Austrian economy, then any deviation from that reference policy represents an intervention that must have been exogenous to the Austrian economy. Thus, for this identification strategy to be valid, it is crucial to identify a reference rule that is a good predictor for observed ECB policy rates, when applied to euro area data. A natural choice for such a reference policy is a Taylor rule, which predicts a policy interest rate based on inflation and output gaps.[26] Using this reference policy, we construct a Taylor rule gap, defined as the difference between realized ECB refinancing rates and those predicted by the Austrian Taylor rule, which identifies periods during which – according to the method applied – monetary policy was exogenous to the Austrian economy. In particular, we interpret the ECB's refinancing rate as being "tight" whenever the Austrian Taylor rule gap is less than –25 basis points, while we consider it to be "loose" whenever the Austrian Taylor rule gap exceeds 25 basis points. Our choice of thresholds is guided by the observation that the ECB usually changes its refinancing rates in increments of at least 25 basis points.

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[25] Even though only a fraction of banks is actually refinanced by the central bank and for many banks yield curve changes have a greater direct impact on refinancing conditions, monetary policy (i.e. the refinancing rate) nevertheless influences the spread between the short-term and long-term interest rates.

[26] This method is often used, successfully, to model the refinancing rate. This does not mean that the ECB follows a Taylor rule; and naturally, the ECB's monetary policy decisions must apply to the entire euro area, and cannot be geared toward individual countries. From a statistical perspective, however, this is not sufficient to state a causal relationship between monetary policy and the risk-taking behavior of Austrian banks. If, for instance, a certain monetary policy decision is largely geared toward Germany (given its weight in the euro area average) and the Austrian economy is in synch with Germany at that time, from a statistical perspective, such a monetary policy decision is to be regarded as if it had been geared toward Austria. In such a case, an estimated correlation between a change in the ECB's monetary policy and Austrian economic developments does not provide clear evidence about causality. For details on the precise Taylor rule specifications, see Gaggl and Valderrama (2011), who show that the results presented in this study are robust to various specifications of the reference rule. The effects identified in this study are based on a Taylor rule with equal weights on inflation and output stabilization, and all equilibrium variables (or targets) are proxied by a Hodrick-Prescott trend. This is a very agnostic specification of a Taylor rule, as it allows for changes in the ECB's targets for inflation and output gaps, as well as for changes in the target for the equilibrium short-term real interest rate.

Chart 2

**Design of the Natural Experiment**

Austrian Taylor rule gap (TRG) of at least 25 basis points
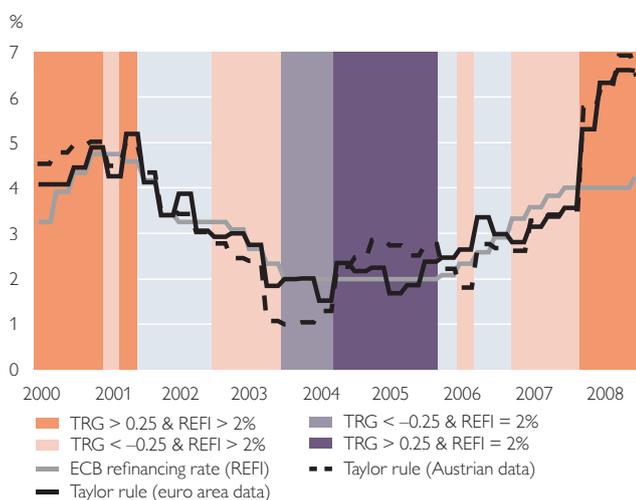
Austrian Taylor rule gap (TRG) of at least 50 basis points



Legend (left panel):
- TRG > 0.25 & REFI > 2%
- TRG < −0.25 & REFI > 2%
- ECB refinancing rate (REFI)
- Taylor rule (euro area data)
- TRG < −0.25 & REFI = 2%
- TRG > 0.25 & REFI = 2%
- Taylor rule (Austrian data)

Legend (right panel):
- TRG > 0.5 & REFI > 2%
- TRG < −0.5 & REFI > 2%
- ECB refinancing rate (REFI)
- Taylor rule (euro area data)
- TRG < −0.5 & REFI = 2%
- TRG > 0.5 & REFI = 2%
- Taylor rule (Austrian data)
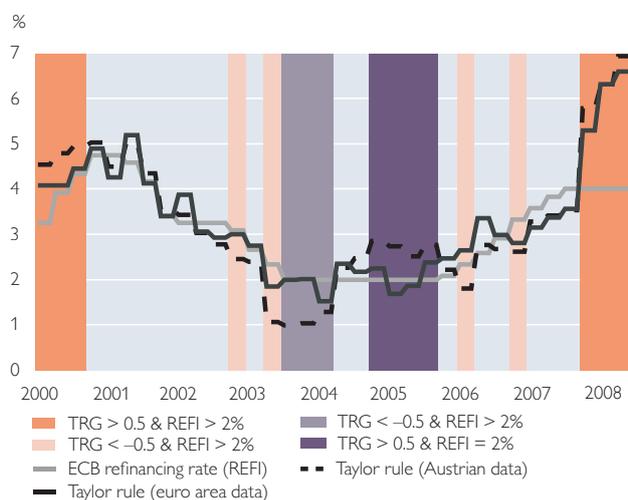
*Source: Authors' calculations.*

The left-hand panel of chart 2 illustrates the division of our sample into subperiods in which we consider the refinancing rate to be exogenous to Austria. The figure also illustrates the Taylor rule predictions for both Austria and the euro area. One can clearly see that the Austrian Taylor rule predicts a larger deviation than the euro area Taylor rule in almost all of the highlighted periods. To ensure that our analysis is not contaminated by the few selected periods during which the euro area Taylor rule is a worse predictor for observed ECB policy than the Austrian Taylor rule, we select an alternative set of subperiods in which the Austrian Taylor rule gap is larger than 50 basis points in absolute value. The right-hand panel of chart 2 illustrates that, for this alternative specification, there is no case where the euro area Taylor rule gap exceeds the Austrian Taylor rule gap in the same direction. Hence, we argue that during the selected subperiods, the ECB refinancing rate was not geared either directly or indirectly — for instance, through the tight link

between Austria and Germany — toward the Austrian economy.

In the next step we restrict our focus to the "treatment" period, starting in the third quarter of 2003 and ending in the fourth quarter of 2005. This period can be divided into two subperiods: an earlier subperiod during which the Austrian economy was characterized by inflation and output gaps below the euro area average (Taylor rule gap less than −25 basis points), and a later subperiod, during which Austrian output gaps and inflation were increasing rapidly and, hence, above the euro area average (Taylor rule gap greater than 25 basis points), which began as early as in the second quarter of 2004. The former was characterized by the aftermath of the bursting of the dot-com bubble, while the latter was a period of rapid recovery and the onset of a long-lasting boom that continued until the most recent global financial crisis.

Accordingly, the very accommodating monetary policy — refinancing rates had just been lowered to an unprecedented low of 2% p.a. — an adequate

Table 1

**The Effect of an Extended Period of Low Interest Rates on Riskiness**

| | $i_{ECB} > 2\%$ | $i_{ECB} = 2\%$ | Difference |
|---|---|---|---|
| *Experiment 1: Taylor rule gap of at least 25 basis points* | | | |
| Taylor rule gap smaller than −25 basis points | 0.4960 | 0.5269 | 0.0309 |
| | (0.0066) | (0.0121) | (0.0201) |
| Taylor rule gap larger than 25 basis points | 0.4574 | 0.6171 | 0.1598 |
| | (0.0069) | (0.0141) | (0.0499) |
| **Difference** | −0.0386 | 0.0903 | 0.1289 |
| | (0.0225) | (0.0466) | (0.0495) |
| *Experiment 2: Taylor rule gap of at least 50 basis points* | | | |
| Taylor rule gap smaller than −50 basis points | 0.5213 | 0.5269 | 0.0056 |
| | (0.0106) | (0.0121) | (0.0199) |
| Taylor rule gap larger than 50 basis points | 0.4416 | 0.6639 | 0.2223 |
| | (0.0074) | (0.0199) | (0.0624) |
| **Difference** | −0.0797 | 0.1370 | 0.2167 |
| | (0.0266) | (0.0613) | (0.0631) |

*Source: Authors' calculations.*

*Note: Standard errors in parenthesis.*

policy for the earlier subperiod. In fact, the Austrian Taylor rule suggests an even more expansionary policy than the ECB chose to implement. During the later subperiod, the Austrian Taylor rule suggests a sharp tightening of monetary policy, but ECB refinancing rates remained unchanged.

