

# Financing conditions in Austria since the introduction of the euro

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*How have financing conditions for Austrian firms and households evolved since the start of the euro? To answer this question, we consider Austrian credit, bond and stock markets, estimate a financial conditions index and assess euro rates against a simple hypothetical monetary policy rule for Austria. We find that interest rates for bank loans have fallen since the introduction of the euro, with real interest rates being mostly lower in Austria than in Germany and the euro area average. This was partly related to the high share of variable rate loans, especially for house purchase. However, banks have compensated, at least in part, for lower interest rates by increasing non-interest price elements. Banks have also applied higher collateral requirements and loan covenants since the crisis. The post-crisis expansionary monetary policy conducted by the European Central Bank (ECB) has brought Austrian bond yields below 1% since end-2014. Earnings ratios of ATX companies were mostly below those in the DAX and Euro STOXX50. The stock earnings premium over 10-year government bonds was 2% to 3% in Austria during most of the period under review but rose substantially to around 9% in 2017/2018. A financial conditions index for Austria shows that the transmission of the policy rate through lending rates was an important driver of the tightening of financial conditions prior to and during the financial crisis. In the same way, the transmission of expansionary monetary policy through lending rates and credit risk has contributed to the loosening of financing conditions during the recovery. Judging from a hypothetical monetary policy rule for Austria, the monetary stance given by the euro area rate has been broadly adequate or slightly on the loose side in relation to economic conditions in Austria.*

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Monetary policy affects financing conditions through multiple channels. Indeed, it is the purpose of monetary policy to manage aggregate demand by influencing the cost of financing and the return on savings. In this way, monetary policy strives to keep output close to potential and inflation close to target in the medium term.

In the three decades of “hard currency policy” prior to Economic and Monetary Union (EMU), Austria had already experienced a situation where monetary policy was not fine tuned to its business cycle and inflation developments since the exchange rate of the Austrian schilling was unilaterally pegged to the Deutsche mark. In this sense, participation in EMU, where monetary policy is geared to economic conditions in the euro area rather than to Austria, was not new.

Still, it is interesting and relevant to investigate how the monetary policy conducted by the European Central Bank (ECB) has affected financing conditions in Austria over the past two decades. This article addresses this question by examining how financing conditions have evolved in Austria since 1999.<sup>2</sup> This is done step by step,

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<sup>2</sup> Due to the lack of consistent time series for Austria, we were unable to cover a longer period including, ideally, two decades prior to the start of EMU, and thus were unable to compare pre-EMU with EMU periods. Lacking this comparison, our analysis nevertheless yields interesting findings.

i.e. by looking at various forms of financing, one by one, reflecting different channels of monetary transmission. Section 1 first discusses retail credit interest rates (interest rate channel) and conditions (credit channel), section 2 then progresses to long-term bond rates and section 3 examines the cost of equity financing in the Austrian stock market (interest rate expectations and portfolio rebalancing channels). For a broader view, we then construct a comprehensive financial conditions index for Austria in section 4. Finally, in section 5, we address the question of whether euro area monetary policy has been appropriate for Austrian economic conditions by comparing actual money market rates with a simple hypothetical monetary policy rule for Austria. Section 6 concludes.

## 1 Financing conditions for bank loans

Financing conditions include both price and non-price terms and conditions of a loan contract. The price consists of interest and other charges, such as fees and commissions. Non-price elements comprise covenants, the collateral or guarantees the borrower has to provide and the size and maturity of the loan.

While banks resident in the euro area regularly report interest rates for several types of loans in the monetary financial institution (MFI) interest rate statistics, the analysis of terms and conditions of loan contracts has to rely largely on surveys. However, these surveys do not cover the entire period since the inception of the euro. Starting in 2003, the Eurosystem's Bank Lending Survey (BLS) has monitored credit managers at leading euro area banks for their assessment of credit market developments. Since 2009, the Survey on the Access to Finance of Enterprises (SAFE) has asked enterprises about their assessment of financing conditions. While the SAFE covers firms of all sizes, data for Austria are only available for small and medium-sized enterprises (SMEs) due to the small size of the Austrian sample. Moreover, information derived from these surveys is only qualitative; they do not ask about the (perceived) level of credit conditions but about the change in credit conditions over time.

As regards interest rates for bank loans, it is obvious to distinguish between the pre-crisis and the post-crisis period (see chart 1). While annualized agreed interest rates on newly extended euro loans to nonfinancial corporations averaged 4.4% in nominal terms (and 2.6% per annum on an inflation-adjusted basis<sup>3</sup>) in the first decade of the euro, they fell to 1.9% in nominal terms and 0.1% in real terms in the period from 2009 to 2018.<sup>4</sup> Developments were similar for housing loans to private households,<sup>5</sup> with real interest rates declining from 3.1% before the crisis to 0.6% in the period thereafter. Interest rate reductions for consumer loans were

