

# Causes of declining investment activity in Austria

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*Austria's share of investment relative to GDP, which is high by international standards, dipped significantly in recent years. This downtrend, which was also evident in peer economies, chiefly reflected an adjustment process in a climate of weaker long-term growth. While the international trend reversed in mid-2013, Austria's investment share continued to decline. The main reasons for Austrian companies' current reluctance to invest can be traced back to fragile demand and deep uncertainty. Lack of access to finance is unlikely to have dampened investment activity, as the higher level of internal financing has offset the diminishing importance of bank loans. Although there is some evidence of banks tightening their lending conditions, this is unlikely to have led to credit rationing, as demand for bank loans has also fallen off. Estimations based on a structural vector autoregressive (VAR) model also show that loan supply shocks have only had a small negative impact on growth.*

*JEL classification: E22, E32, E51*

*Keywords: Austria, investment, business cycle, loan supply, credit crunch*

Investments play a vital role in fueling economic growth. Apart from their importance for aggregate demand, they also have a key function in building up a country's capital stock and boosting the economy's future growth potential. Subdued investment activity, as observed in EU countries since the outbreak of the financial and economic crisis, therefore reduces future production capabilities.

Even before the crisis, the level of investment activity differed significantly within the EU. Several peripheral countries experienced a boom in construction investment as the property bubble progressively inflated, especially in Spain and Ireland. By contrast, other countries, including Germany, the Netherlands and Finland, already recorded very weak investment activity before the crisis. The financial and economic crisis caused a persistent fall in investment activity that affected all European economies. As a case in point, between 2007 and 2014, the euro area's aggregate investment share contracted by 3.6 percentage points, to 19.5% of GDP. The only EU countries

that managed to more or less sustain their investment shares were Germany (−0.1 percentage points), Belgium (−0.3), Sweden (−0.6) and Austria (−0.6). Investment shares in Cypress, Ireland, Greece, Spain, Romania and the Baltic states, on the other hand, dropped by between 10 and 15 percentage points.

Although investment activity has traditionally been fairly high in Austria over the long run, it has been gradually falling. The overall decline since 1995 of 3.1 percentage points is above the euro area average (−2.0 percentage points), but below that of Germany (−3.4 percentage points). Despite the recent dip in growth, Austria still has one of the highest investment shares in Europe. In 2014, Austria ranked sixth in the EU, with an investment share of 22.1% of GDP. Since the middle of 2013, however, Austria has fallen behind. While investment shares have stabilized in the euro area and in the EU, the share in Austria has continued the downward trend (chart 1, right panel).

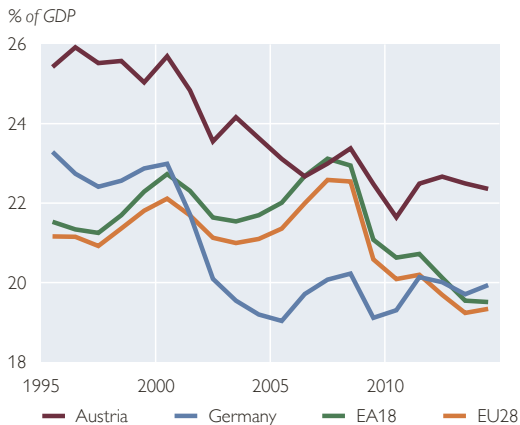
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Chart 1

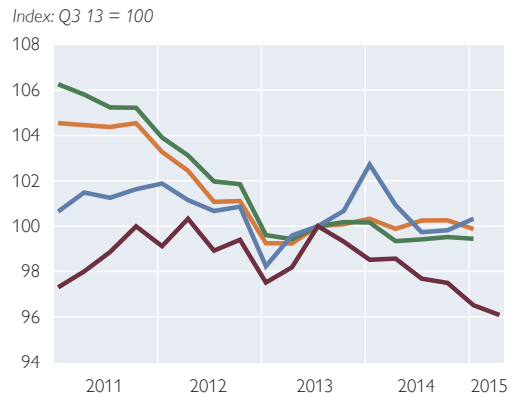
### International comparison of investment shares

#### Austria's investment share is high, but declining steadily



Source: Eurostat.

#### Austria's investment share has bucked international trends by declining since mid-2013



In this article, we examine the factors behind Austria's recent falloff in investment activity. Section 1 includes a survey of the literature analyzing the determinants of shrinking investment across Europe. The main factors identified are weak aggregate demand and the high degree of uncertainty, while financing only seems to have had a minimal effect. Section 2 presents an analysis of investment trends in Austria. The decline in the investment share since 1995 is mainly attributable to construction investments, but since the middle of 2013, all investment components have played a similar role. In section 3, we examine the traditional determinants of investment activity based on a simple capital accumulation equation and an estimated investment equation. Our results corroborate the findings of empirical studies, namely the dominant influence of demand and financial uncertainty. In section 4, we take a look at the role of financing. This factor does not appear to have dampened investment activity, as the diminishing importance of bank loans has been offset by a higher level of internal financing.

Section 5 considers the case for the existence of a credit crunch. Although there is some evidence of banks tightening up their lending conditions, this is unlikely to have led to credit rationing, as demand for bank loans has also fallen off. In section 6, we look at whether credit constraints apply and assess their potential macroeconomic effects on the economy as a whole, using a Bayesian structural vector autoregressive model. Loan supply shocks only appear to have a small negative effect on Austria's GDP growth. In section 7, we summarize the research results and discuss their implications for economic policy.

### 1 Determinants of weak investment activity in Europe

The sluggish pace of investment in Europe has triggered a wave of empirical studies, which have identified *weak demand* and the high degree of *uncertainty* as the main determinants. *Muted aggregate demand* in the wake of the crisis is the key driver behind declining investment. The traditional accelerator effect explains investment activity as

the need to adapt production capacities to fluctuations in demand.<sup>2</sup> This has been confirmed in all empirical studies (e.g. European Commission, 2013, 2014 and 2015; Barkbu et al., 2015; OECD, 2015). On top of that, weak *demand and profit expectations* have had a dulling effect on investments.

The second central factor identified is the high level of *uncertainty* about future economic performance. In addition to the immediate consequences of the financial and economic crisis, aspects such as escalating public debt and the banking crisis, coupled with concerns about the possible collapse of the euro area, have dented business and consumer confidence. The European Investment Bank (2013) came to the conclusion that insecurity about the future direction of the global economy, coupled with uncertainty regarding the resolution of the European sovereign debt crisis, had been the main causes of the decline in investment since 2009. Besides, fear of a possible credit crunch encouraged companies to build up their cash reserves rather than invest in capital goods.

The fragmentation of Europe's financial markets during the crisis and the resulting *financing constraints* only played a key role in a handful of peripheral European countries. Particularly small and medium-sized enterprises, which are heavily reliant on bank loans, have had to contend with tighter financing conditions (European Investment Bank, 2013). On top of that, the conditions for financing public-sector infrastructure investments have also become more demanding.

The *need to run down debt* in a highly leveraged corporate sector was a par-

ticularly urgent priority in Italy, Spain, Portugal and France (Barkbu et al., 2015). In addition, investments in some countries have been held back by *rebalancing requirements* in response to over-investments and the resulting misallocation of capital.

*Real user costs of capital* play a key role in neoclassical economics as a central investment determinant. However, empirical studies have identified very little real influence of lower financing costs since the crisis (Banerjee et al., 2015; OECD, 2015).

As well as the traditional factors, the OECD (2015) has found that *product market regulations* have had a negative influence on investment activity. Moreover, *structural shifts* have also reduced investment shares. As a result of the crisis – which hit industry the hardest – the relative importance of services has increased, as they do not generally require such high levels of investment. Even so, these structural shifts have only had a marginal effect of no more than half a percentage point on the investment share (OECD, 2015).

Even when quantifiable factors are taken into consideration, there is still an *unexplained residual investment weakness*. According to Barkbu et al. (2015), for example, the investment share in the euro area is 2 percentage points below the values explained by the determinants. The findings of Baldi et al. (2014) suggest that the investment volume in the euro area during post-crisis years was too low compared with the structural investment share.<sup>3</sup> In the euro area on average, this investment gap was closed in the pre-crisis years. However, this concealed considerable cross-country variations. In Germany,

<sup>2</sup> An overview of investment theories can be found, for instance, in Oliner et al. (1995) and Eklund (2013).

<sup>3</sup> The structural investment share depends on a number of variables, such as GDP, savings ratio, employment rate and industry's share in total value added.

the Netherlands and Finland, investment activity was lower than the structural investment share, but in Greece, Italy, Ireland, Portugal and Spain, it was higher – by quite a significant amount in some cases.