This provides a case study that allows us to analyze whether policy interest rates that stay "too low for too long" have a significant impact on banks' risk-taking behavior. The second column of table 1 illustrates that, indeed, the average expected default rate of Austrian banks, as defined in the previous section, increased by about 9 basis points, from 0.53% to 0.62%. However, even though this increase is statistically significant, it does not prove that the ECB's monetary policy caused the increase in banks' risk positions. As in the example of the medical experiment given above, we need to compare this increase to a counterfactual change in risk positions during periods in which the path of ECB policy rates was not flat (the change in temperature of the group that received the sugar pill).

To construct a counterfactual, we study the remaining periods in which ECB refinancing rates were changing relatively frequently, but the particular policy choices were still exogenous to the Austrian economy. As one can see in the left-hand panel of chart 2, these periods can likewise be split into two types of subperiods: periods during which economic conditions were benign in comparison with the euro area average (Taylor rule gap in excess of 25 basis points) — and, hence, the Austrian Taylor rule suggests a more restrictive monetary policy than had actually been administered — and periods during which a more accommodative monetary policy would have been called for (Taylor rule gap less than −25 basis points) from an Austrian perspective. Therefore, in analogy to the "treatment" period, we compute the difference in banks' average expected default rates between the two types of subperiods. The first column of table 1 shows that this counterfactual difference is slightly negative, but statistically sinsignificant. This means that, in periods during which ECB refinancing

rates were not kept flat for an extended period of time, banks' risk positions did not change significantly in response to a switch from a situation in which monetary policy was "too tight" to one in which it was "too loose," as identified by the Austrian Taylor rule gap.

The comparison of these two differences allows us to conclude that the measured increase in risk taking within the "treatment" period is about 13 basis points greater than during the counterfactual period. This effect is statistically significant and sizeable relative to the unconditional overall sample average of 0.52%.

However, since the euro area Taylor rule gap has the same sign and is even larger than the Austrian Taylor rule gap during some of the selected subperiods, one must raise the concern that the ECB's policy decisions may have been endogenous to the Austrian economy in at least some of the periods analyzed. To accommodate this concern, we perform the same exercise as that described above on a slightly more restrictive pseudo-randomization scheme, requiring the Austrian Taylor rule gap to be greater than 50 basis points in absolute value. This alternative selection criterion is illustrated in the right-hand panel of chart 2. As can be seen at the bottom of table 1, this alternative specification reveals an even larger increase of about 22 basis points in average expected default rates. Thus, our analysis provides some evidence that apart from other possible influencing factors the low interest rate period between June 6, 2003, and December 6, 2005, induced Austrian banks to significantly increase their risk taking.

The analysis presented here implies, however, that the "intervention period" (2003–2005) and "control periods" (2000–2002 and 2006–2008, respectively) differ exclusively with regard to the monetary policy regime and to

Austrian inflation and output gaps relative to the euro area, respectively. Since this assumption is most likely not met, Gaggl and Valderrama (2011) apply an extended analysis, controlling for a number of important macro and individual bank factors which may have had a considerable influence on Austrian banks' risk-taking behavior. In particular, it is found that the results presented here are robust to the following control variables: the levels of Austrian inflation and output gaps, the spread between long- and short-term interest rates in Austria (term spread) as well as the spread between Austrian and European long-term interest rates (country-risk spread), credit growth in Austria, the share of business loans in the entire portfolio of Austrian banks and the share of business loans in the given sample of total Austrian business loans. Furthermore, Gaggl and Valderrama (2011) control at the bank level for size, capitalization, liquidity, the number of bank-business relationships as well as unobserved bank heterogeneity (fixed effects).

Controlling for bank capitalization, for instance, rules out the concern that the regulatory changes due to the Basel II Accord might be causing the observed effect. Specific contractual terms agreed upon by individual banks and their clients are captured by fixed effects. Moreover, structural changes in management practices and risk management (e.g. owing to the Basel-II-induced changeover to Value-at-Risk analysis) may be ruled out as primary cause for the observed effects, as the analysis presents qualitatively equivalent results when the periods (in the extended analysis) before and after the intervention phase are considered separately as counterfactual.

Based on the extended analysis in Gaggl and Valderrama (2011) it can be argued that the chosen empirical analy-

sis indeed identifies a causal relationship between the period of low interest rates from 2003 to 2005 and Austrian banks' business lending risk position.

## 4 Conclusions

In this paper, we briefly discussed some of the main characteristics of a channel within the monetary transmission mechanism – usually referred to as the risk-taking channel of monetary policy – the potential existence and economic relevance of which has been acknowledged only recently. If this channel is at work, monetary policy affects the economy not only through its impact on the valuation of assets, the current riskiness of borrowers and expectations regarding their future development, but also by affecting the risk attitude of lenders. Thus, it may have important implications not only for monetary policy, but also for financial stability. The risk-taking channel implies that monetary policy contributes, in part, to the buildup of financial imbalances, which could – in the worst case scenario – culminate in a financial crisis that is brought about both by excessive lending and, in particular, by the deterioration of lenders' portfolios.

The candidate mechanisms driving this undesirable side effect of an expansive monetary policy are diverse, and there is neither conclusive empirical evidence nor a theoretical consensus on the relative importance of one or the other of the proposed explanations. The potential existence of this additional component within the transmission mechanism first attracted attention during a prolonged period of low interest rates, which was – quite importantly – accompanied by benign economic and financial conditions. Thus, it is not surprising that the most frequently cited cause for the risk-taking channel are so-called "search for

yield" motives, which are said to arise whenever banks' and investors' profit margins are squeezed substantially on account of interest rates that are "too low for too long." Nevertheless, there are a host of additional forces claimed to be driving, or at least contributing to, this phenomenon, such as the particular contractual agreements between investors and financial institutions, as well as the incentives given to bank and investment fund managers. Explanations derived from nonrational human behavior are yet another possibility.

The quoted scarcity of empirical evidence for both the existence of and the driving forces behind the risk-taking channel can be attributed to the inherent difficulties in disentangling this channel from the more traditional broad credit channel. In part, this is due to the lack of appropriate datasets that are detailed enough to test the proposed hypotheses. More importantly, however, there is a lack of formal theoretical models, which flesh out the details of either channel and allow for precise formulations of testable hypotheses that distinguish between the two mechanisms.

The empirical analysis in this study adds to the literature on the existence of the risk-taking channel. Using a unique sample of matched lenders and borrowers, we present evidence that the entirely flat path of ECB policy interest rates in the period from June 6, 2003, to December 6, 2005, caused a significant increase in the amount of risk taking in Austrian lending to businesses. Moreover, our identification strategy reveals that, from an Austrian perspective, ECB refinancing rates in this period had been "too low for too long," which confirms one of the potential causes cited most for the risk-taking channel.