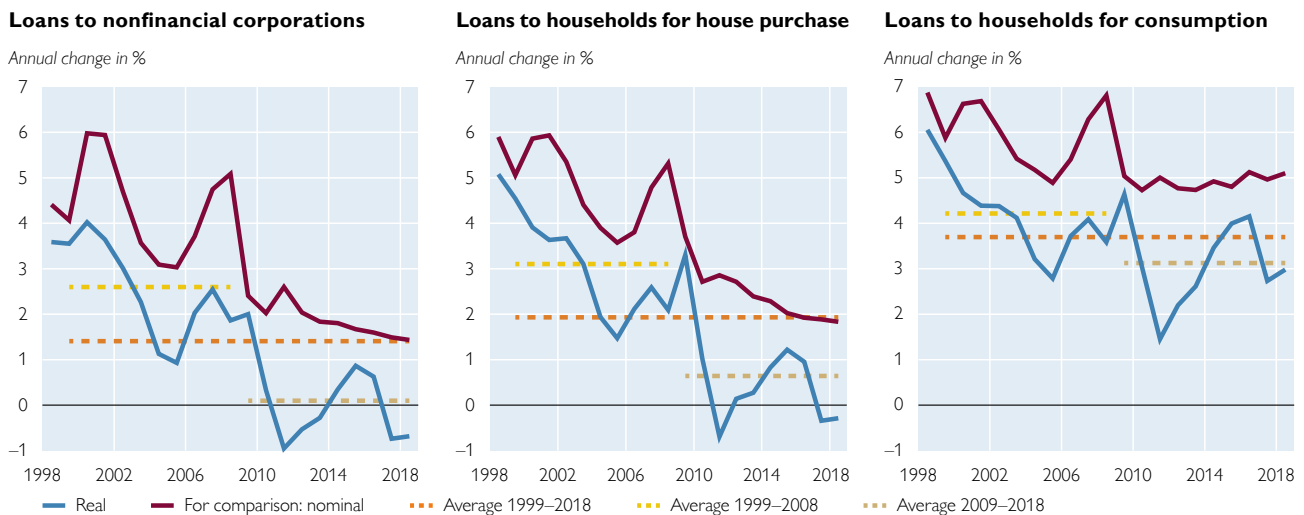
<sup>3</sup> We use the Harmonized Index of Consumer Prices (HICP) to track the general level of prices.

<sup>4</sup> The MFI interest rate statistics refer to euro loans granted to customers in the euro area. They do not cover foreign currency (FX) loans, which played an important role in bank financing in Austria for a large part of the period under review. Data on interest rates for FX loans in a number of foreign currencies to households and nonfinancial corporations collected by the Oesterreichische Nationalbank (OeNB) cannot be broken down by economic sector of the borrower or by loan purpose. Moreover, there are no comparable data for other countries. Hence, interest rates for FX loans are not analyzed in this article. While nominal rates for CHF- and JPY-denominated loans were usually lower than those for euro-denominated loans, there were a number of additional fees that were charged for these schemes (for which there are no data either). In addition, these loans carried additional risks.

<sup>5</sup> "Households" refer to households and non-profit institutions serving households.

Chart 1

### Real interest rates for MFI loans to nonfinancial corporations and households<sup>1</sup>



Source: ECB, Statistics Austria.

<sup>1</sup> For new euro-denominated loans to borrowers in the euro area. Annual averages. HICP-deflated.

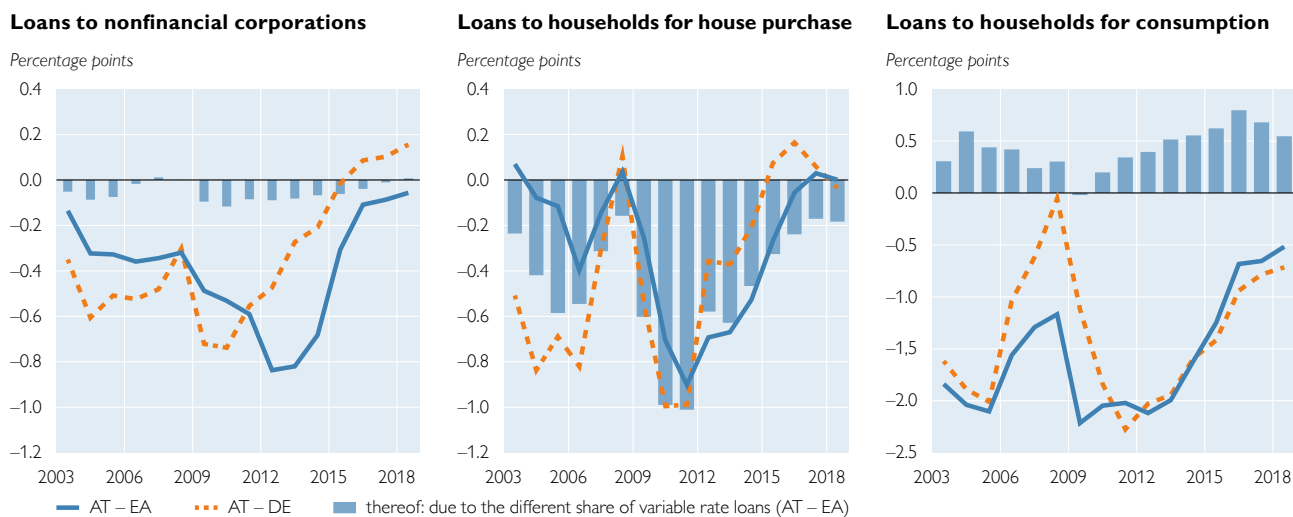
less pronounced, with differences between before (4.2% real) and after the onset of the crisis (3.1% real) being much smaller.<sup>6</sup>

For most of the period under review, both nominal and inflation-adjusted interest rates for bank loans were lower in Austria than in Germany and the euro area. As regards real interest rates, this reflects, to a large extent, higher inflation in Austria. Since 2008, Austrian HICP inflation has been above German and euro area inflation rates. However, since 2016, real interest rates for loans to nonfinancial corporations have been slightly higher than their German equivalents.<sup>7</sup>

The lower level of Austrian nominal interest rates (see chart 2) was, in part, related to the high – and for a long time increasing – share of variable rate loans, whose interest rate is typically lower than that of loans with longer interest fixation periods, if the yield curve is positively sloped. This held true for housing loans to households, in particular, for which aggregate interest rates would have been about half a percentage point higher in the past 20 years on average if the shares of interest fixation periods in Austria had been the same as in Germany or the euro area. In some years (e.g. in 2010/2011), the difference would have been more than one percentage point. Had the share of variable rate loans been the same as in Germany, nominal interest rates for housing loans in Austria would have been higher than in Germany on average. The opposite effect would have been registered in the case of consumer loans, for which the yield curve has been negative in Austria throughout the past

<sup>6</sup> However, the amount of loans for consumption is considerably smaller than that of loans for house purchase, amounting to about one sixth of housing loans. Moreover, credit risk is considerably higher in the case of loans for consumption. The nonperforming loan (NPL) ratio for this type of loan came to 6.1% in the third quarter of 2018, compared to 1.6% for mortgage loans (loans to households secured by residential real estate).