## 2 Decline in Austria's investment share since mid-2013 across all types of investment

Viewed over the longer term, Austria's investment share has declined more sharply than in the euro area as a whole, but at the same rate as in Germany. An analysis of the contributions made by the different types of investments to this decline (chart 2, left panel) shows that construction investments are the main culprit, contributing 2.2 percentage points less in 2014 than in 1995. Investments in machinery and

equipment have also contributed to the shrinking investment share (–1.5 percentage points). Only investments in research and development (R&D) have provided a positive contribution (+2.1 percentage points).<sup>4</sup>

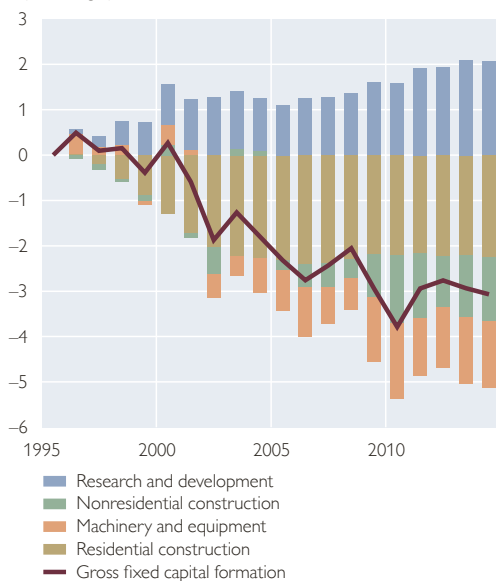
Given that Austria and Germany show similar trends in demographics and property prices, Austria's extremely anemic growth in residential construction investment compared with its neighbor is particularly striking. While investments in residential construction expanded by 24% in Germany between 2009 and 2014, they stagnated in Austria over the same period (+1%). The difference is only half as big in nonresidential construction investment (Austria: –5%, Germany: +7%).

Chart 2

### Contributions to the decline in Austria's investment share

#### Decline since 1995 mainly down to construction investments

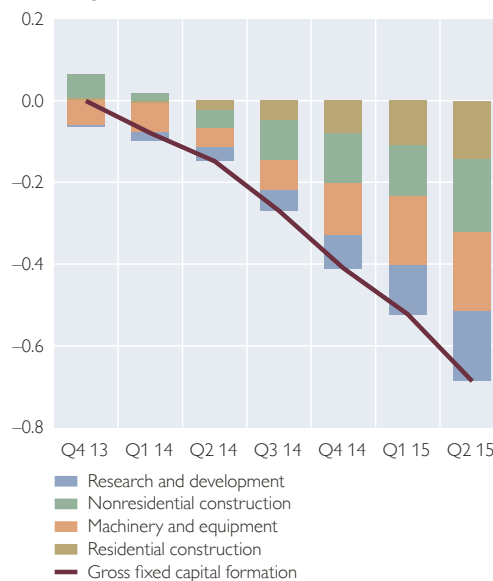
Contributions to change in the investment share since 1995 in percentage points



Source: Eurostat (not seasonally and working day-adjusted data).

#### Austria's investment share has bucked international trends by declining since mid-2013

Contributions to change in the investment share since Q3 13 in percentage points



Source: Eurostat (seasonally and working day-adjusted data).

<sup>4</sup> A specific type of investment makes a positive (or negative) contribution to the overall investment share if investments grow more quickly (or slowly) than GDP.

Table 1

**Investment growth in Austria**

|   | 2014  | Q2 15 | Q1 15 | Q4 14 | Q3 14 | 2014 | 2013 | 2012  | 2011 |
|---|---|-------|-------|-------|-------|------|------|-------|------|
|   | <i>Share in %   Change on previous period in % (seasonally and working day-adjusted, trend-cycle component)</i> |       |       |       |       |      |      |       |      |
| Gross capital formation                           | 100.0   | 1.5   | -0.1  | -0.4  | -2.5  | -1.6 | -0.1 | -0.9  | 7.0  |
| Gross fixed capital formation                     | 96.6  | -0.2  | -0.2  | -0.4  | -0.5  | -0.1 | -0.1 | 2.0   | 5.3  |
| Residential construction                          | 18.1  | -0.4  | -0.5  | -0.6  | -0.7  | -1.1 | -0.5 | -0.5  | 2.0  |
| Nonresidential construction                       | 26.1  | -0.4  | 0.4   | -0.2  | -1.1  | -0.8 | -2.8 | 4.6   | 1.9  |
| Machinery and equipment and weapons systems       | 33.1  | 0.1   | -0.2  | -0.4  | -0.1  | 1.3  | 0.1  | 1.1   | 8.3  |
| Transport equipment                               | 9.0   | -0.4  | -2.9  | -4.6  | -4.3  | -1.5 | 2.8  | -3.4  | 15.7 |
| ICT equipment                                     | 5.7   | 0.4   | 1.6   | 2.9   | 4.6   | 6.6  | -8.5 | 4.1   | 6.9  |
| Other machinery and equipment and weapons systems | 18.4  | 0.3   | 0.4   | 0.6   | 0.7   | 1.1  | 1.6  | 2.4   | 5.1  |
| Cultivated biological resources                   | 0.2   | -0.5  | -0.2  | 0.5   | 1.8   | 14.5 | 3.7  | -18.8 | -8.7 |
| Intellectual property products                    | 19.2  | -0.5  | -0.4  | -0.3  | -0.4  | -0.7 | 3.6  | 2.5   | 8.8  |

Source: WIFO.

Since the middle of 2013 (Q3 13 to Q2 15), Austria's investment share of GDP has contracted by 0.7 percentage points. The decline extends across all types of investment (chart 2, right panel).

Table 1 shows the growth in Austria's investment for the period since 2011 and for the last four quarters up to the second quarter of 2015. While investments in both residential and nonresidential construction fell in 2013 and 2014, the pattern is more varied in the machinery and equipment component. Investments in this category as a whole increased in these two years, but investments in transport equipment contracted in 2014 and the first half of 2015, as did investments in research and development.

### 3 Traditional determinants of investment activity in Austria: weak demand and uncertainty account for shrinking investment share

In this section, we examine whether traditional determinants identified in empirical studies analyzing the weak

investment activity in Europe (section 1) – low aggregate demand and a high level of uncertainty – also apply to Austria. To this end, we use a simple capital accumulation equation to illustrate how the medium-term decline in the investment share can be explained by a falling rate of underlying GDP growth. We subsequently use an estimated investment equation to show that the drop in investment activity in recent years has been influenced mainly by demand trends and confidence factors.

#### 3.1 Lower growth explains the medium-term decline in the investment share

A shrinking investment share is not necessarily symptomatic of a specific investment weakness, but may be caused by a slowing pace of underlying economic growth.

The level of the investment share is determined in the long term by the strength of economic growth and the depreciation rate. This relationship can be derived from a simple capital accumulation equation (see box 1).

Box 1

### Calculating the level of the investment share

The level of the steady state investment share ( $I/Y$ ) can be shown as the relationship between economic growth ( $g$ ), the depreciation rate ( $\delta$ ) and the capital ratio ( $K/Y$ ), whereby  $I$  stands for investments,  $Y$  for GDP and  $K$  for capital stock (see Gros, 2014, for example). If the capital ratio is now differentiated by time ( $t$ ) and a simple capital accumulation equation ( $I - \delta K$ ) is inserted for the change in capital stock, the resulting formula is:

$$\partial \left( \frac{K_t}{Y_t} \right) / \partial t = \frac{\partial K_t}{\partial t} \frac{1}{Y_t} - \frac{\partial Y_t}{\partial t} K_t \frac{1}{Y_t^2} = (I_t - \delta K_t) \frac{1}{Y_t} - g \frac{K_t}{Y_t}. \quad (1)$$

The capital ratio is almost a constant value in empirical terms. In Austria, it has been around 3.8 since 1995. According to the perpetual inventory method, the depreciation rate on the real capital stock has also been very stable, only increasing gradually over time. In 1995, 4.1% of the capital stock depreciated in Austria, compared with 4.5% in 2013. Given these assumptions, a decline in the steady-state investment share – where the rate of change in the capital ratio is zero over time – can only be explained by a drop in the rate of steady-state economic growth ( $g$ ):

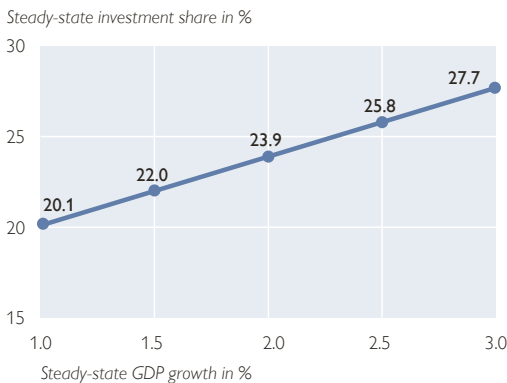
$$\frac{I}{Y} = (\delta + g) \frac{K}{Y} \quad (2)$$

It follows that an economy with weak (underlying) growth rates also shows a low steady-state investment share. Given a capital ratio of 3.8, a drop of 1 percentage point in steady-state GDP growth rate causes the steady-state investment share to decline by 3.8 percentage points. Chart 3 (left panel) shows the relation between steady-state investment shares and GDP growth rates, assuming a constant capital ratio of 3.8 and a constant depreciation rate of 4.3%.

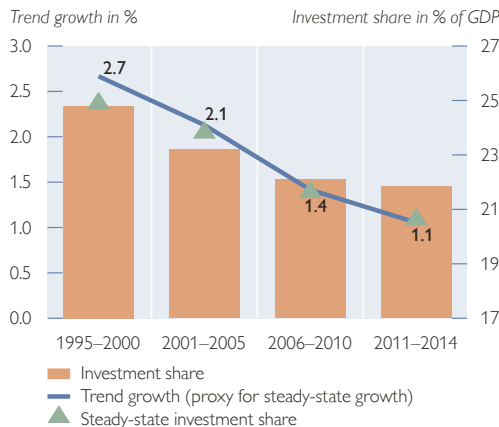
Chart 3

### Declining investment share can be explained by weaker steady-state growth

#### Relation between steady-state investment shares and GDP growth rates



#### Trend growth and investment share in Austria



Source: Authors' calculations, OeNB.