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# The Impact of Economic Factors on Bank Profits

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*This study examines the impact of macroeconomic changes on bank profits that Austrian banks have experienced over the past 15 years. We used several proxies based on balance sheet data at the individual bank level, as well as macroeconomic variables to capture these changes, and additionally controlled for a number of microeconomic factors. Our estimation is based on panel regression analysis using unconsolidated micro-level data reported by all Austrian banks from 1995 to 2009. While we found that disintermediation (fewer loans in total assets) and the degree of concentration in the banking sector had a positive effect on bank profitability, changes in the ownership structure (privatization and increased foreign ownership), as well as more foreign lending by Austrian banks, did not, on the basis of unconsolidated data, have a clear-cut or significant impact on bank profits. As in other countries, bank profits in Austria are contingent on the business cycle and are positively influenced by the spread between long-term and short-term interest rates.*

In all economies, banks play a key role in transforming savings into investment. This holds especially true of a primarily bank-based financial system like that in Austria. Therefore, developments in the banking sector do not affect banks alone, but are highly relevant for the economy as a whole. Accordingly, the efficiency and profitability of the banking sector is of interest not just at the business level, i.e. at the individual bank level; rather, it is crucial at a broader macroeconomic level. Profits are a basic factor in the capital formation of enterprises, which include banks. Capital can be increased either by issuing equity or by retaining earnings (adjusted for payouts – dividend payments, share buybacks, etc. – to shareholders). Profits have an impact on a bank's cost of raising capital not only because of their direct contribution to equity financing, but also because profitability has an effect on external investors' assessment of the bank's financial strength. The better a bank's profit situation is, the better its prospects are for issuing new capital,

because investors have greater confidence in the bank's financial strength. This applies to the cost of both equity and debt financing. The yields of AAA-rated euro area bank bonds, for instance, averaged 2.9 percentage points less between the beginning of 2001 and September 2010 than those of BBB-rated banks.

The theory of the bank capital channel, which explores the link between equity ratios and the loan supply (Van den Heuvel, 2002, 2009) postulates that profits impact on bank lending through their effects on bank capital. International studies have shown that banks with sufficient capital resources are better equipped to absorb monetary policy and macroeconomic shocks (Altunbas et al., 2004; Gambacorta and Mistrulli, 2004). Conversely, banks with shrinking capital resources could be induced to cut back on lending on the asset side. The results of the Eurosystem's bank lending survey may also be interpreted in this fashion. The survey data show that, to some extent, banks' balance sheet constraints

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contributed to the tightening of lending standards in the course of the crisis. At the same time, well-capitalized banks are in a better position to attract deposits, and thus have more funds to lend.

The environment within which Austrian banks make profits has been influenced by a broad range of economic and economic policy developments over the past decades.[2] EU integration and the related liberalization of the regulatory framework for the Austrian financial market from the mid-1990s represented the catalyst for these developments. At the EU level, the increased competitive pressure became manifest in the establishment of Economic and Monetary Union, and then in the efforts to set up a single market for financial services by 2005. A key development for Austrian banks was the opening up of the Central, Eastern and Southeastern European (CESEE) markets. This integration of the financial markets led to a significantly more international orientation of the banking sector. Austrian banks accumulated significant positions, especially in CESEE.

In parallel, the comprehensive liberalization of the Austrian and international financial markets triggered a shift to capital market funding in Austria, a development observable in most countries with a bank-based financial system. Financial market deregulation spawned new financial instruments and transactions. Capital market instruments played an increasingly important role in corporate financing and in household investment. For banks, this translated into a drop in interest income, but also into additional income from other sources — as univer-

sal banks, Austrian banks also sell many of the financial instruments into which investors diversified.

More deregulation went hand in hand with comprehensive privatization of banks. Over the past 20 years, the public sector's holdings of Austrian banks' capital have gradually been scaled back, but were enlarged again in 2008 when recapitalization measures were taken under the bank support package. The changes in the ownership structure of banks appear to have brought about changes in the corporate governance structures of the banks involved, possibly also in the market as a whole. Moreover, the integration of the Austrian banking market into the EU was accompanied by a pronounced increase in the number of mergers. One of the express goals of mergers — especially in the 1990s — was to create larger units representing a critical mass powerful enough to cope with the challenges of EU integration.[3] Mergers and acquisitions led to substantial reductions in the number of market participants: Between 1995 and 2009, the number of independent banks declined from 1,041 to 855.

Against the background of the importance of bank profits for the economy, the object of this study is to quantify the impact of the economic and economic policy changes of the past 15 years on Austrian banks' profits. Thus far, the macroeconomic determinants of bank profits have been analyzed mainly in the context of cross-country comparative studies using aggregated data for the banking sector of each country. By contrast, panel analyses of individual bank data have usually focused on microeconomic

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[2] See also Glauninger et al. (2001), Mooslechner (2005) and Waschiczek (1999, 2005).

[3] In addition, there were a number of other reasons for mergers and acquisitions in banking, such as the exploitation of synergies.

influences. The impact of the economic and economic policy framework on bank profitability has to date not been systematically analyzed specifically for Austria. This study attempts to close that gap by analyzing the effects that such changes have had on the Austrian banking system over the past 15 years with the aid of microeconomic data on bank profits. Furthermore, microeconomic determinants are integrated into the study, making it a comprehensive examination of micro- and macroeconomic drivers of bank profits in Austria.

This study is structured as follows: Section 1 provides a brief overview of the literature on the determinants of bank profits. Section 2 contains a description of the data and variables on which the analysis is based. In section 3, we briefly review the econometric method used and analyze the estimation results. Section 4 summarizes the results and draws a number of relevant economic policy conclusions.

## 1 Survey of the Literature

A large number of studies have already dealt with the determinants of bank profitability, both at the international and at the specifically Austrian level.[4] The analyses focus primarily on microeconomic or bank-specific drivers of profits, based on variables like size, capitalization, risk management and cost management. With respect to the impact of the bank's size on its profitability, the results are ambiguous, but newer studies generally find a negative correlation (e.g. Maudos and Fernández de Guevara, 2004; for Austria: Liebeg and Schwaiger, 2006). Many authors find a strong, positive correlation between a bank's capitalization and its profitability (Bikker and Hu, 2002; Demirgüç-Kunt and Huizinga, 2000; Maudos and Fernández de Guevara, 2004; Carbó Valverde and Rodríguez Fernández, 2007). Generally, the authors postulate a link between capitalization and risk aversion. According to this view, banks with a high level of capital are more risk averse and ignore potential diversification options or other methods to increase profitability (Goddard et al., 2004). Some studies look at the influence of the cost-to-income ratio as an indicator of the quality of management. Whereas it is no surprise that the cost-to-income ratio makes a positive contribution to overall profitability, it is notable that other authors (Maudos and Fernández de Guevara, 2004; Liebeg and Schwaiger, 2006) find a negative correlation with the interest spread.

Most of the studies focusing on macroeconomic influences are cross-country comparisons that use aggregated country data to compare the profitability of different countries' banking systems. At the international level, a number of studies (Albertazzi and Gambacorta, 2009; Bikker and Hu, 2002; Demirgüç-Kunt and Huizinga, 2000) find that the business cycle has a positive influence on the development of bank profits. Demirgüç-Kunt and Huizinga (2000) emphasize the importance of the difference between institutional factors, such as the structure of the financial sector, the legal system and taxation. Thus far, researchers have found almost no evidence that the ownership structure of banks had an impact on their profitability.

A number of studies examined the influence of the market structure (degree of competition, barriers to market

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[4] Given the pronounced changes in banking, both internationally and in Austria in recent years, this section concentrates on the literature of the past decade.

entry) on bank profitability. Most of them are based on the structure-conduct-performance (SCP) model that links market structure to the behavior of firms (in this case, that of banks) and postulates a positive correlation between market power and profit. Goddard et al. (2004), as well as Hahn (2008), find a negative influence of the degree of competition (positive influence of the degree of concentration) on bank profits. The efficient structure hypothesis, by contrast, assumes that banks with superior management have lower costs and therefore higher profits. These banks will be able to gain market share over time, leading to a higher market concentration (Berger, 1995, 2007).

In addition, interest rate levels and, above all, the possibility of generating income gains through maturity transformation, i.e. the slope of the yield curve, have an impact on bank profits (Albertazzi and Gambacorta, 2009). Demirgüç-Kunt and Huizinga (2000) also find a positive correlation between bank profits and inflation. Finally, corporate tax rates influence bank profits (Albertazzi and Gambacorta, 2009; Demirgüç-Kunt and Huizinga, 2000).