<sup>7</sup> Broken down by loan size, this has only concerned loans with a volume of more than EUR 1 million, while real interest rates for smaller loans have remained below German rates. Since 2016, credit standards for loans to larger enterprises have remained largely unchanged but have been tightened somewhat for loans to SMEs, according to the BLS. The main reasons behind this divergent development include, according to banks, risk factors, such as industry- or firm-specific situations and general economic activity, as well as competition in the banking market.

**Interest rate difference for MFI loans: Austria versus Germany and the euro area<sup>1</sup>**

Source: ECB, OeNB.

<sup>1</sup> For new euro-denominated loans to borrowers in the euro area. Annual averages.

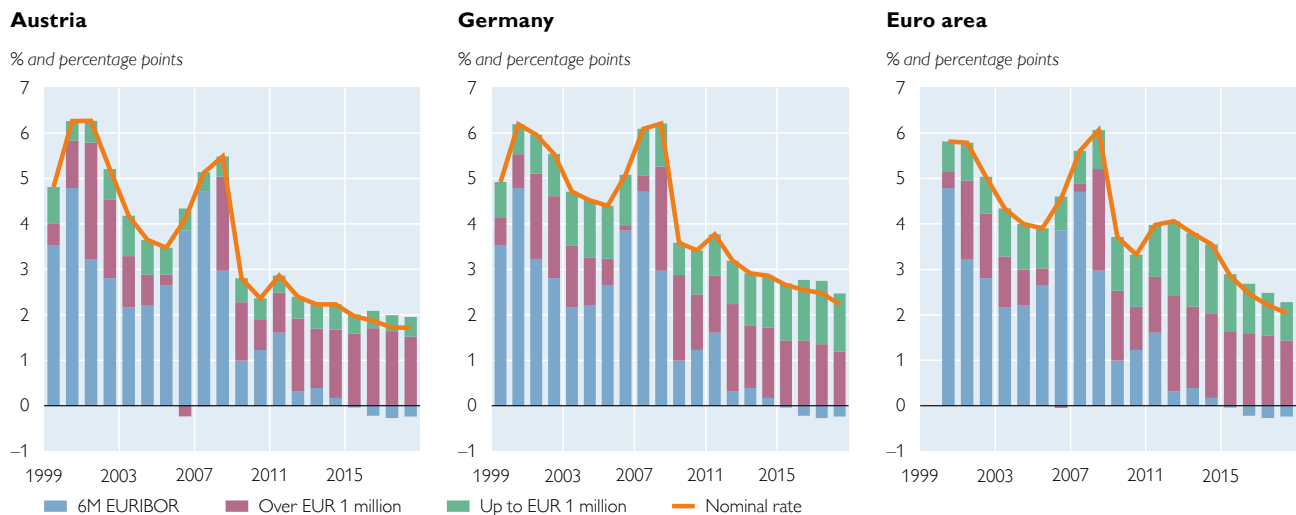
two decades.<sup>8</sup> For loans to nonfinancial corporations, the higher share of variable rate loans did not explain much of the interest rate difference vis-à-vis the euro area, but has accounted for about one third of the interest rate difference vis-à-vis Germany over the whole period under review, and for almost half of this difference since the onset of the crisis. As the share of variable rate loans has come down in the past few years, the interest cost advantage of Austrian borrowers has become smaller or has diminished altogether toward the end of the period under review.

While the steep decline in interest rates since the onset of the crisis can be attributed, to a large extent, to the Eurosystem's large-scale monetary policy response to the crisis, the pass-through to customer rates was far from complete, both in Austria and the euro area. As chart 3 shows, the lending spread, defined as the difference between customer and money market rates of comparable interest fixation periods or maturities, has widened since the onset of the crisis. For non-financial corporations, the spread between customer rates with an interest fixation period of up to one year and six-month money market rates – which had fallen from 2001 to 2007 – has widened since then, some fluctuations in 2008/2009 notwithstanding. Heightened credit risk considerations might have altered the interest rate pass-through, with banks requiring higher risk premiums, either because of more stringent regulatory requirements or, more generally, because of changed risk policies. Indeed, in the BLS, an increasing number of banks reported a widening of interest margins on riskier loans compared to average loans, suggesting increasing risk discrimination.<sup>9</sup> In the BLS, banks also stated that risk aspects

<sup>8</sup> Consumer loans with longer interest fixation periods were, for the most part, granted to consumers with good creditworthiness.

<sup>9</sup> The data do not allow to determine whether risk premiums were “too low” before the crisis and/or “too high” afterwards.

### Composition of interest rates for MFI loans to nonfinancial corporations<sup>1</sup>



Source: ECB.

<sup>1</sup> For new euro-denominated loans with an interest fixation period of up to 1 year. Annual averages.