If the relationship between steady-state investment share, capital ratio, depreciation rate and underlying growth rate is calibrated with the Austrian data (using trend growth as a proxy for steady-state growth), the investment share would show a decline of 4.7 percentage points for the period from 2011 to 2014 compared with the period from 1995 to 2000 (chart 3, right panel).<sup>5</sup> As a matter of fact, the investment share contracted by 3.3 percentage points between these two periods. *The decline in the investment share observable over time in Austria can therefore be explained solely by the fall in underlying economic growth.*

### 3.2 Traditional determinants and confidence effects explain the investment trends of recent years

In this section, we estimate an investment equation with traditional explanation factors. This equation is part of the OeNB's macroeconomic model (AQM).<sup>6</sup> Gross fixed capital formation ( $i$ ) is partly determined by an adjustment process to the equilibrium capital stock ( $k^*$ ).  $k^*$  follows from the cost minimization problem of a representative company using Cobb-Douglas production technology. Other determining factors are real GDP growth ( $\Delta y$ ), the real user costs of capital ( $ucc^r$ ) – which are a function of the average corporate interest rate, long-term interest rates as a proxy for bond financing, depreciation, corporate income tax and a risk premium – and a time trend ( $T$ ):

$$\Delta i_t = -0.21 - 0.06 \cdot \left( \frac{i_{t-1}}{k_{t-1}^*} \right) + 0.77 \cdot \Delta y_t - 0.99 \cdot \Delta ucc_t^r - 0.00026 \cdot T + \varepsilon_t^i \quad (1)$$

In addition to the adjustment to the equilibrium capital stock, gross fixed capital formation is essentially determined by two factors:

- *Accelerator effect*: stronger GDP growth boosts investment activity.
- *Interest-rate effect*: higher interest rates push up financing costs ( $ucc^r$ ) and depress investment activity.

Chart 4 (left panel) shows the contributions to investment growth made by the *traditional determinants* in the investment equation of the AQM for the period from the first quarter of 2010 to the second quarter of 2015. They explain *a large proportion of the investment trend*. The faltering pace of economic growth in recent years is reflected in the modest contributions to growth made by demand (accelerator effect) in the investment equation. The real user costs of capital, which are in turn clearly determined by external financing costs, even rose in 2013 as a result of falling inflation coupled with persistently low nominal interest rates, and had a dampening effect on growth.

The residuals of the investment equation represent the part not explained by the traditional determinants. Since January 2010, the residuals showed longer, persistent deviations during two phases. In 2011, investment activity was stronger than explained by

<sup>5</sup> Historical trend growth was calculated by using the Hodrick-Prescott (HP) filter.

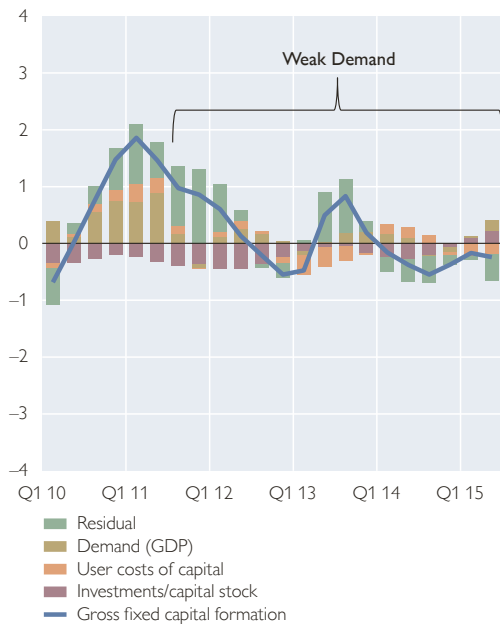
<sup>6</sup> The Austrian Quarterly Model (AQM) is based on the tradition of neoclassical synthesis: the long-term relationship is dictated by the supply side, but the short-term dynamic mainly by Keynesian factors (rigidities). The central equations of the model – and subsequently the investment equation as well – are estimated empirically by using an error correction approach. For more details, see Fenz and Spitzer (2005) and Schneider and Leibrecht (2006).

Chart 4

### Traditional determinants of investment activity

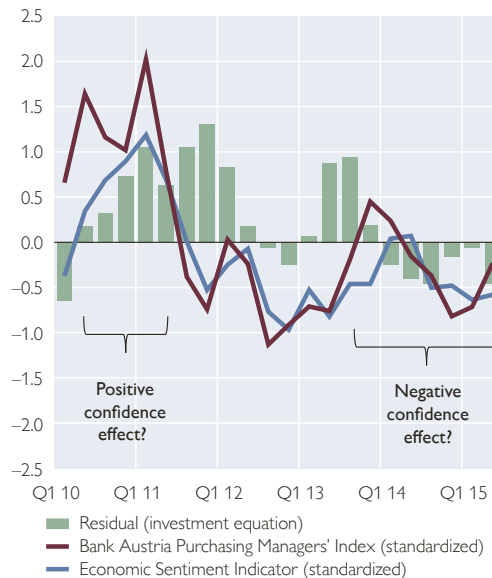
#### Determinants of investment growth in an estimated investment equation

Quarter-on-quarter change in %; contributions to growth in percentage points



#### Residuals of the investment equation and confidence indicators

Investment growth (residual) in percentage points and divergence from the mean in standard deviations (indicators)



Source: Authors' calculations; Bank Austria; European Commission.

the determinants, but then weaker during the period since January 2014. An analysis of the development of two important sentiment indicators, the Bank Austria Purchasing Managers' Index and the European Commission's Economic Sentiment Indicator, shows extensive similarities between the sentiment indicators and the unexplained residual of the investment equation (chart 4, right panel). This suggests that confidence shocks supported investment in 2011, but then more recently undermined it. The confidence shock is also one reason, why some GDP-forecasts of the OeNB – and of other institutions – overpredicted GDP-growth in last years.

### 4 Higher level of internal financing offsets diminishing importance of bank loans in Austria

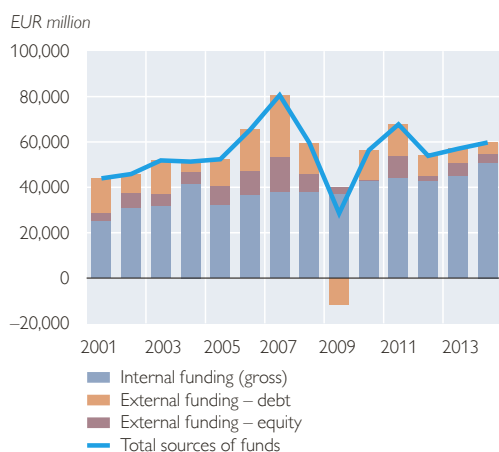
The corporate sector can fund investments either through internal or external financing. Following a sharp drop in 2009 in the wake of the financial crisis, the total financing volume of nonfinancial corporations initially rebounded quickly, but following a brief surge in 2011 remained fairly flat (chart 5, left panel). A look at the components shows that *internal funding*<sup>7</sup> is the most important source of financing for investment activity in the corporate sector. This source is far more stable over time than external funding. Its

<sup>7</sup> Corporations' internal funding comprises the gross operating surplus and transfers less net property income and income tax and property tax payments. The use of gross internal funding flows (including depreciation) allows for a direct comparison with corporate investments, which also include a depreciation component.

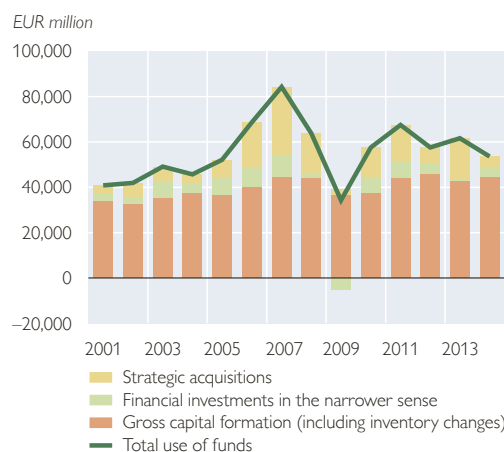


### Use and sources of funds of nonfinancial corporations

#### Sources of funding



#### Use of funds



Source: OeNB, Statistics Austria.

share in total (internal and external) corporate financing averaged 81% over the period 2009 to 2014. Its relative importance had thus increased significantly compared with the average level of 61% recorded before the crisis (2001–2008). External funding was dominated by external borrowing in recent years (2009–2014: 11% of the total financing volume), while the raising of equity capital only played a comparatively marginal role over the same period (8%).

The right panel of chart 5 (use of funds) shows the structure of firms' overall investment activity, i.e. the total of nominal gross capital formation ("real economic investments") and nominal financial investments. The latter can be divided into strategic acquisitions and financial investments in the narrower sense.<sup>8</sup>

The total volume of real economic and financial investments made from

2012 to 2014 was well below the level of 2011. Financial investments in the narrower sense – which tend to be more volatile – fell sharply, while real economic investments stagnated. The chart therefore provides *no evidence of real economic investments being displaced by financial investments*. On the contrary: the downturn in investment activity has been particularly noticeable in financial investments in recent years.