Some studies examined bank profits in Austria from various angles. Most of the analyses concentrated on either microeconomic factors and/or market structure, although all of the studies took into account at least a few macroeconomic variables, generally as control variables. The first comprehensive analysis of Austrian banks' profitability is Mooslechner (1995), who examined, above all, the influence of both microeconomic factors and the market structure. This study found a negative correlation between profitability and total assets, and only a weak correlation with

balance sheet structure, where the share of lending was found to have a positive influence. Using regression analysis, Arpa et al. (2001) examined the impact of macroeconomic variables on Austrian banks' profits (and on their risk provisioning). Burgstaller (2006), too, took a predominantly macroeconomic perspective, whereas Hahn (2008) essentially analyzed the effects of the market structure of Austrian banking on banks' profits. Liebeg and Schwaiger (2006) focused not on total profit but rather on the determinants of Austrian banks' interest margins from a primarily microeconomic angle.

The last four of the studies listed above examined the effects of the business cycle on bank profits, but only Liebeg and Schwaiger (2006) found a significant contribution of the business cycle (to the interest margin). The three other studies, which used economic growth as a variable, did not ascertain any significant influence. Looking at the impact of interest rates on bank profits, Arpa et al. (2001) found a positive influence of the level of short- and long-term interest rates, while Liebeg and Schwaiger (2006) established that both the spread between short- and long-term interest rates and the volatility of interest rate levels had positive effects. By contrast, Burgstaller (2006) did not determine any significant correlation. Three of the studies analyzed the influence of market structure on bank profits, each using other variables to establish a positive correlation between a higher degree of market concentration and bank profitability.[5] At the micro level, efficiency indicators (with the exception of economies of scale, which Hahn, 2008, tested) and capitalization proved

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[5] *Liebeg and Schwaiger (2006) used the Lerner index, Burgstaller (2006) the share of the ten largest banks in total assets, and Hahn (2008) the Herfindahl-Hirschman index.*

significant in all studies. Findings with respect to the market share of an institution were mixed: Liebeg and Schwaiger (2006) found a significant negative influence (on interest margins), whereas Hahn (2008) found no effect (on return on assets). Looking at the earnings structure, Liebeg and Schwaiger (2006) found a positive influence both of the share of interest income and of non-interest income in total assets. None of the studies included variables that capture the impact on Austrian banks' profitability of the changes in the economic fundamentals mentioned earlier.

## 2 Data and Variables

### 2.1 Panel Dataset Containing Individual Bank Data and Macro Data

Reports by all banks that did business in Austria in the period from 1995 to 2009 – a total of 1,042 banks – represent the basis for this study.[6] Data on balance sheet items and Austrian banks' profitability were taken from the quarterly reports of condition and income – the (unconsolidated) Asset, Income and Risk Statement – that are available as from the fourth quarter of 1995. Data on banks' core capital and risk-weighted assets up to 2007 were taken from the monthly reports (part C) by banks to the Oesterreichische Nationalbank (OeNB) and, from 2007, they were taken from the (unconsolidated) reports on compliance with regulatory standards.

As consolidated data for Austrian banks did not become available until 2006, the unconsolidated figures were used for this analysis, despite the fact that they do not capture key areas of Austrian banks' activities. These data do not include the business activities of foreign subsidiaries of Austrian banks, which have become increasingly important over the past decade. However, as this study reviews the development of the Austrian market, the use of unconsolidated data appears warranted, considering that while the unconsolidated data may not capture the full volume of foreign business, they provide an indication of the speed at which this foreign business has developed, although perhaps understating it.

With respect to the performance indicators, the banks' data on their operating income and operating expenditure (and, therefore, also those on their operating profit) are based on the total for the respective business year. For instance, third-quarter values are the sum total of the values of the first three quarters of the year in question. In addition, banks report quarterly updates of the outlook for the respective business year for the operating profit, loan loss provisions, profit from ordinary activities, tax payments and the net profit or loss for the year. In other words, most of the performance indicators are expected rather than actual figures – only the financial statements for the year contain the actual figures. For operating profit, both quarterly and outlook values for the respective business year are available. As there is only a negligible difference between the two values for the fourth quarter in each year, the outlook values are suitable as a proxy for the annual figures. However, this also means that performance indicators are available solely on an annual basis. Therefore, annual values for 1995 through 2009 were used for this analysis. The data were evaluated in anonymized form for all

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[6] With the exception of those of branches of credit institutions subject to the provisions of Article 9 Banking Act (governs the activities of branches of credit institutions under the freedom of establishment within the EU).

banks that existed between 1995 and 2009.

Data on GDP growth and inflation come from Statistics Austria, with inflation being calculated on the basis of the HICP. The data on long-term and short-term interest rates were taken from Thomson Reuters.

## 2.2 Banks' Profit Rates Tended to Fall

As dependent variables two profit indicators were analyzed, namely earnings before tax and operating profit. Earnings before tax is the sum of operating profit, provisions[7] and extraordinary income, and is thus banks' profit before taxes. The use of earnings before tax as an indicator eliminates the impact of changes in taxation. The use of the variable earnings before tax as one of the two profitability measures makes it possible to take into account the impact of value adjustments, which rose markedly in 2008 and 2009. In line with usual practice, both profit variables are expressed as a ratio to core capital, so that the return on equity (ROE) is our profitability measure. The ROE is the rate of return on equity investors' capital during a given period. As this measure is expressed in terms of core capital, it allows a comparison of individual banks' data over time.[8]

Chart 1 shows the development of the unweighted averages of the profit-

ability variables covered in this study for all banks in the sample for the entire observation period.[9] Chart 1, panel (a), demonstrates that the unweighted average of all observed banks' earnings before tax, which take into account depreciation and extraordinary income, rose marginally when expressed as a percentage of core capital (ROE I) in the late 1990s and tended to decline from 2000 to 2007, when the financial and economic crisis started and slashed banks' profits. The other profitability measure – the operating profit expressed as a percentage of core capital (ROE II) – has, on average, also declined since 2000, as indicated in chart 1, panel (b). Consequently, bank profitability exhibited a falling trend, on average, in the past decade.

## 2.3 Determinants of Bank Profits

This study uses a variety of microeconomic indicators stemming from bank data, including balance sheet and income statement figures, as well as macroeconomic indicators, to capture changes in the economic and economic policy framework.

### 2.3.1 Disintermediation

This study uses the share of loans extended to domestic non-banks in total assets as a measure of the magnitude of disintermediation tendencies.[10] This share diminishes the more bor-

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[7] Here, the allocation and dissolution of provisions for lending to banks and customers, on securities as well as on participations and shares in affiliated enterprises have been aggregated. The item includes already executed direct write-offs of claims and expected value adjustments.

[8] Some studies also use a ratio dividing earnings before tax and/or the operating profit by total assets, namely the return on assets (ROA). However, use of the ROE is preferred in this study for econometric reasons, as many of the explanatory variables are also expressed in terms of total assets. Consequently, if the ROA were used, there would automatically be a correlation between the ROA and some of the explanatory variables, which could have a negative effect on the reliability of the estimation results. Most of the studies available, however, do not take into account this issue (e.g. Maudos and Fernández de Guevara, 2004).

[9] The figures in this study differ from those published in the OeNB's regular statistics and analyses because this study uses the unweighted averages of all banks covered.

[10] Disintermediation is also visible on the liability side of banks' balance sheets, where investing households substitute capital market products for bank deposits. Results for the deposit ratio may differ from those of the credit ratio if the ratios are subject to different influences.