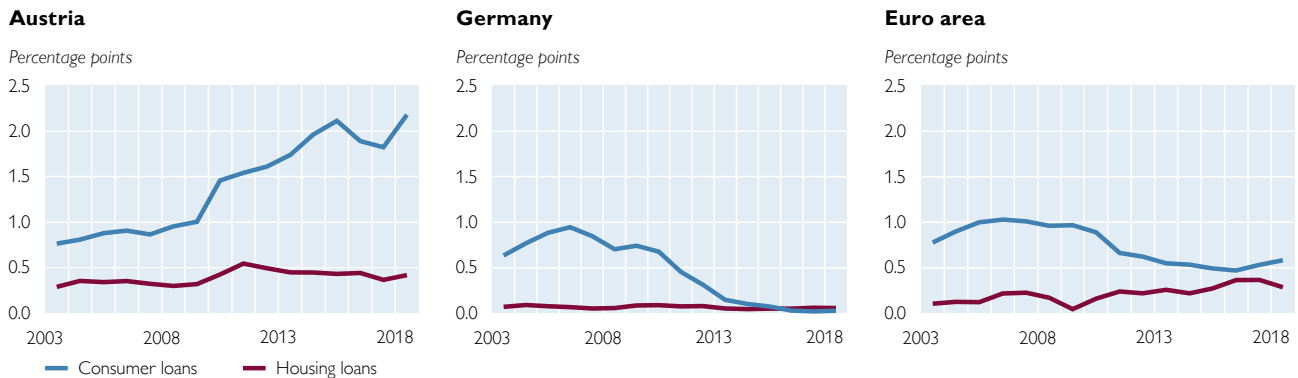
were an important factor for tightening credit standards.<sup>10</sup> Another factor affecting the interest rate pass-through may have been the zero lower bound on deposit rates, which put a floor under banks' funding costs.

Furthermore, chart 3 shows the spread between interest rates for smaller and larger loans which, given the lack of other data, is commonly used as an indicator of the relative cost of bank financing for SMEs and larger firms. During the past 20 years, this spread has been rather low in Austria. It even fell in the years before the crisis and has remained fairly stable since then – contrary to developments in Germany where this spread has risen almost continuously since 2010 and to developments in the euro area where it rose sharply in the first years after the crisis. Over the whole 20 years, it averaged 53 basis points in Austria – about half of the value in Germany and the euro area. To the extent that loan size and firm size go hand in hand, these divergences imply that bank lending rates for SMEs have developed favorably in Austria in relation to Germany and the euro area.

Regarding non-interest price elements, there is no hard evidence for loans to nonfinancial corporations. The BLS and SAFE surveys suggest that non-interest price elements have increased somewhat more strongly in Austria than in Germany and the euro area (although it is not possible to determine their actual level as these surveys ask about the change in non-interest price elements over the previous reporting period).<sup>11</sup> As far as loans to households are concerned (which the SAFE does not cover), banks said in the BLS that they increased non-interest rate charges

<sup>10</sup> However, more risk-aware lending policies need not result in higher aggregate interest rates in the MFI interest rate statistics as these include loans across all rating categories. If higher-risk borrowers (who would have to pay higher rates) are denied loans to a larger extent, this might lead to more low-risk borrowers being granted loans (who would have to pay lower rates).

<sup>11</sup> However, the results diverge somewhat on the question of whether non-interest price elements have still been increasing in recent years. While banks have reported no further increases since 2016, Austrian SMEs have seen ongoing increases (which have been perceived as being more pronounced than those in Germany but lower than those in the euro area).

**Spread between the annual percentage rate of charge and the agreed rate<sup>1</sup>**

Source: ECB.

<sup>1</sup> For new euro-denominated loans to borrowers in the euro area. Annual averages.

for both housing and consumer loans to households only modestly over the whole survey period. As regards loans to households, the MFI interest rate statistics provide data on the annual percentage rate of charge (APRC) that covers the total cost of loans, i.e. both interest rate and other cost elements, from 2003 onward. The difference to the annualized agreed rate can be seen as an indication of non-interest price elements. Strikingly, the difference increased for both housing and consumer loans in Austria in the period from 2003 to 2018 (see chart 4). Especially in the case of consumer loans, this contrasts with developments in Germany and the euro area where the APRC decreased more markedly than annualized agreed rates. Overall, these results suggest that banks in Austria made up, at least in part, for lower interest rates by increasing non-interest components so that total financing costs decreased less (or even increased) compared to what was suggested by interest rate developments.

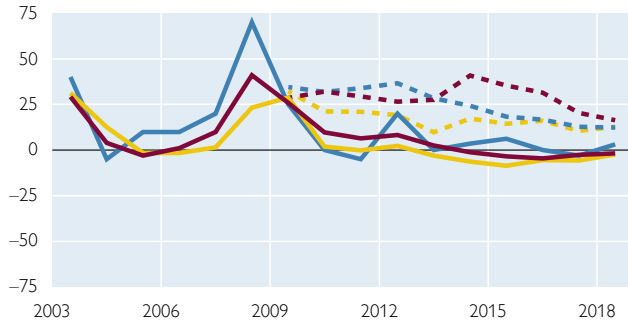
As mentioned at the beginning, the analysis of other credit conditions has to rely on survey data (see chart 5). According to the SAFE, credit-seeking SMEs in Austria have registered a significant tightening of non-price factors since the onset of the crisis, especially with respect to collateral requirements and loan covenants.<sup>12</sup> The view that tightening was most pronounced in these areas is also shared by banks when asked about terms and conditions in the BLS. Banks and firms disagree, however, on the degree of tightening – with enterprises seeing more severe tightening – and on whether and when this tightening ended. While banks said that they have no longer tightened credit conditions in recent years, enterprises felt that banks have still done so. Both sides agreed, however, that the effects on loan size and maturity have been limited. Yet, at least to some extent, price and non-price requirements might be interdependent. Compliance with covenants implies costs, which may be substantial in some cases. Conversely, higher collateral requirements and covenants might mitigate credit risks of loans, thus allowing for lower interest rates or the granting of loans.

<sup>12</sup> However, when trying to gauge the absolute level of financing conditions, it has to be borne in mind that the survey asks about the change in conditions. If conditions were less stringent at the start of the survey, then even higher increases do not necessarily mean higher absolute levels.