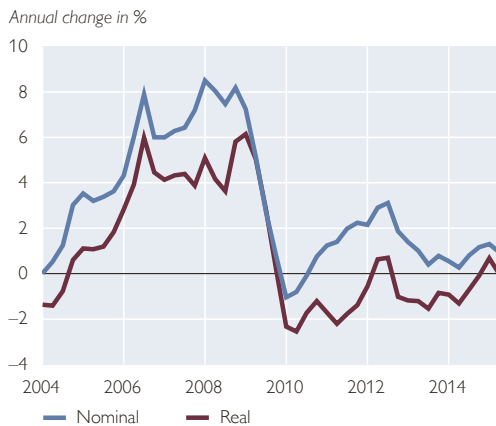
From 2012 to 2014, *external funding* (debt and equity capital) was well below the level of 2011. The *role of corporate loans* for corporate financing has been *steadily declining for some years now*. Since the crisis, their growth has significantly slowed in nominal terms, and in real terms has even registered a decline (chart 6, left panel). This is also illustrated by the continuous fall in the share of bank loans as a percentage of total assets in the balance sheets of Austrian companies, namely from

<sup>8</sup> Here, "strategic equity investments" include all equity securities and credits (domestic and foreign) held by the corporate sector as reported in the financial account. They mainly contain positions which can be considered to be direct investments in other companies (although portfolio investments in listed companies cannot be factored out). "Financial investments in the narrower sense" refers to all other asset items in the financial account.

Chart 6

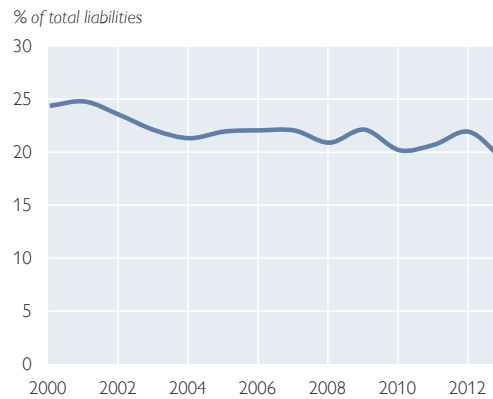
## Bank loans becoming less important as a source of corporate funding

### Growth of corporate loans



Source: OeNB.

### Bank loans as a percentage of company liabilities



Source: BACH database.

24.4% in the year 2000 to 19.2% in 2013 (chart 6, right panel).<sup>9</sup> Summing up funds raised through equity capital and internal financing, own resources accounted for around 90% of the corporate sector's total financial volume during the period 2012 to 2014.

The financial and economic crisis notwithstanding, the ability of companies to finance themselves internally has steadily increased in recent years thanks to an *improvement in net property income* (chart 7).<sup>10</sup> This balance was reduced by 41%, from –EUR 28.7 billion in 2008 to –EUR 17.0 billion in 2014. This achievement was primarily attributable to the *sharp rise in the dividend payments and withdrawals received from shareholdings in other companies*, which registered a 70% nominal increase over the period 2008 to 2014, from

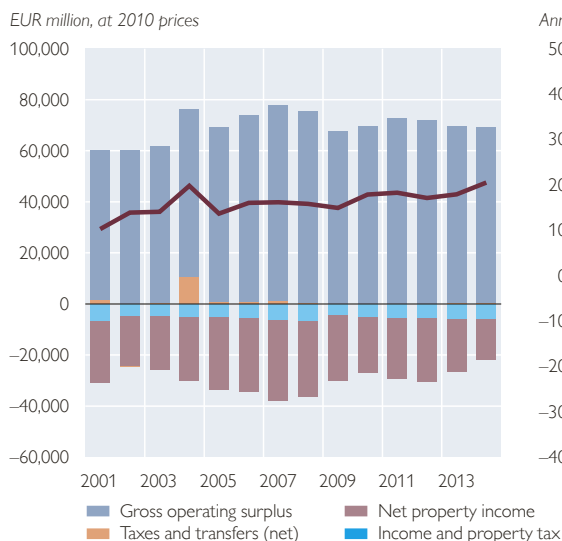
EUR 11.5 billion to EUR 19.5 billion. Net interest payments of the corporate sector also made a positive contribution during this period, declining by 36% from EUR 5.0 billion to EUR 3.2 billion. In contrast, the *gross operating surplus* – the excess generated by the company's business activity after deducting labor costs – has still not recovered to its pre-crisis level in real terms. In 2014, the gross operating surplus was 10% below the 2007 level in real terms, reflecting on the one hand the extremely moderate development of gross value added, which recorded an average annual increase of a mere 0.5% in real terms between 2007 and 2014, and on the other hand a comparatively stronger rise in workers' wages (2.0% p.a. in real terms).

<sup>9</sup> If the deleveraging leads to a reduction in total assets, this is known as a "balance sheet recession" (Koo, 2008). This usually occurs after financial crises when companies and households suffer losses. Such a situation was not evident in Austria, however, as the total assets held on the balance sheets of Austrian companies continued to rise even after the crisis.

<sup>10</sup> Net investment income is always deeply negative given the significant net debtor position of nonfinancial corporations.

## Gross internal funding of nonfinancial corporations<sup>1</sup>

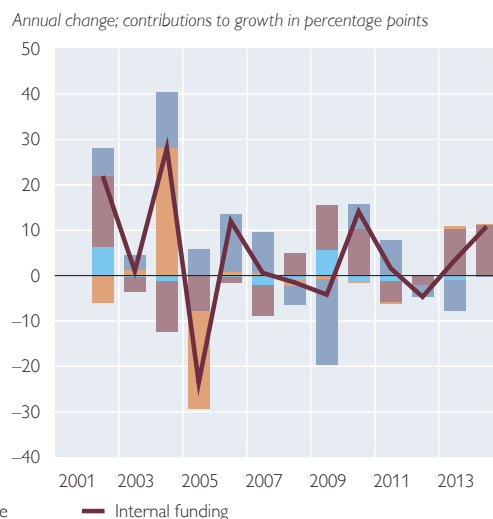
### Absolute amounts (in real terms)



Source: Statistics Austria.

<sup>1</sup> Including depreciation.

### Contributions to growth in internal funding (in real terms)



## 5 Cautious lending policy by Austrian banks since onset of the crisis

The decline in credit growth since the outbreak of the financial crisis raises the question as to how much this development is attributable to banks tightening their lending policies or whether it is mainly the result of weakening demand. The ongoing discussion of how effectively banks have performed their financing function during the course of the crisis often revolves around the term “credit crunch.” However, the definition of this term is not that clear in the academic literature. All the definitions have one point in common: not every decline in lending is understood to be a credit crunch. Owens and Schreft (1995) describe a credit crunch as *a period of sharply increased non-price credit rationing, which may well be connected with the risk of corporate default*. Bernanke and Lown (1991) provide a

narrower definition, describing a credit crunch as *a reduction in bank lending that goes beyond a growth-related weakening of credit demand or the deterioration of credit ratings as a result of refinancing constraints*. According to this definition, a decline in borrowing attributable to weaker demand from companies or a poorer credit rating from banks does not constitute a credit crunch.

### 5.1 Bank Lending Survey reveals a slight tightening of credit standards and weak demand for loans

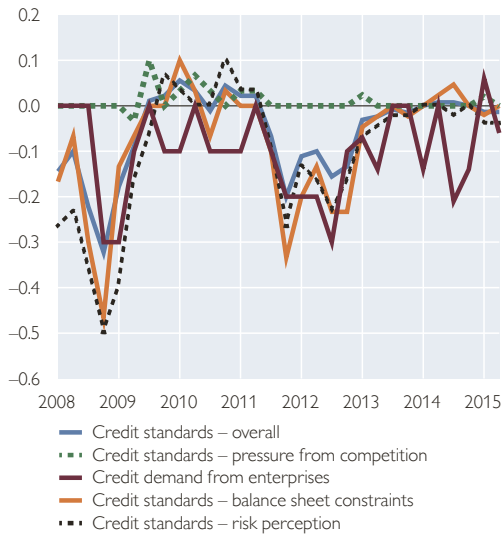
The Bank Lending Survey conducted by the Eurosystem among selected euro area banks provides some pointers for the existence of a credit crunch. The main findings are reproduced in chart 8. The panel on the left shows the development of credit standards and banks’ perception of credit demand trends. Since 2008, banks have tight-

Chart 8

### Bank Lending Survey results reveal a slight tightening of credit standards and weaker credit demand

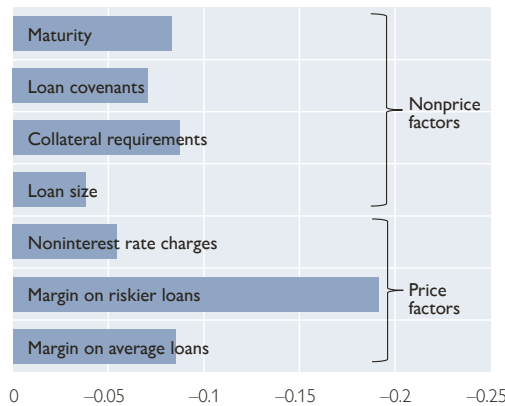
#### Loans to enterprises: credit standards and demand

> 0: easing; < 0: tightening



#### Credit conditions

Average quarterly change from Q1 08 to Q1 15 (< 0: tightening)



Source: OeNB.

ened their credit standards in 16 out of 29 quarters, and only eased them twice. Even though the degree of tightening has been relatively gentle for the most part, it is bound to have had a cumulative effect over the years. At the same time, credit demand from corporations was also flat. Since the outbreak of the crisis, banks have registered a very small drop in credit demand in 19 out of 29 quarters.