Chart 1

## Unweighted Annual Averages of Selected Variables from 1995 to 2009



**(a) ROE I**

**(b) ROE II**
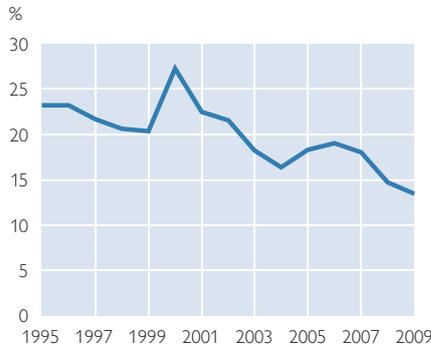
**(c) Loans**

**(d) Share of publicly owned banks (dummy)**
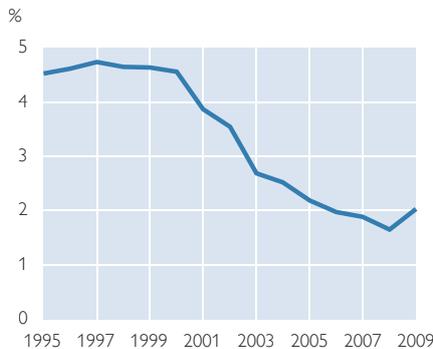
**(e) Share of foreign-owned banks (dummy)**
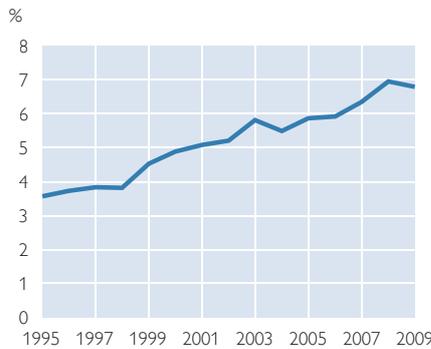
**(f) Foreign lending**

**(g) Herfindahl-Hirschman index**

**(h) GDP growth**
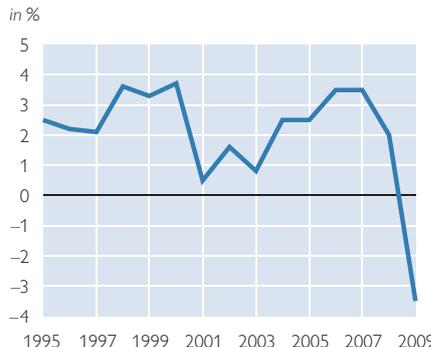
**(i) Yield curve (ten years minus three months)**

**(j) Inflation rate (HICP)**
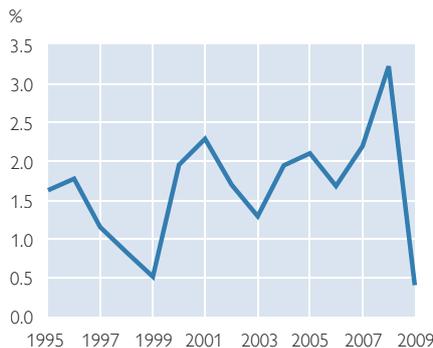
**(k) Core capital**

**(l) Foreign currency loans**
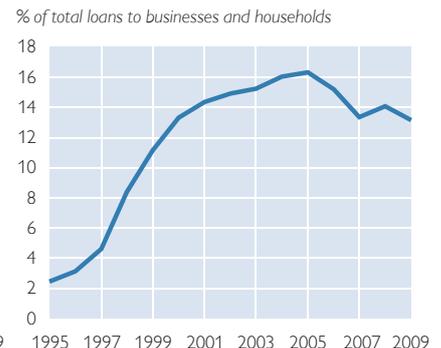
Source: OeNB.

rowers opt for market-based debt financing rather than for bank-based financing. Chart 1, panel (c), shows that, on average, loans expressed as a percentage of total assets have fallen since 2000. The literature does not give a clear account of the impact of such disintermediation tendencies on bank profits. Whereas some studies come to the conclusion that a higher share of non-interest income increases the volatility of bank profits (Stiroh, 2004; Carbó Valverde and Rodríguez Fernández, 2007), other authors find that the diversification resulting from disintermediation strengthens the banks' profit base (Lown et al., 2000; Rossi et al., 2009). We expect that, on balance, disintermediation tendencies have a positive impact on banks' earnings – the lower the share of loans is in total assets, the higher profits are.

### 2.3.2 Privatization

The share of public holdings in Austrian banks is an indicator of the level of privatization (or the remaining share of public ownership) in Austria. A bank is considered to be publicly owned if the public (central, state and local government) share exceeds 50%. Minority public interests (up to 50%) are not taken into account. We use a dummy variable (0 or 1) to represent the banks' ownership structure. The economic rationale for the use of a dummy is that the issue at stake is essentially the impact of changes in behavior rooted in the ownership structure, which can best be represented by focusing on the majority shareholder. Chart 1, panel (d), establishes that the share of publicly owned banks has dropped from 5% to below 2% since 2000. The impact of privatization on bank profits is not clear-cut. On the one hand, public ownership frequently put restrictions on banks' business opportunities, with

some banks' options for raising capital (and, hence, for expanding their business activities) also being limited, so that privatization could be expected to have a positive effect on bank profits. On the other hand, however, the profitability of the banks that the public sector has acquired in the wake of the crisis in recent years was low.

### 2.3.3 Internationalization of the Ownership Structure

The procedure for capturing the internationalization of the ownership structure is the same as that used to determine the volume of privatization in the Austrian banking sector. A bank is classified as foreign-owned if the share of foreign ownership exceeds 50% (again, using a dummy). Much of the increase in the share of foreign ownership in Austrian banks was due to privatization, but in a number of cases, banks not owned by the public sector were also sold to investors outside of Austria. Chart 1, panel (e), records a steady growth of the share of foreign-owned Austrian banks (again as a percentage of all banks) over the entire observation period, to nearly 7% at present. The expected effect of foreign ownership on bank profits is ambiguous, as was the case for the impact of privatization on bank profits. If foreign owners expect higher returns on their interests than Austrian owners, one would expect these banks to make higher profits. Moreover, if a bank is integrated into a multinational group, one could expect this to entail efficiency gains, provided that the group proves capable of following international customers to their respective markets. Conversely, information asymmetries between shareholders and management could play a greater role at foreign-owned banks. Regulatory, language-related and cultural differences may also have a

negative impact on profits (Buch, 2005). Overall, the empirical evidence on the issue of whether predominantly foreign-owned banks are more profitable is mixed. For the U.S.A., the correlation between foreign ownership and bank profitability tends to be positive, while other countries tend to exhibit a negative or no correlation (Berger, 2007).

### 2.3.4 Internationalization of Banking Activity

The degree of internationalization in banks' activities is measured as the share of foreign lending in total assets.[11] The unconsolidated data used in this study reflect Austrian banks' international business only incompletely, so that the estimate falls considerably short of the absolute volume. The reason for this is that while the large Austrian commercial banks have built up extensive subsidiary networks in the CESEE region, the CESEE business volume is not included in the Austrian banking sector's total assets. Nevertheless, the internationalization indicator reflects the speed of internationalization in Austrian banking in the wake of the opening up of the CESEE region fairly well. Since 1995, the average share of cross-border loans in total assets has expanded to over 10% in the last two years of the sample (chart 1, panel (f)). In the consolidated figures, CESEE business made an important contribution to Austrian banks' profits

(for more information, see the regular analyses of Austrian and international developments in the OeNB's Financial Stability Report). But even in the incomplete coverage based on unconsolidated data, the share of foreign business should correlate positively with banks' income.

### 2.3.5 Degree of Competition

The literature frequently uses market structure indicators to assess the degree of competition in the banking system, based on the line of reasoning that a larger market share implies greater market power, which in turn restricts competition. This argumentation is rooted in the structure-conduct-performance (SCP) paradigm, which postulates a positive correlation between market power and profit.[12] In practice, such considerations also play a role in banking. Frequently, one of the reasons explicitly cited as a motive for mergers and acquisitions in banking is that of strengthening a bank's market position and reducing the degree of competition on regional and national markets. Hence, higher market concentration should entail greater bank profitability. One of the most widespread measures of the degree of competition on a market is the Herfindahl-Hirschman index (HHI). The HHI is defined as the total of the squared market shares (in percent) of the individual firms.[13] As the HHI squares the banks' market shares, larger banks are represented dispropor-

[11] As in the case of the assessment of disintermediation, the share of foreign business is depicted in terms of the asset side. It would also be possible, however, to depict it in terms of the liability side.