## Change in terms and conditions of loans to enterprises

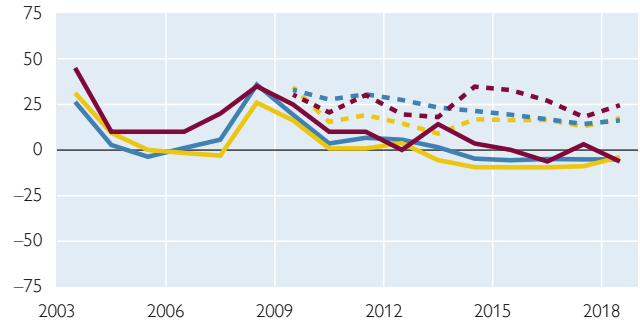
### Collateral requirements

Net percentage of responses, annual averages



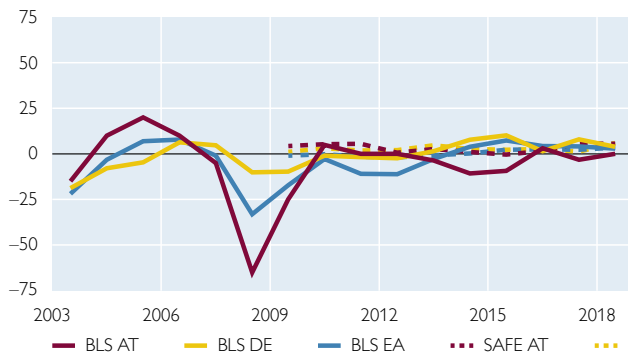
### Covenants/other

Net percentage of responses, annual averages



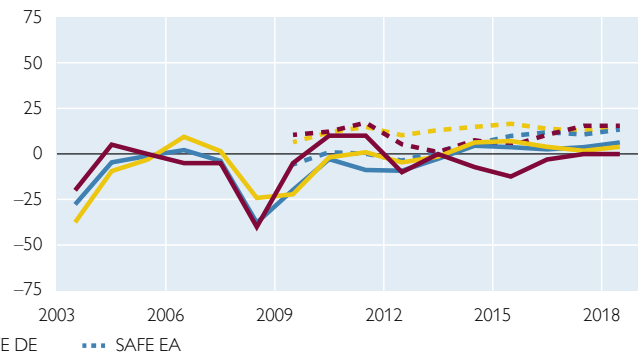
### Maturity

Net percentage of responses, annual averages



### Loan size

Net percentage of responses, annual averages



Source: ECB.

Note: BLS: Net percentage of banks' easing minus tightening. SAFE: Weighted percentage of enterprises. 2018 refers to Q1–Q4 (BLS) and H1 (SAFE).

## 2 Bond market financing conditions

For lack of data on corporate bond yields in Austria, this section focuses on government bond yields, which serve as a benchmark for private market interest rates in many cases. Already in anticipation of the introduction of the euro, sovereign bond yields had receded markedly in participating countries. This reflected the expectation that the Eurosystem's monetary policy would bring lasting price stability. The yield decline was particularly pronounced in countries with comparatively higher pre-EMU inflation rates since risk premiums were more strongly depressed in these countries in anticipation of the euro.

In Austria, nominal government bond yields almost halved from 7.74% to 4.14% between Austria's accession to the EU on January 1, 1995 and the start of the third stage of EMU in 1999. Following a temporary increase to 5.75% by the second quarter of 2000, yields gradually declined to a low of 3.1% by fall 2005, hovering around 4% thereafter until the onset of the financial crisis in 2007/2008. Nominal sovereign bond yields declined to 2.5% in Austria in reaction to the Lehman crisis in September 2009 and the resulting adjustment of global growth expectations and inflation prospects as well as the slashing of official interest rates and the step-by-step adoption and extension of unconventional monetary policies

by central banks. The monetary policy measures taken in response to the euro area sovereign debt crisis pushed Austrian 10-year sovereign yields below 1% toward the end of 2014, with a low of 0.14% being reached in September and October 2016. Since then, 10-year sovereign yields have remained below 1% (see left panel of chart 6).

Austrian yield spreads over German bunds had already fallen to just a few basis points (which reflected the lower liquidity of the smaller market for Austrian as compared to German bunds) toward the late 1980s, and remained at these low levels until the onset of the crisis. Thus, the irrevocable fixing of conversion rates as at January 1, 1999 was apparently not regarded as a significant regime change by financial markets compared to Austria's hard currency policy that had been pursued over the two preceding decades. The yield spread temporarily increased to 1% and above between 2009 and mid-2012 in the context of the financial and sovereign debt crisis when Austrian banks' exposure in Central, Eastern and Southeastern European (CESEE) markets raised concerns about the stability of Austria's banks and the potential consequences for Austria's public finances. However, the de-escalation of the sovereign debt crisis by the ECB's announcements in July 2012 also caused Austrian yield spreads to almost return to their pre-crisis level, i.e. to one of the lowest levels of euro area countries (see middle panel of chart 6).

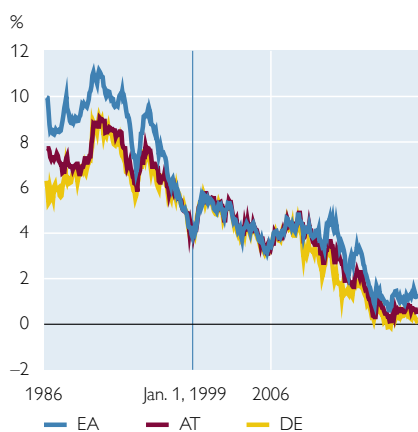
While Austria exhibited much lower nominal government bond yields than most of the other euro area countries (except Germany and a few "core" countries), this "yield advantage" disappeared in the run-up to EMU. It resurfaced, though, during the financial crisis as Austria was less affected than several other euro area countries, and has not fully vanished to date (see middle panel of chart 6).