Chart 8 moreover shows that those factors which can be summarized under “balance sheet constraints” and mainly relate to developments on the liabilities side of banks’ balance sheets (equity capital costs, financing conditions on the money or bond markets and also banks’ liquidity position) have certainly contributed to a tightening of credit standards in the period from January 2008 to mid-2009 and then again in the second half of 2011 and in 2012. However, factors capturing banks’ “risk perception” (expectations regarding

general economic activity, industry or firm-specific outlook and the risk on the collateral demanded) made a similar contribution.

A more restrictive lending policy may not only manifest itself in the form of lower loan volumes, but also in a *tightening of credit conditions*. This is highlighted in the right panel of chart 8, which shows that since the beginning of the financial crisis there has been a *significant tightening* of nonprice factors, especially the collateral requirements, the agreements on maturity and the other terms and conditions (loan covenants). This would suggest that according to the narrow definition set forth by Bernanke and Lown (1991), which only refers to volumes but not to higher risk premiums, no credit crunch exists (at least up to now), while the wider delineation applied by Owens and Schreft (1995) would in fact *indicate the existence of a credit crunch*.

### 5.2 Companies' lower financing needs for fixed investments accounts for flagging credit demand

The Bank Lending Survey also asks banks about the underlying drivers for loan demand from companies. The left panel of chart 9 shows the cumulative change in investment motives since the start of the crisis. Banks attribute the decline in credit demand primarily to companies' smaller financing requirements for fixed investments. In responding to surveys, enterprises also report falling demand for loans. In the Survey on the access to finance of enterprises (SAFE) carried out every six months by the ECB, for example, Austrian small and medium-sized enterprises (SMEs) reported falling demand for bank loans on balance for eight consecutive periods. As with the Bank Lending Survey, Austrian SMEs cited fixed-asset investments as the most important factor for their lower financing needs (chart 9, right panel).

A further indication of whether financing is a significant problem for the corporate sector as a whole is provided by the question the SAFE survey regularly asks about the most important problem that SMEs face at the time of the survey. Here, less than 10% of Austrian SMEs consistently named access to finance as their major concern. This percentage – typically only about half as high as in the euro area as a whole – has been very stable ever since the survey was first launched back in 2009 (chart 10, left panel). Since 2011, Austrian enterprises have consistently named this factor as their least important concern (previously it had been production costs and labor costs).

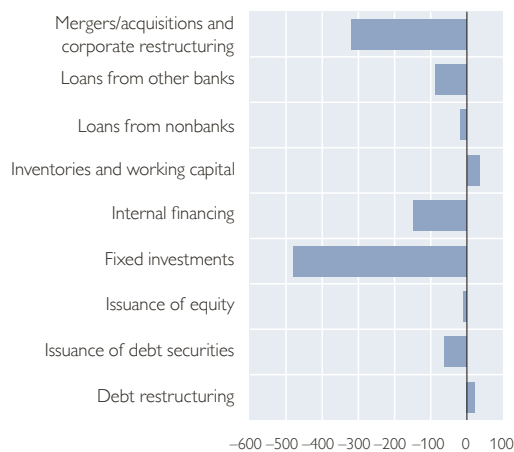
Since 2011, the Austrian Institute of Economic Research (WIFO) has polled Austrian enterprises about their experience of credit terms and conditions at their bank, as part of the WIFO Business Cycle Survey. Here, almost a quarter of the enterprises reported a need for credit during the last quarter

Chart 9

#### Fixed investments are the main factor behind companies' reduced financing needs

##### From the perspective of banks

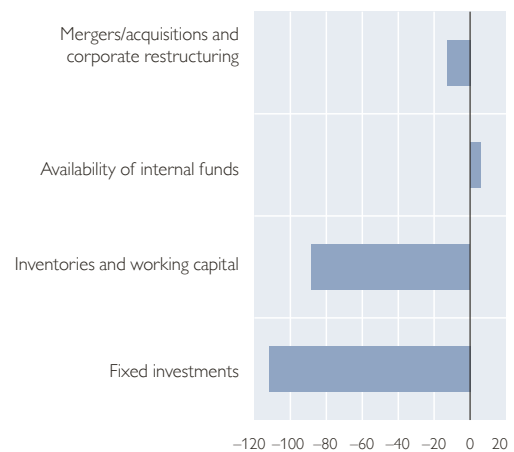
Cumulative diffusion indices from Q3 08 to Q2 15



Source: ECB (Bank Lending Survey).

##### From the perspective of SMEs

Cumulative balances from H1 09 to H2 13



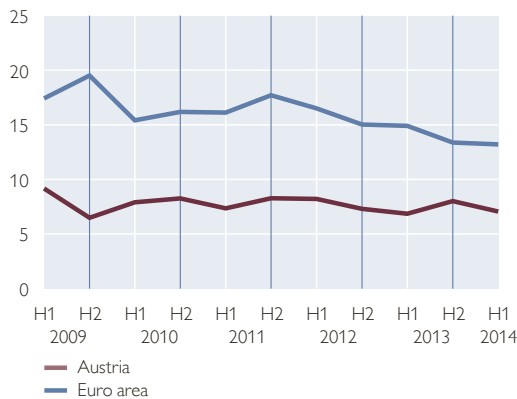
Source: ECB (Survey on the access to finance of enterprises – SAFE).

Chart 10

### Company surveys offer no evidence of a financing problem

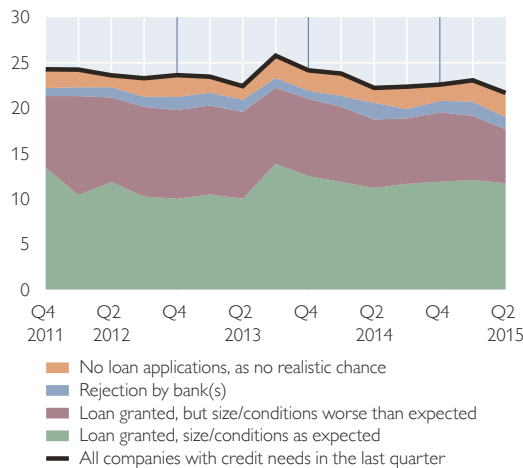
#### Is access to finance the main concern for your company?

Share in total responses in %



#### Companies with credit needs in the last quarter

Share in total responses in %



Source: ECB (SAFE), WIFO Business Cycle Survey.

(chart 10, right panel). This percentage came to 21.7% in the second quarter of 2015. Just over half of the companies that need credit receive a loan that meets their expectations both in terms of size and credit conditions. Less than one-third of enterprises are granted a loan that falls short of their expectations in terms of size and/or conditions. This proportion has gradually dropped in recent years. In the second quarter of 2015, 6% of loan applications were rejected. 12% of enterprises with a credit need did not apply for a loan as they saw no realistic chance of their application being approved. The WIFO survey does not therefore provide an indication of tighter credit conditions as far as enterprises are concerned.

### 5.3 Sectoral analysis provides no indication of credit financing dampening investment activity

Reliance on bank loans varies enormously in the different segments of the manufacturing and services sectors.

Data from the Bank for the Accounts of Companies Harmonized (BACH) database show that bank loans on average make up around 19% of the total assets held on companies' balance sheets. Table 2 shows the share of bank loans in the balance sheet of companies, broken down by firm size for the NACE 1-digit codes. The highest share of bank loans is in NACE I (accommodation and food service activities), at 50 % in 2013, and the lowest share in NACE J (information and communication), at 5 %. In terms of scale, there appears to be a clear correlation between the size of a company and the importance of bank loans. The share of bank loans in the balance sheet of small enterprises (sales < EUR 10 million) is 37%, almost three times more than the share of 13% recorded for large companies (sales ≥ EUR 50 million).