[12] However, the assumptions underlying the SCP model are the subject of some controversy in the literature. The causality might in fact be reversed, as the efficient structure hypothesis postulates. This hypothesis assumes that costs are lower and profits higher in well-managed banks, so that such banks can gain market share over time, leading to higher market concentration.

[13] However, Austrian banks are interlinked in many ways as a result of their organization in sectors. For much of the banking system – the decentralized sectors, i.e. Raiffeisen banks, savings banks and Volksbank credit cooperatives – the local markets are clearly separate. An alternative calculation of the HHI that takes this into account by treating each of the three decentralized sectors as a hypothetical single group has no noteworthy impact on the regression results presented later in the study.

tionately. Chart 1, panel (g), shows that the HHI rose slightly until 2001, increased sharply in 2002 and tended to fall again thereafter.[14] This indicator thus allows the conclusion to be drawn that the overall degree of concentration in Austrian banking has not risen since 1995.[15]

### 2.3.6 Cyclical Factors

Cyclical aspects must also be taken into account in macroeconomic analyses of bank profits. A number of studies have shown that the position in the economic cycle may influence bank profits significantly (Albertazzi and Gambacorta, 2009). Economic growth is the most comprehensive measure of macroeconomic developments, and is thus an indicator of both demand for bank services and credit risk (loan loss provisions). Therefore, real GDP growth is used as an explanatory variable, and it is expected that economic growth and bank profit are positively correlated.

In addition, the general level of interest rates – above all, the spread between short-term and long-term interest rates – is key to explaining bank profitability. As the maturities of banks' assets and liabilities frequently differ – usually, their investment has a longer maturity than their funding – changes in the yield curve have a noticeable impact on the profitability of maturity transformation. A positive correlation between the spreads and bank profitability is expected.

Like other studies on this topic, this study also uses the inflation rate as an additional economic variable in the analysis. Arpa et al. (2001), Bikker and Hu (2002), and Demirgüç-Kunt and Huizinga (2000) all find a positive correlation between bank profit and inflation. However, the literature hardly substantiates this correlation. It is conceivable, for example, that fees and commissions rise simply because the nominal value of the underlying assets rises, or that interest rates on loans are adjusted for inflation more quickly than those on deposits, which may temporarily lead to higher profits in periods of higher inflation.

### 2.3.7 Control Variables

This study also takes into consideration some microeconomic control variables that have proved to be particularly significant for the development of bank profits in other studies, especially in those on Austrian bank profits.

- *Bank size:* The correlation between bank size and profitability is controversial in the literature. In addition to the market power argument already discussed in connection with the degree of competition, economies of scale are also cited as a factor behind a positive correlation between bank size and bank profits. Delegated monitoring as described by Diamond (1984), above all in lending, should create economies of scale by lowering transaction costs, but empirical research on the existence of economies of scale and economies of scope in banking does not come to unambiguous conclusions. In fact, in the 1990s, negative economies

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[14] *The marked increase in 2002 reflects the merger of Bank Austria AG and Creditanstalt-Bankverein AG. Given the use of unconsolidated data, the merger can only be considered as of that point in time.*

[15] *The development of another common structural measure of the degree of competition, namely the concentration ratio, presents a similar picture. The concentration ratio depicts the cumulative market share of the x largest banks. The share of the five largest banks in the total volume of credit diminished from 41% in 2005 to 35% in 2009. Prior to this period, the ratio fluctuated fairly strongly without following a clear trend. Finally, the development of banks' total assets has not indicated a rise in the concentration ratio in recent years.*

of scale were measured for Austrian banks (Mooslechner, 1995). Since then, however, technical progress and regulatory changes are likely to have increased the optimum size for European banks. Given that economies of scale will probably be highest in lending, the bank size is measured in terms of each individual institution's share in total domestic lending by the banking sector.

— *Risk aversion:* A bank's risk behavior is another fairly important determinant of its profitability. Many studies, such as that by Maudos and Fernández de Guevara (2004), use the capital ratio (core capital ratio) as an indicator – the higher the capital ratio, the greater the risk aversion. As the core capital ratio first became available in 1998, this study uses the ratio of core capital to risk-weighted assets (until 2007) and the risk-weighted exposure amount of on-balance-sheet business (from 2008).[16] In 2008 and 2009, this ratio surged, as banks boosted their capital considerably during the crisis; moreover, the ratio of core capital to risk-weighted assets declined marginally in 2009 (chart 1, panel (k)). Considering the strong positive correlation between a bank's capitalization and its profitability in many other studies, the correlation in this study is also expected to be positive.

— *Share of foreign currency lending:* The proliferation of foreign currency lending to households and, albeit to a lesser degree, enterprises became typical of the development of Austrian banking from the mid-1990s. Therefore, the share of foreign currency loans in total lending to businesses and households was considered as an additional control variable for the analysis. The (unweighted average) share of foreign currency loans in total lending to domestic nonfinancial corporations and households more than quadrupled between 1995 and 2005 and, even though it declined in the meantime, came to roughly 12% at the end of 2009 (chart 1, panel (l)). As the sharp increase in foreign currency lending is an Austrian phenomenon, it has been analyzed in only one study so far, namely by Liebeg and Schwaiger (2006), who find a negative correlation with the interest rate spread.

— *Sector-specific dummies:* To control for possible heterogeneity in profits that stem from the classification of a bank as belonging to a specific sector, dummy variables are used in the estimation for each sector represented in the sample (Raiffeisen banks, savings banks, Volksbank credit cooperatives, joint stock banks, state mortgage banks, building and loan associations and special purpose banks). Since the sectoral classification of banks can change on account of mergers and acquisitions or other reclassifications, these dummy variables are not necessarily constant over time.

— *Introduction of the euro:* In the run-up to Stage Three of EMU, some banks voiced concerns that the introduction of the euro could affect their profits because they would no longer have income from

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[16] *In 2007, the year of transition from the Basel I to the Basel II regime, reporting requirements were changed. The proxy for banks that no longer reported under the old requirements in 2007 was the assessment base for credit risk pursuant to Articles 22a – 22h Austrian Banking Act multiplied by the factor 12.5 (the inverse of the regulatory minimum capital ratio of 8%).*

currency exchange fees or other earnings generated through e.g. hedging business with other European currencies. To test this hypothesis, a dummy variable was included that takes the value of 1 as from the date on which the euro was introduced as a noncash currency in 1999.

— *Financial crisis:* Finally, as the single most important macroeconomic occurrence in the past 15 years, the financial crisis had a material impact on the data of all variables used. In order to explicitly take into account this effect, which is visible in macroeconomic variables such as economic growth and the yield curve, we use a dummy variable that takes a value of 1 for 2008 and 2009.

— *Trend:* As indicated in chart 1, panels (a) and (b), ROE I and – even more so – ROE II are likely to show a negative trend over time. To take this circumstance into account, the estimation equation also includes a time trend.

## 3 Estimation Method and Results

The two indicators of bank profits – earnings before tax as a percentage of core capital (ROE I) and operating profit as a percentage of core capital (ROE II) – are available at the individual bank level $i = 1, ..., M$ for the years 1995 through 2008, $t = 1, ..., 15$. Hence, a panel regression is the natural estimation technique for our analysis. To allow for individual heterogeneity in the estimation, i.e. the heterogeneity among bank profits, which is not explained by any of the independent variables, the model is estimated using a fixed-effects specification:[17]

$$y_{it} = \alpha + X'_{it}\beta + Z'_t\gamma + \mu_i + \varepsilon_{it} \qquad (1)$$

where $y_{it}$ is the dependent variable (ROE I and ROE II, respectively), $\alpha$ is the constant and $\beta$ as well as $\gamma$ are the coefficient vectors to be estimated. $X_{it}$ is the vector of all explanatory variables available at the micro-level: lending as a percentage of total assets, foreign lending and foreign currency lending as a percentage of total assets, the bank's market share in total lending, core capital as a percentage of risk-weighted assets, and dummy variables for publicly owned and foreign-owned banks and for sector classification. Vector $Z_t$ contains variables that vary only over time: the HHI, the macro variables economic growth, the slope of the yield curve and inflation, and the dummies for the introduction of the euro as well as the financial crisis and the time trend. $\mu_i$ denotes the individual fixed-effects, $\varepsilon_{it}$ the individual error terms, which are assumed to be independently and normally distributed.