The slope of Austria's sovereign yield curve, as approximated in the right panel of chart 6 by the 10-year minus 2-year yield difference, has undergone strong changes over the past two decades. After a marked flattening until the summer of 2000 following the Asian crisis, the yield curve steepened strongly until end-2003, reflecting marked cuts in key ECB rates, which depressed short-term yields. The yield curve turned virtually flat ahead and during the early phases of the financial crisis, reflecting the ECB's tightening of key interest rates in response to increasing

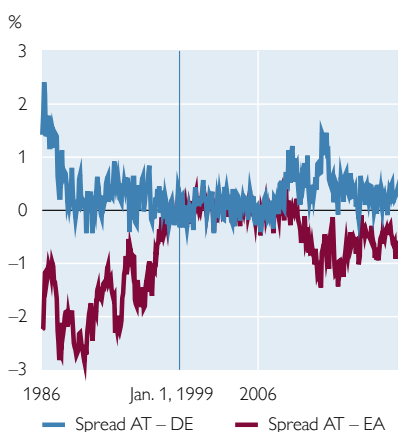
Chart 6

## Bond market financing conditions

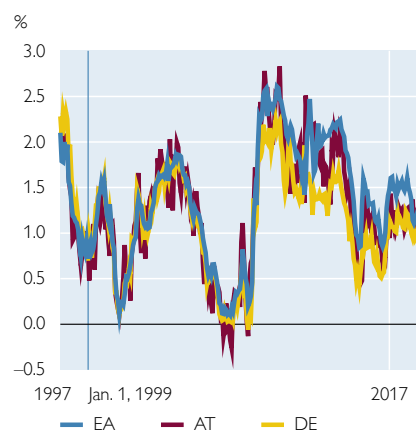
### 10Y sovereign yield



### 10Y spread AT versus DE/EA



### 10Y-2Y yield spread



Source: Macrobond.



HICP inflation during this period. Expectations of lower growth and inflation and resulting expectations of low future policy rates as well as expected and actual outright purchases in bond markets flattened the Austrian sovereign yield curve until 2015. Since then, with short-term rates around or slightly below zero and 10-year yields between zero and 1%, the Austrian sovereign yield spread has remained fairly stable with a moderately positive slope.

### 3 Stock market financing conditions

Overall, Austria's stock market, as measured by the ATX index since the start of EMU, has performed much better than both the DAX (price index) and the Euro STOXX50. Initially, Austrian stocks participated neither in the boom nor in the ensuing bust recorded in German and European stocks in the first five years of EMU. The following boom between mid-2003 and mid-2007 was far more pronounced in Austria than in Germany and Europe at large. During these four years, Austrian stock prices quadrupled. In turn, the price drop during the financial crisis until early 2009 was also much sharper in Austria. Ups and downs in stock prices thereafter basically reflected patterns in other stock markets.

Earnings ratios of listed companies as approximated by the inverse of the price-to-earnings ratio trended up from around 5% to 7% during the first EMU years up to the financial crisis. A short episode of extremely high values exceeding 20% reflected abrupt price corrections in the last quarter of 2008. The decline in listed companies' earnings ratios until 2014/2015 mirrored overall weak economic growth during this period, while the strong rise in earnings ratios until the third quarter of 2018 resulted from improved corporate earnings, which were not fully accompanied by stock valuations. Finally, the stock price corrections in the last quarter of 2018 further boosted earnings ratios to almost 10% by end-2018 (see middle panel of chart 7).

A common measure to gauge the premium that stock owners demand as compensation for the risk they assume compared to risk-free assets is the equity premium, which is estimated based on future expected earnings. For lack of data, we consider a much simpler, backward-looking measure of a "stock earnings premium," which is computed as the difference between the earnings ratio described

Chart 7

#### Stock market financing conditions



Source: Macrobond.

above minus a low-risk long-term asset, namely the premium over Austrian 10-year sovereign yields. Naturally, the time profile of these premiums closely reflects the development of the earnings ratio. Measured this way, Austrian stock earnings showed a premium of around 2 to 3 percentage points over the long term. Leaving aside the very start of EMU and the price collapse during the financial crisis, the steady and strong increase in the stock earnings premium to 9 percentage points in the course of 2017/2018 seems quite exceptional (see right panel of chart 7).

## 4 Financial Conditions Index

A common way of summarizing the information contained in several of the above indicators is to construct a Financial Conditions Index (FCI). The idea behind an FCI is that one can aggregate several financial variables in one number by using a weighted average of these variables. The index does not describe the change of individual variables but rather captures the overall trend in financial markets (see Fransson and Tysklind, 2017). FCIs are widely used by financial market analysts and, despite being atheoretical, have been found to be good predictors of GDP growth and financial market tensions (see Hatzius et al., 2010; Brave and Kelley, 2017).

### 4.1 Data and methodology

The data used to construct the FCI are chosen based on availability, their correlation with GDP,<sup>13</sup> and whether they represent different channels of the transmission mechanism of monetary policy. Our FCI is based on 16 variables, which have a common sample starting in January 2000. These include (1) price variables (EONIA, EURIBOR, 10-year government bond yields, lending rates for house purchase, nonfinancial corporations and consumers, the Vienna stock exchange index and the nominal effective exchange rate (NEER)); (2) quantity variables, such as growth of total credit to households and nonfinancial corporations as well as liquidity supplied by the Eurosystem;<sup>14</sup> and finally (3) risk variables, such as the spread between Austrian and German 10-year sovereign bond yields (country risk), the spread between the 10-year Austrian bund and EURIBOR (slope of the yield curve) as well as the spreads between lending rates to households, nonfinancial corporations and consumers and the EONIA (sectoral credit risk).