These data can be combined with sectoral investment data according to structural company statistics in order to verify whether a credit crunch exists. *A negative correlation between the*

Table 2

**Share of bank loans in the balance sheet of companies  
(broken down by firm size )**

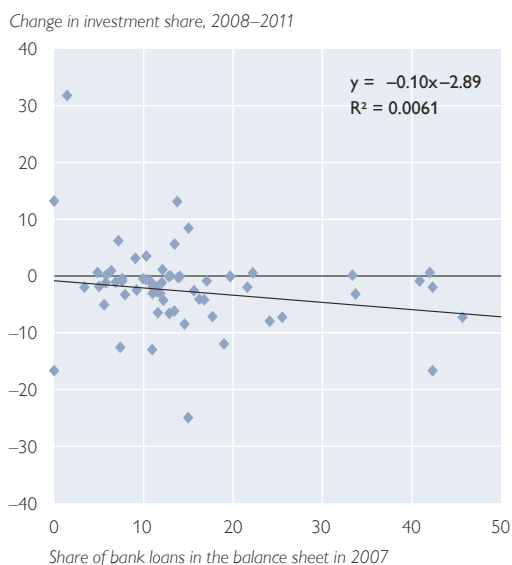
|   | All | Small | Medium | Large |
|---|-----|-------|--------|-------|
| Share in %  |     |       |        |       |
| Total NACE (excluding K642 and M701)(NACE Zc)                                 | 19  | 37    | 22     | 13    |
| Agriculture, forestry and fishing (NACE A)                                    | 37  | 39    | 61     | x     |
| Mining and quarrying (NACE B)   | 16  | 34    | 8      | 11    |
| Manufacturing (NACE C)  | 13  | 31    | 23     | 9     |
| Electricity, gas, steam and air conditioning supply (NACE D)                  | 7   | 34    | 25     | 5     |
| Water supply, sewerage, waste management and remediation activities (NACE E)  | 32  | 40    | 35     | 28    |
| Construction (NACE F)   | 15  | 30    | 13     | 12    |
| Wholesale and retail trade, repair of motor vehicles and motorcycles (NACE G) | 19  | 29    | 21     | 16    |
| Transportation and storage (NACE H)   | 24  | 39    | 32     | 15    |
| Accommodation and food service activities (NACE I)                            | 50  | 57    | 33     | x     |
| Information and communication (NACE J)  | 5   | 19    | 4      | 3     |
| Activities of holding companies (NACE K642)                                   | 9   | x     | x      | x     |
| Real estate activities (NACE L)   | 31  | 42    | 26     | 28    |
| Professional, scientific and technical activities (NACE M)                    | 13  | x     | x      | x     |
| Professional, scientific and technical activities (excluding M701) (NACE Mc)  | 15  | 21    | 6      | 3     |
| Activities of head offices (NACE M701)  | 13  | x     | x      | x     |
| Management consultancy services (NACE M702)                                   | 15  | 20    | 11     | x     |
| Administrative and support service activities (NACE N)                        | 13  | 22    | 21     | 5     |
| Education (NACE P)  | 12  | 15    | 10     | x     |
| Human health and social work activities (NACE Q)                              | 38  | 44    | 32     | x     |
| Arts, entertainment and recreation (NACE R)                                   | 14  | 21    | 12     | 12    |
| Other service activities (NACE S)   | 22  | 35    | 12     | 27    |

Source: BACH database.

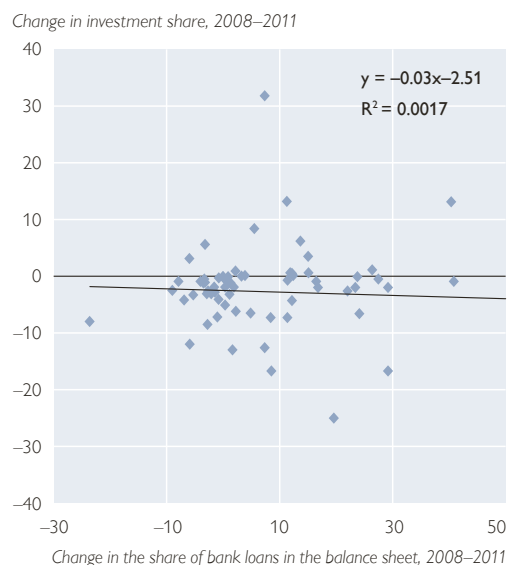
Chart 11

**Change in the investment shares with respect to bank loans,  
broken down by sector**

**Change in investment share vs.  
share of bank loans**



**Change in investment share vs. change in  
share of bank loans**



Source: BACH database, Eurostat.

change in the investment share and the share of bank loans would indicate a credit crunch. This is based on the hypothesis that enterprises with a high share of bank loans were potentially more heavily affected by a possible credit squeeze and have therefore scaled back their investments more aggressively during the crisis.

The left panel of (chart 11) plots the change in the sectoral investment shares between 2008 and 2011 compared with the share of bank loans in each sector in 2007. Therefore every point in this chart shows – for a specific sector – the change in the investment share between 2008 and 2011 and the share of bank loans in the balance sheet in 2007. In case of a credit crunch those sectors with a high share of bank loans in the balance sheet should have faced a clear deceleration of the investment share. However, the data show no correlation and therefore there is *no indication for the existence of a credit crunch*. The right panel plots the change in the share of bank loans and the investment share for every single sector. Once again, no correlation is evident.

## 6 Can loan supply shocks explain business cycle fluctuations in Austria?

The last two sections considered the role of financing in general (section 4) and the importance of banks' lending policy with regard to a potential credit crunch (section 5).

In section 6, we examine whether credit constraints exist and assess their

potential effects on the economy at the macro level by using a structural vector autoregressive (VAR) model based on Bayesian principles. Here, the aim is to identify positive (negative) *loan supply shocks* through falling (rising) credit spreads with a simultaneous rise (fall) in credit growth. At the same time, the responses of several other macroeconomic variables, such as GDP growth, inflation and foreign trade conditions, are likewise subject to specific constraints.<sup>11</sup>

The VAR model includes four variables for the domestic and two for the international environment. The Austrian variables include real GDP growth as a measure of the activity level. The GDP deflator serves as a measure for price rises, whereas the volume of lending to nonfinancial corporations and the spread between short-term interest rates (three-month Euribor) and the corporate loan interest rates for describing the loan market.<sup>12</sup> Growth of Austria's export markets (measured by the import demand from Austria's trading partners weighted with foreign trade shares) and development of competitors' prices on Austrian export markets serve as a proxy for the foreign trade environment. The estimation period runs from the first quarter of 2002 to the first quarter of 2015. Growth rates (year-to-year changes) are used for all variables with the exception of credit spreads, which are used in levels.

The VAR model in its reduced form is represented by the following equation:

<sup>11</sup> The method for identifying shocks follows that of Gambetti and Musso (2012); the econometric estimation is based on Arias et al. (2014) as well as Gali and Gambetti (2015) and allows for the simultaneous use of sign and zero restrictions.

<sup>12</sup> Loans to households were not included in the analysis, as they follow a separate cycle in Austria on the one hand due to the high proportion of foreign currency bullet loans and on the other hand because of the major importance of mortgage loans.



$$\begin{bmatrix} x_t^{AT} \\ x_t^{world} \end{bmatrix} = \begin{bmatrix} A_{11}(L) & A_{12}(L) \\ 0 & A_{21}(L) \end{bmatrix} \begin{bmatrix} x_{t-1}^{AT} \\ x_{t-1}^{world} \end{bmatrix} + \begin{bmatrix} \varepsilon_t^{AT} \\ \varepsilon_t^{world} \end{bmatrix} \quad (2)$$

whereby  $x_t^{AT}$ , and  $x_t^{world}$  represent the vectors of the endogenous variables for Austria (AT) and the international environment (world). The matrices  $A$  contain the coefficients on the endogenous variables, and  $(L)$  stands for the lag operator. The coefficients of the domestic on the foreign variables were restricted to zero.  $\varepsilon_t^{AT}$  and  $\varepsilon_t^{world}$  represent the residuals produced by the estimation. Both the estimation of the model and the identification of structural shocks are described in detail in the annex.

The historical breakdown of Austria's GDP growth into domestic and international shocks allows for drawing conclusions about the importance of loan supply shocks for the period 2003 to 2014. The results are illustrated in chart 12 and show that *business cycle fluctuations in Austria's economic cycle (measured by mean-adjusted GDP growth) can mostly be explained by*

*the international environment.* This finding is not particularly surprising for a small, open economy like Austria, but is further amplified by the high global synchronicity of economic cycles in the wake of the financial and economic crisis. *Domestic shocks play a comparatively subordinate role.*

Loan supply shocks did not make a significant contribution to GDP growth in any of the years during the period 2003 to 2014, but their impact should not be overlooked entirely: on average, they contributed around 0.1 percentage points every year. In the pre-crisis years, their contribution to GDP growth had always been positive or close to zero. Although their contribution turned negative in 2009 following the outbreak of the financial crisis, it remained remarkably low given the strength of the downturn and the financial market turmoil. This may have been due to companies' increased use of existing credit lines during the crisis years in order to safeguard their cash

Chart 12

### Loan supply shocks only make a small contribution to GDP growth

Real GDP growth in %, growth contribution in percentage points



Source: Authors' calculations, OeNB.

Table 3

**Variance decomposition of the forecast error for Austrian GDP growth**

|                                     | 1 quarter | 4 quarters | 8 quarters | 20 quarters |
|-------------------------------------|-----------|------------|------------|-------------|
| <i>Share in total variance in %</i> |           |            |            |             |
| Domestic shocks                     |           |            |            |             |
| Loan supply shock                   | 3.2       | 3.4        | 3.1        | 3.0         |
| Demand shock                        | 23.8      | 18.5       | 16.7       | 16.1        |
| Supply shock                        | 15.6      | 12.3       | 11.1       | 10.6        |
| Other domestic shocks               | 13.6      | 7.0        | 6.3        | 6.2         |
| International shocks                |           |            |            |             |
| Export market shock                 | 43.7      | 56.6       | 54.5       | 55.1        |
| Competitors' price shock            | 0.0       | 2.3        | 8.2        | 9.0         |
| Total                               | 100.0     | 100.0      | 100.0      | 100.0       |

Source: Authors' calculations.

flows, which could have resulted in an overestimation of the loans actually used for investment purposes.