### 3.1 Disintermediation and Foreign Ownership Dampen Bank Profits

Table 1 shows the results of the fixed-effects estimation for ROE I and ROE II.[18] Principally, the results differ

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[17] *In panel regression econometrics, this estimation method is called fixed-effects least squares, in which the "within" transformation of the estimation equation (Baltagi, 2008, chapter 2) is used. The random-effects generalized least squares (GLS) estimation method would be an alternative to the fixed-effects estimation. The GLS method assumes that individual-specific effects are not fixed (deterministic) but random (normally distributed). We chose the fixed-effects method for this study because first, our sample is not randomly selected but rather contains the total population of Austrian banks and second, a correlation between the individual-specific effects and other explanatory variables cannot be ruled out. The latter represents a basic assumption of the random-effects GLS method (for more details, see also Baltagi, 2008, chapter 2).*

[18] *To test whether the estimation results are robust with respect to the estimation method, the same model is also estimated with the method introduced by Arellano and Bond (1991). The corresponding estimation results are presented in the annex to this study and largely confirm the fixed-effects estimation results shown in table 1.*

somewhat for the dependent variable being earnings before tax (ROE I) and operating profits (ROE II). As ROE I is already adjusted for loan loss provisions and thus represents a more complete picture of bank profitability, the regression using ROE I is considered our standard specification. However, ROE II, which is not adjusted for loan loss provisions, deserves to be taken into account as well as it may well provide a more accurate picture of profit developments in the current period because these provisions frequently originate in previous periods. Overall, however, we consider ROE I as the more relevant profitability measure; therefore, results for ROE II are highlighted only where they diverge.

The results show a significantly negative correlation between the share of loans in total assets and bank profits. Banks with a lower proportion of their business in classical lending operations and hence a higher proportion in other types of investment, such as equity and debt securities, appear to make higher profits. In other words, the disintermediation tendencies in Austrian banking may well have boosted profits. The coefficient of −0.08 means that: If the share of lending in total assets declines by 1 percentage point for the average bank, its ROE I rises by 0.08 percentage points under *ceteris paribus* conditions. We find an inverse relationship for ROE II, which is not adjusted for loan loss provisions. Obviously, loss provisions are on average lower for equity and debt securities than for loans.

Continued privatization in the Austrian banking sector throughout the observation period is likely to have

Table 1

## Fixed-Effects Panel Regression Analysis of Bank Profits

| Dependent variable | ROE I | ROE II |
|---|---|---|
| Loans in % of total assets | −0.079*** | 0.106*** |
| Public ownership (dummy) | 0.291 | −1.403 |
| Foreign ownership (dummy) | −7.854** | −4.761 |
| Foreign lending in % of total assets | 0.052 | 0.119** |
| HHI | 0.481* | −0.530*** |
| GDP growth | 0.331** | −0.168* |
| Yield curve (ten years minus three months) | 1.234*** | 0.040 |
| Inflation rate (HICP) | 3.165*** | 1.858*** |
| Market share in total lending | 0.650 | 1.051 |
| Core capital in % of risk-weighted assets | 0.002** | −0.001 |
| Share of foreign currency lending | 0.085 | −0.017 |
| Euro introduction (dummy from 1999 on) | −1.608 | 0.948 |
| Financial crisis (dummy for 2008 and 2009) | −9.232*** | −2.505*** |
| Trend | −0.165** | −0.871*** |
| Number of observations | 12,694 | 12,694 |
| Number of banks | 1,042 | 1,042 |
| $R^2$ (within $R^2$) | 0.27 | 0.13 |

Source: Authors' calculations.

Note: The regressions also contain sector-specific dummies and a constant in addition to the stated variables. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. The standard errors are robust with respect to heteroscedasticity and control for clusters in the 1,042 banks.

The coefficients of the variables defined as ratios and of the macrovariables are to be interpreted as semi-elasticities: If the respective explanatory variable rises by 1 percentage point, the ROE rises (falls) by x percentage points (e.g. 0.3-percentage-point higher ROE I as a result of 1-percentage-point higher GDP growth). For the dummy variables, the change from 0 to 1 translates into an increase (decrease) of the ROE by x percentage points (e.g. ROE I decreases by an average of 7.9 percentage points if the bank becomes majority foreign owned).

had a neutral impact on bank profits, as the results available do not indicate a significant correlation between the profits of, and the dummy variables for, majority publicly owned banks. The profitability of majority publicly owned banks turns out to be no higher on average than that of majority privately owned banks.

Conversely, the internationalization of the Austrian banking landscape apparently did have an impact on profits. We find a significantly negative influence on ROE I in the case of the dummy variables for majority foreign-owned banks – these banks made lower profits in the review period. The negative effects of foreign ownership on the bank profits mentioned in section 2.3.3 appear to outweigh the positive factors. While this impact is also negative for ROE II, it is no longer statistically significant.

The other factor capturing Austrian banks' internationalization, namely the rise in lending abroad, had a positive but not statistically significant impact on ROE I. But this variable may reflect the problem mentioned in section 2.3.4 that a review of bank profits on an unconsolidated basis does not take into account the profits of subsidiaries abroad, so that the impact of internationalization on bank profits may be underestimated. However, foreign lending is found to have a significant positive effect on profitability in the case of ROE II, however. Thus, the higher profit is likely to have been canceled out by higher loan loss provisions.

The fixed-effects estimation shows the degree of competition in Austrian banking measured with the HHI to have a significantly positive effect on ROE I, which means that average profits were higher (lower) in years in which, *ceteris paribus,* market concentration in the Austrian banking sector rose (fell). By contrast, the degree of competition as shown by the HHI has a negative effect on profits in the case of ROE II.

## 3.2 Bank Profits Are Procyclical and Depend on the Slope of the Yield Curve

All three macroeconomic variables included in the analysis have a positive and significant effect on bank profits. Economic growth measured as the annual percentage change in real GDP has a positive impact on ROE I: Bank profits are higher in years with stronger economic growth. However, at an average 0.3 percentage points, the effect is fairly small. It was certainly especially apparent in 2009, the year in which the financial crisis hit the banking sector hard and in which it also caused GDP to shrink. This correlation was not driven exclusively by the events during 2008 and 2009, as shown by the fact that the variable is significant despite the inclusion of a dummy for the financial crisis (see the last paragraph in this section) and that it remains significant in an estimation of the same model using data only up to 2007.[19] But looking at ROE II, the fixed-effects estimate produces a negative correlation between economic growth and bank profits.

The steepening in the yield curve – measured in terms of the differential between three-month rates and the ten-year government bond yields – also has a significant positive effect on

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[19] *To assess whether the results are robust with respect to the unprecedented financial crisis, which is likely to have influenced all data of the past two years, we performed an alternative estimation using only data from 1995 to 2007. The results of this estimation confirm the results shown in table 1 at the qualitative level for every variable.*

ROE I. This differential has an impact on the interest rate spread between deposits (assumed to be shorter-term) and loans (assumed to be longer-term) and thus determines banks' profitability. As in Demirgüç-Kunt and Huizinga (2000), we also find a positive correlation between bank profits and inflation. Obviously, banks benefit from higher inflation.

Of the microeconomic control variables, only the ratio of core capital to risk weighted assets was found to have a significant and positive influence on bank profits. More risk-averse banks identified in terms of a higher ratio of core capital to risk-weighted assets made higher profits in Austria in the review period than less risk-averse banks. Bank size – measured in terms of the individual institution's share in total domestic lending – and foreign currency lending had no significant influence on the two profitability indicators analyzed in this study.

The findings of this study show that the introduction of the euro represented by a dummy from 1999 on had no sustained influence on bank profits, whereas the financial crisis had a clearly negative influence on both profit variables. In addition, a mild, but still significantly negative trend over the observation period was found for both profit variables.