There are many methodologies used in the literature to estimate FCIs.<sup>15</sup> We have opted to extract the weights of each variable on the FCI by factor analysis. The principal components extracted with factor analysis capture the common variation of all the financial variables included in the index. As done in the literature, we normalize the data and transform the variables in such a way that an increase in the FCI reflects a loosening of financial conditions, while a decrease reflects a tightening. The index is constructed using the first five factors that explain 87% of the variance.<sup>16</sup>

<sup>13</sup> *F-tests of each variable correlated with GDP are available from the authors upon request.*

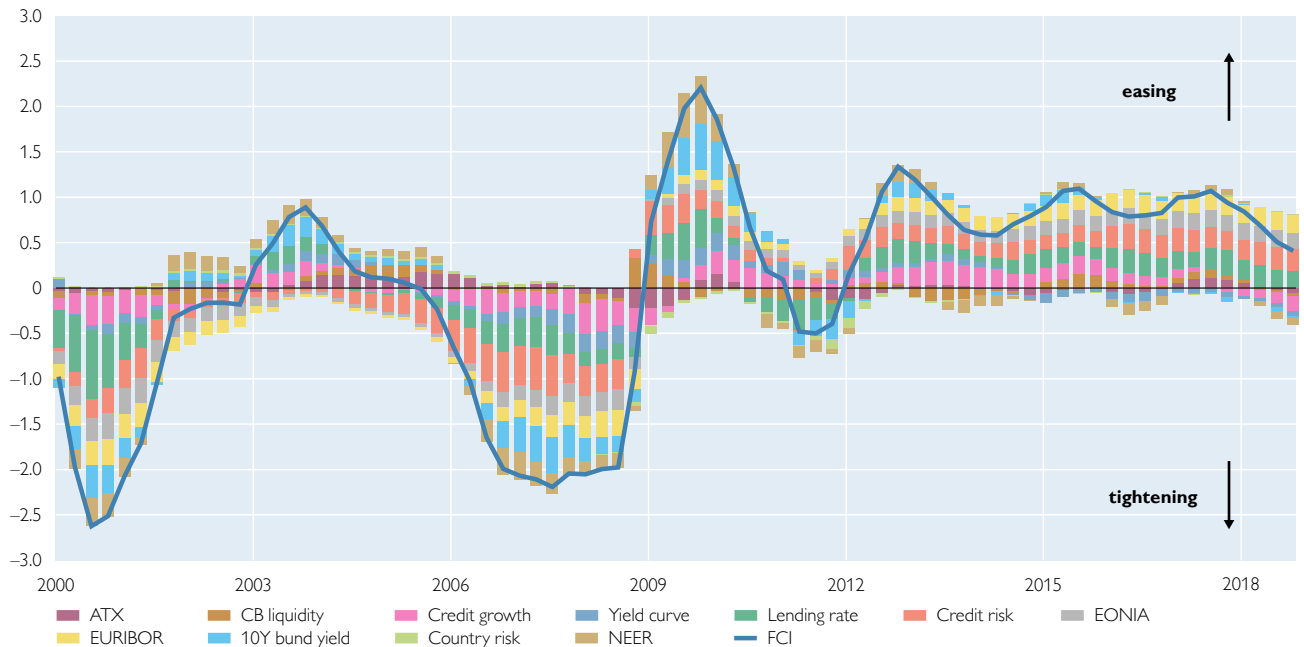
<sup>14</sup> *Excluding the Securities Markets Programme (SMP).*

<sup>15</sup> *For excellent reviews, see for example Davis et al. (2016) and Moccero et al. (2014).*

<sup>16</sup> *The first factor already explains 47% of the variance. Increasing or decreasing the number of factors and the percentage of variance explained does not alter the FCI significantly.*

Chart 8

### Contributions to the Financial Conditions Index



Source: Authors' calculations, ECB, Eurostat.

## 4.2 Results

Chart 8 shows the estimated financial conditions index and the contribution of each variable (or group of variables) to the FCI. Throughout the entire period under review, short- and long-term interest rates were important drivers of financial conditions in Austria, even though the long-term rate has contributed much less to overall financial conditions since 2015. While other variables that are usually associated with financing conditions, such as the stock market, the NEER or liquidity from the central bank, have smaller weights in this index, lending rates and sectoral credit risk turned out to be important contributors to financing conditions. Although the tightening that occurred between 2006 and 2009 was mostly driven by rising interest rates, other variables, such as lending to households, the stock market and the NEER, were also tightening during this period. After the crisis, lending rates and credit risk responded positively to the different policy measures implemented by the Eurosystem and have, for the most part, contributed to the easing of financial conditions. While lending rates followed the general tightening observed during the sovereign debt crisis in 2011, credit risk was still low and dampened the tightening observed in the sovereign bond market. In fact, the main drivers of the brief tightening period around the sovereign bond crisis in 2011 were, besides lending rates, the 10-year bund yield and country risk. This is surprising since Austria was considered a safe-haven market and yields of Austrian sovereign bonds therefore increased relatively less than those in several other countries. Finally, since 2011, almost all variables except central bank liquidity and the slope of the yield curve have contributed to more accommodative financing conditions.

## 5 Monetary stance

In order to gauge the monetary stance, it is common to compare the policy rate to a monetary policy rule, which should approximate the appropriate level of the policy rate as a function of national economic conditions. Since the OeNB does not set the interest rate for Austria, we can only measure whether euro area nominal interest rates were adequate for the economic conditions in Austria, as seen through the lens of a hypothetical monetary policy rule calibrated for Austria. The most popular monetary policy rule used to gauge the monetary stance is the Taylor rule but this rule has the disadvantage that it requires an estimation of the natural rate of interest (see Hartmann and Smets, 2018). This is problematic because the natural rate of interest is not observable, and its estimation is very imprecise. In fact, although there are good reasons to believe that the current natural interest rate in Austria is lower than at the beginning of the currency union, the uncertainty surrounding estimates of the natural interest rate is so large that it may well be that the natural interest rate has not changed.<sup>17</sup>

Thus, we rely on a so-called first-difference rule to gauge the monetary stance in Austria.<sup>18</sup> The advantage of this type of rule is that it only considers the inflation rate in Austria and the output gap or GDP growth but does not rely on estimates of the natural interest rate (see Hartmann and Smets, 2018). Orphanides and coauthors have shown in several studies that under uncertainty, a first-difference rule, where the policy rate has a very high degree of inertia, is the most robust rule a central bank can follow.<sup>19</sup> This is because this type of rule implies a smoother reaction of policy-makers to shocks in the economy, which reduces mistakes in case of mismeasurements of the relevant variables (see Williams, 1999).<sup>20</sup>