During the last three years (2012 to 2014), the contribution made by loan supply shocks to GDP growth was negative, at  $-0.1$  percentage points on average. Since loan supply shocks primarily affect growth through corporate investment activity, and investments make up just over one-fifth of total economic output, supply-side constraints on the credit markets in recent years are likely to have dampened investment growth by up to half a percentage point every year.

The issue of the relative importance of individual structural shocks for business fluctuations in Austria can be analyzed with the help of a forecast error variance decomposition. This makes it possible to identify what percentage of the variance of the forecast error for a specific forecast horizon can be attributed to the shock in question.

The results of the variance decomposition in table 3 show that the two international shocks together account for between 44% (with a forecast horizon of one quarter) and 64% (with 20 quarters). Among the domestic shocks, the loan supply shock has by far the weakest explanatory power. Only 3% of the

fluctuations in economic growth can be attributed to loan supply constraints.

To summarize, loan supply shocks have been found to have only had a marginal impact on Austrian GDP growth since 2003. *While loan supply shocks had made a very small positive contribution to Austria's economic growth before the outbreak of the crisis, they have had a negative impact of around 0.1 percentage points every year since then.* As a result, credit constraints are only likely to be a modest drag on the level of investment activity in the economy as a whole at present.

## 7 Summary and conclusions

Answering the question as to whether Austria suffers from a *specific investment weakness* requires a differentiated view. Although its investment share has fallen sharply in the last twenty years, Austria still comes in sixth place in the EU rankings. The decline in the investment share since 1995 is mainly attributable to construction investments, but since the middle of 2013 *all investment components have played a similar role.* Nevertheless, the decline in investment shares seems to reflect the economic fundamentals:

- Using a *long-term* oriented simple capital accumulation model, we

show that the decline in investment shares observed over the last two decades can be explained by the decreasing trend growth rate of the Austrian economy.

- Standard *short- to medium-term* oriented investment models, such as the accelerator model, also explain the investment trend over the past years extremely well.

Only when it comes to the *most recent quarters* since the first quarter of 2014 the accelerator model highlights an inexplicably low rate of investment growth that could in part be attributable to the recent dip in confidence in Austria, contrary to international trends.

An analysis of other determinants of investment (access to finance, credit constraints) also does not find strong evidence for a specific and strong investment weakness:

- An analysis of the *access to finance* does not provide any evidence of a dampening effect on investments. The entire financing volume of the corporate sector was certainly relatively low and showed very little dynamic over the past three years, but there were significant structural shifts. External financing through companies taking out loans and raising equity declined, while internal financing rose due to higher dividend payouts and lower interest payments (equivalent to higher cash flows, all else being equal).
- *Credit constraints are likely to have had only a marginally negative effect on investment growth.* A number of indicators support this assumption: while surveys confirm that banks have tightened their lending conditions, at the same time corporate demand for loans has been weak, with less demand for fixed investments cited as the main reason. As a result, the cautious lending policy

of banks for financing business investments is unlikely to have been much of a constraint on investment volumes given the very low demand for credit, even though the tighter credit standards – such as stricter collateral requirements or higher margins – have undoubtedly been an additional challenge for enterprises. An analysis at the *sector level* shows that the decline in investment activity in the wake of the crisis occurred irrespective of the importance of bank loans for the sector in question. Estimations using a *structural vector autoregressive model* show that loan supply shocks had a dampening effect on GDP growth of just 0.1 percentage points per year in the period from 2012 to 2014.

In conclusion, despite the mentioned *recent dip in confidence*, no *specific structural investment weakness* can be identified in Austria. Given the *moribund economic environment characterized by a high level of uncertainty and low growth expectations*, the behaviour of corporations has actually been quite rational: Investments are low due to weak economic conditions and still dampened growth expectations. Investment activity will only pick up in Austria once the *expectations* improve for companies' sales. This does not rule out possibilities for economic policy measures, which are not in the focus of this paper. They could aim at the business cycle itself as well as on long term conditions. Traditional anticyclical policy measures (aiming at standard short-term multiplier effects as described in equation 1 in this paper) could foster investment in the short term. Policy measures could also focus at improving long-term growth prospects (e.g. aiming at R&D and human capital following the traditional literature on economic growth).

## References

- Arias, J. E., J. F. Rubio-Ramirez and D. F. Waggoner. 2014.** Inference based on SVARs identified with sign and zero restrictions: Theory and applications. *Dynare Working Paper Series No. 30.*
- Baldi, G., F. Fichtner, C. Michelsen and M. Rieth. 2014.** Weak investment dampens Europe's growth. In: *DIW Economic Bulletin* 7.2014. 8–21
- Barkbu, B., S. P. Berkmen, P. Lukyantsau, S. Saksonovs and H. Schoelerman. 2015.** Investment in the euro area: Why has it been weak? *IMF Working Paper* 15/32.
- Banerjee, R., J. Kearns and M. Lombardi. 2015.** (Why) is investment weak? In: *BIS Quarterly Review*. March 2015. 67–82.
- Bernanke, B. and C. Lown. 1991.** The credit crunch. *Brookings Papers on Economic Activity*, 1991:2.
- Buti, M. and P. Mohl. 2014.** Lacklustre investment in the Eurozone: Is there a puzzle? *VoxEU.org*. June 4.
- Eklund, J. E. 2013.** Theories of investment: a theoretical review with empirical applications. *Swedish Entrepreneurship Forum Working Paper* 2013:22.
- European Commission. 2013.** Assessing the impact of uncertainty on consumption and investment. In: *Quarterly Report on the Euro Area*. 12(2). 7–16.
- European Commission. 2014.** Autumn forecast 2014: Slow recovery with very low inflation. Box I.1: Drivers and Implications of the weakness of investment in the EU. 40–43.
- European Commission. 2015.** Investment dynamics in the euro area since the crisis. In: *Quarterly Report on the Euro Area*. 14(1). 35–43.
- European Investment Bank. 2013.** Investment and investment finance in Europe. [http://www.eib.org/attachments/efs/investment\\_and\\_investment\\_finance\\_in\\_europe\\_en.pdf](http://www.eib.org/attachments/efs/investment_and_investment_finance_in_europe_en.pdf).
- Fenz, G. and M. Spitzer. 2005.** AQM – The Austrian quarterly model of the Oesterreichische Nationalbank. In: *Macroeconomic models and forecasts for Austria. Workshops – Proceedings of OeNB Workshops No. 5.* 11–60.
- Gali, J. and Gambetti, L. 2015.** The effects of monetary policy on stock market bubbles: some evidence. In: *American Economic Journal: Macroeconomics*. Vol. 7 No. 1. 233–257.
- Gambetti, L. and Musso, A. 2012.** Loan supply shocks and the business cycle. *ECB Working Paper No. 1469.*
- Gros, D. 2014.** Investment as the key to recovery in the euro area. *CEPS Policy Brief No. 326*
- Koo, R. 2008.** The holy grail of macroeconomics – lessons from Japan's great recession. *John Wiley & Sons.*
- OECD. 2015.** *OECD Economic Outlook 2015/1*. Chapter 3: Lifting investment for higher sustainable growth.
- Oliner S., G. Rudebusch and D. Sichel. 1995.** New and old models of business investment. A comparison of forecasting performance. In: *Journal of Money, Credit and Banking* 27(3). 806–826.
- Owens, R. and L. Schreft. 1995.** Identifying credit crunches. *Contemporary Economic Policy* 13.
- Schneider, M. and M. Leibrecht. 2006.** AQM-06: The Macroeconomic Model of the OeNB. *OeNB Working Paper No. 132.*

### Annex: estimation and identification of the structural BVAR model

As it is impossible to identify the structural model purely through the reduced form, appropriate constraints have to be imposed. In the identification scheme adopted in the current analysis, constraints derived from economic theory are overlaid on the impulse response functions. For the international environment, a Cholesky decomposition is used to approximate the supply and demand shock, whereby the variables are included in the following order: export markets and competitors' prices. As assumed, the Austrian variables do not have any influence on developments in the global economy. The Austrian block comprises four variables: GDP, GDP deflator, loans to nonfinancial corporations and the credit spread between corporate lending rates and short-term interest rates. Besides a supply and demand shock, also a loan supply shock is identified. A fourth shock is a residual that cannot be determined economically. Algebraic sign constraints are applied when identifying the Austrian shocks: with a positive supply shock, GDP increases while prices decline. No assumptions are

made for the response of loans and credit spreads. All four variables (GDP, prices, loans and credit spread) must rise in the case of a positive demand shock. A positive loan supply shock is determined by a rise in GDP, prices and loans coupled with a parallel decline in credit spreads. The idea underlying the system used to identify the loan supply shock is as follows (see Gambetti and Musso, 2012): in the case of a positive loan supply shock, banks will increase their loan supply either directly or indirectly by offering more favorable lending conditions. Both a rise in lending volume and a decline in credit spreads will thus be observable. The improved loan supply should have a positive impact on consumption and investment and boost GDP. Prices rise in response to demand. All the sign and zero constraints are shown in table A1.

The estimation uses the method of Gambetti and Musso (2012) and Arias et al. (2014). The authors employ a time-variable VAR model with stochastic volatility which is estimated using Bayesian principles. It allows for theoretically motivated sign constraints and zero restrictions (as used in the Cholesky decomposition).