## 4 Conclusions

Overall, the findings suggest that Austrian banks have coped well with the major challenges of financial market restructuring. Contrary to widespread expectations prior to the liberalization and integration of the Austrian banking market, the economic policy adjustments did not reduce profits. Despite a slight tendency to decline, profits have remained robust, except during the current crisis.

The regression results show that banks in fact benefited from the disintermediation tendencies of the past 15 years. On average, those banks which engaged to a greater degree in business activities outside of conventional lending made higher profits than banks with a larger share of their business in lending. The positive correlation may also be interpreted as disintermediation resulting in a broader diversification of bank assets – and thus of bank profits. These results are also noteworthy because they show that the Austrian banks' business model is based on a strong position in deposits and lending, which to some degree represented a stabilizing factor in the current financial crisis.

Only few indications were found that a change in ownership structure had an impact on bank profits. While foreign ownership seems to have had a negative impact on bank profitability, this result is not robust with respect to the second profitability measure or to alternative estimation methods. By contrast, the results show that privatization did not have a significant influence on bank profits. Nor did the introduction of the euro have a sustained effect on bank profits.

What came as a surprise was that the internationalization of banks' asset-side business (as shown by foreign lending) did not lead to significantly higher profits, possibly because the data cover only unconsolidated profit measures that reflect the banks' CESEE business incompletely. Even if a portion of lending to foreign customers is handled through the parent bank, the subsidiaries do play an important role, above all for large banks. But large banks are not as dominant in a panel data analysis as in an analysis of aggregated data, so that medium-sized and small banks have a greater weight in the panel data

analysis result than they do in the public perception of Austrian banks.

As in other countries, bank profits are strongly influenced by cyclical developments. Moreover, the estimation results show a significant positive influence of the spread between short- and long-term rates as well as of the inflation rate on bank profits.

Of the microeconomic control variables, only the core capital ratio was found to have a significant positive influence on bank profits. The finding that a higher core capital ratio on average during the past 15 years did not prevent higher profits is also relevant for the current economic policy debate about future regulatory requirements for the banking sector. Furthermore, the findings indicate that foreign currency loans, which stopped expand- ing as the crisis unfolded, did not positively contribute to banks' profitability.

However, in discussing the findings, it must be taken into account that the regression is based on unconsolidated data, so that important developments in the banking sector were captured only incompletely. The current crisis, which has resulted in massive reductions in profits as well as of some explanatory variables, makes it difficult to assess the long-term development of profits. At the current juncture, it is still impossible to determine whether and, if so, how much the financial crisis has changed the operational environment for Austrian banks, and it remains to be seen to what extent the results of this study will remain valid in the post-crisis period.

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## Annex

### Robustness Analysis: Estimation Using the Arellano-Bond Method

The standard method in panel data analysis is the fixed-effects estimation, which assumes that all explanatory variables are exogenous with respect to the dependent variable and that the variables are not correlated over time. To allow for the possible correlation of dependent variables with their own past values and thus to allow for a dynamic panel structure,[20] or for endogeneity of individual variables with respect to the profit measures, we additionally use the dynamic panel data estimation method introduced by Arellano and Bond (1991) (which was designed for panels with large $M$ and small $T$). The Arellano-Bond method is no longer based on least squares, but on the Generalized Method of Moments (GMM), with the first lag of the respective dependent variable ($y_{i,t-1}$) additionally used as an explanatory variable:[21]

$$y_{it} = \alpha + \delta y_{i,t-1} + X'_{it}\beta + Z'_t\gamma + \mu_i + \varepsilon_{it} \quad (2)$$

### The Arellano-Bond Results Largely Confirm the Fixed-Effects Results

Table 2 summarizes the estimation results obtained on the basis of the Arellano-Bond method.[22] As the autocorrelation of the dependent variables already suggested, the respective first lags of ROE I and ROE II are significant in explaining bank profits.[23] As for autocorrelation, the effect of the first lag in the Arellano-Bond estimation is more pronounced for ROE II than for ROE I. The Arellano-Bond estimation confirms the results of the fixed-effects estimation with reference to disintermediation and the degree of competition. However, the alternative estimation method does not show a significant influence of either of the internationalization measures (ownership structure and lending abroad) on bank profits.

The macroeconomic variables economic growth, slope of the yield curve and inflation do not have different effects on ROE I in the Arellano-Bond and the fixed-effects estimations. However, economic growth and the slope of the yield curve now also have a significant positive effect on ROE II in the Arellano-Bond estimation. Hence, the results for the macroeconomic variables are no longer different for ROE I and ROE II under the Arellano-Bond method, and above all, the unexpected

[20] The autocorrelation of ROE I with its own first lag is roughly 58%, and in the case of ROE II this autocorrelation even comes to 86%.

[21] Arellano and Bond (1991) developed an estimation method that takes account of endogeneity resulting from the inclusion of lags of the dependent variable that arise between these variables and the panel individual effects. GMM, an instrumental variables estimation method, is used, with the lags of the dependent variable instrumented by all of their available further lags and other possibly endogenous variables also instrumented by all of their available lags. Moreover, the first differences of all exogenous variables are used as instruments (for a detailed explanation, see Arellano and Bond, 1991). In the textbook literature, this estimation method is also referred to as "difference GMM," as the moment conditions are formed with the first-differenced residuals (Baltagi, 2008). The assumption whether the individual effects are fixed or random has now become irrelevant for the estimation, as these effects drop out of the equation when the first differences are considered.

[22] The usual specification tests of the Arellano-Bond method reveal a certain specification problem, above all in the estimations with ROE II. Whereas the test for first- and second-order autocorrelation of the residuals does not reveal any specification error in the regression with ROE I, the presence of second-order autocorrelation in the residuals indicates a problem in the estimation with ROE II. Moreover, the test for validity of the instruments (Hansen test) shows that some of the instruments are not strictly exogenous. However, this test is weakened by the use of many instruments.

[23] In an additional estimation, a second lag of the respective dependent variable was included as an additional explanatory variable. However, this lag proved not to be significant in both cases. We may thus conclude that one lag of the dependent variables is sufficient to capture the dynamic structure of our panel.

negative effect of economic growth on ROE II has reversed.

Overall, the results obtained with the Arellano-Bond estimation confirm the earlier estimation results, although the Arellano-Bond estimation uses roughly one-sixth fewer observations as a result of the included lag of the dependent variables and the lagged instruments. Consequently, the available estimation results may be considered largely robust for both estimation methods.

Table 2

**Arellano-Bond "Difference" General Method of Moments (GMM) Estimation of Bank Profits**

| Dependent variable | ROE I | ROE II |
|---|---|---|
| ROE I (t–1) | 0.070** | |
| ROE II (t–1) | | 0.481*** |
| Loans in % of total assets | −0.167*** | 0.151*** |
| Public ownership (dummy) | −2.708 | −2.870 |
| Foreign ownership (dummy) | −2.095 | 7.225 |
| Foreign lending in % of total assets | 0.245 | 0.059 |
| HHI | 0.135 | −0.651** |
| GDP growth | 0.341** | 0.417*** |
| Yield curve (ten years minus three months) | 1.062*** | 0.656** |
| Inflation rate (HICP) | 2.432*** | 1.045*** |
| Market share in total lending | −0.046 | 0.522 |
| Core capital in % of risk-weighted assets | 0.002** | −0.001 |
| Share of foreign currency lending | 0.246 | 0.012 |
| Euro introduction (dummy from 1999 on) | −2.355 | 1.105 |
| Financial crisis (dummy for 2008 and 2009) | −8.789*** | −1.495*** |
| Trend | −0.419** | −0.366*** |
| Number of observations | 10,649 | 10,649 |
| Number of banks | 975 | 975 |
| Number of instruments | 110 | 110 |

*Source: Authors' calculations.*

*Note: The regressions also contain sector-specific dummies and a constant in addition to the stated variables. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level. The standard errors are robust with relation to heteroscedasticity and control for clusters in the 975 banks.*

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