Table A1

#### Identification of structural shocks

|                          | Reaction of model variables to the shocks |        |       |         |                     |                |
|--------------------------|---|--------|-------|---------|---------------------|----------------|
|                          | GDP                                       | Prices | Loans | Spreads | Competitors' prices | Export markets |
| Domestic shocks          |   |        |       |         |                     |                |
| Loan supply shock        | 1   | 1      | 1     | -1      | 0                   | 0              |
| Demand shock             | 1   | 1      | 1     | 1       | 0                   | 0              |
| Supply shock             | 1   | -1     | ?     | ?       | 0                   | 0              |
| Other domestic shocks    | ?   | ?      | ?     | 0       | 0                   | 0              |
| International shocks     |   |        |       |         |                     |                |
| Export market shock      | ?   | ?      | ?     | ?       | ?                   | 1              |
| Competitors' price shock | ?   | ?      | ?     | ?       | 1                   | 0              |

Source: Authors' compilation.

Note: ? = not restricted.

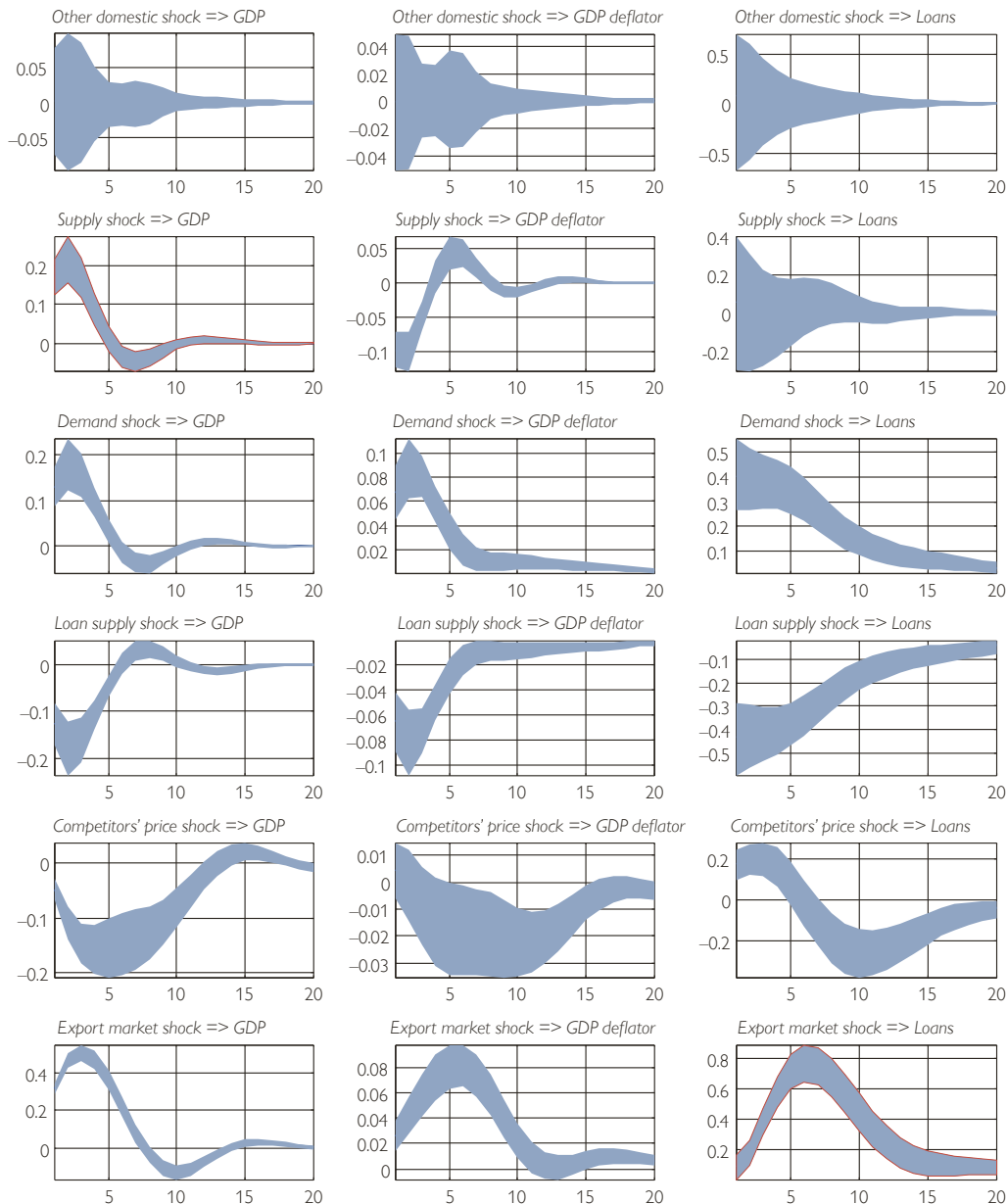
The results of the BVAR model for the impulse response functions are illustrated in chart 13. They show the responses of the model variables to the six identified structural shocks. The bands displayed in chart 13 signal the 16% and 84% threshold of the selected 5,000 valid rotations.

The two international shocks – export market and competitors’ price shock – behave like a typical shock in

global demand or supply. The domestic shocks follow the assumed algebraic sign constraints. The identified negative loan supply shock is characterized by a drop of 0.15% in GDP in the first year, a 0.07% decline in prices, and a 0.46% fall in loans to nonfinancial corporations. At the same time, the spread between corporate loan rates and short-term interest rates widens by 10 basis points.

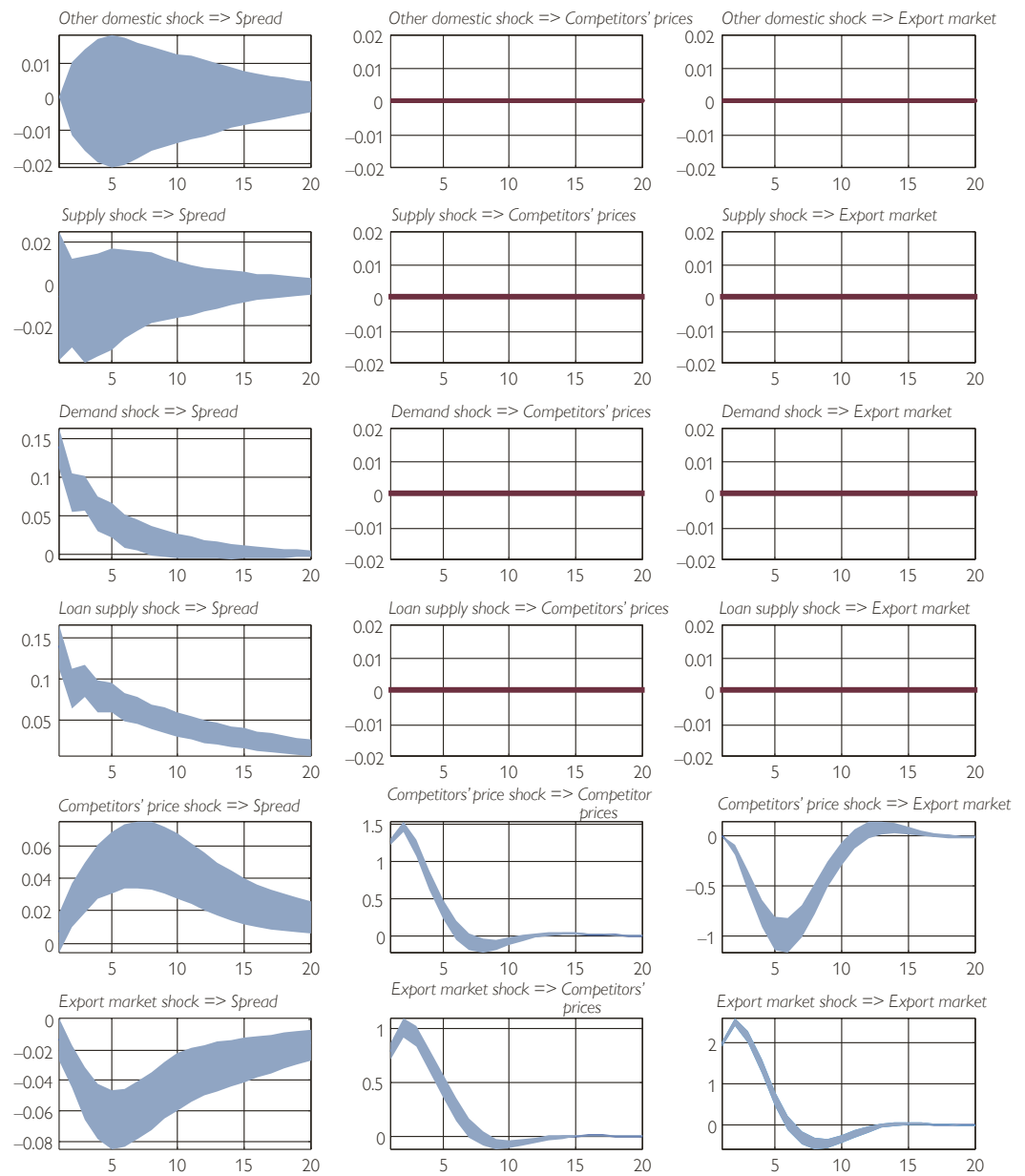
Chart 13

**Impulse response functions: reaction of model variables to structural shocks**



Source: Authors' calculations.

**Impulse response functions: reaction of model variables to structural shocks**



Source: Authors' calculations.