The first-difference rule used here is given by

$$R_t^{FD} = R_{t-1} + \theta(\pi_t - \pi^*) + \theta(y_t - y_{t-4})$$

where  $R_{t-1}$  is the EONIA rate in the last quarter,  $\pi_t$  is the inflation rate in Austria in quarter  $t$ ,  $\pi^*$  is the target inflation rate, which we set at 2%, and  $(y_t - y_{t-4})$  is the annual growth rate of GDP, which can eventually be replaced with the output gap as in Orphanides' original rule (see Orphanides, 2003).<sup>21</sup>

In chart 9 we show the deviation of two different specifications of a hypothetical monetary policy rule for Austria from the EONIA. The two policy rules are, first, Orphanides' original specification using a weight of  $\theta = 0.5$  and the output gap; the second rule uses  $\theta = 0.1$  and the annual growth of GDP as implemented by the Fed.<sup>22</sup> If the deviation is positive, i.e. if the EONIA is higher than the prescribed hypothetical monetary policy rule, the euro area rate was too tight for Austrian economic conditions.

<sup>17</sup> For estimates of the natural rate for Austria, see Belke and Klose (2017).

<sup>18</sup> The rule is also known as the Orphanides rule. For more details, see Orphanides (2003).

<sup>19</sup> Uncertainty not only about the level of the natural rate of interest but also about the structure of the economy, the phase in the business cycle, etc., which can lead to mismeasurements of the relevant variables. For more details, see Orphanides and Williams (2002) and Orphanides and Wieland (2012).

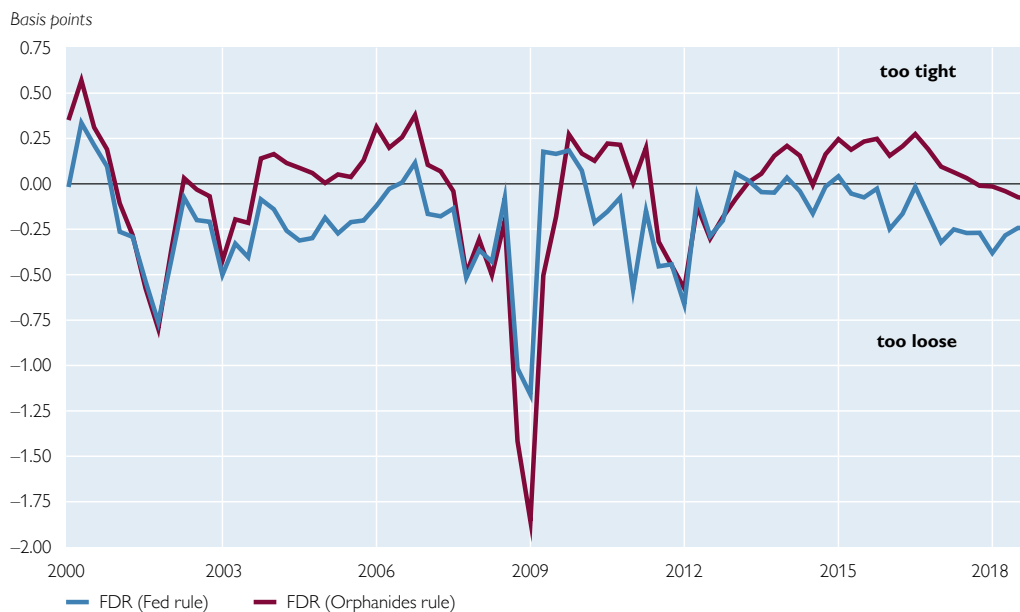
<sup>20</sup> It is understood that if the natural rate of interest was known, it would be more efficient to have a rule including it.

<sup>21</sup> The interpretation is that the output gap captures the deviation of current GDP growth from potential growth.

<sup>22</sup> For more information, see "Monetary Policy Principles and Practice" available at <https://www.federalreserve.gov/monetarypolicy/policy-rules-and-how-policy-makers-use-them.htm>.

Chart 9

### Deviations of an Austrian “policy rule” from the EONIA



Source: Authors' calculations, ECB, Eurostat.

As can be seen in chart 9, there are no large differences across both specifications. According to the original Orphanides rule (which implies a larger reaction of monetary policy to deviations of inflation from its target and to the output gap), the deviations from the EONIA were slightly larger during the peak of the crisis. On the other hand, under this rule the EONIA was too tight more often than under the Fed rule but the deviations from the EONIA were under 25 basis points most of the time. On the contrary, using the Fed rule (which has a much smaller reaction coefficient) the EONIA was almost always too loose for Austrian economic conditions and the deviations from the EONIA were often larger than 25 basis points. Only in the last year, given sustained economic growth and higher inflation in Austria compared to the euro area average, we observe that, according to both hypothetical rules, the EONIA was too low for Austrian economic conditions.

## 6 Conclusions

The various indicators used in this article show that Austria has withered the crisis well in terms of consequences for financing conditions, and Austria's public finances and the real economy have benefited from lower financing costs compared to the euro area average for most of the last 20 years.

Interest rates for bank loans have fallen since the introduction of the euro, with real interest rates being lower in Austria than in Germany and the euro area most of the time. This was, in part, related to the high share of variable rate loans, especially in the case of housing loans. Since the crisis, lending spreads between customer rates and money market rates (credit risk) have widened, while non-interest price elements of loans have increased. Banks have made up, at least in part, for lower interest rates by applying higher collateral requirements and loan covenants.

The Austrian 10-year nominal sovereign yield continued its pre-EMU decline also after the start of the euro; the expansionary monetary policy stance pursued by the ECB in response to the crisis has brought it below 1% since end-2014. Austria's pre-EMU "bond yield advantage" over non-core euro area countries, which had largely vanished in the first 10 years of EMU, resurfaced during the crisis.

The ATX index has risen by far more than the DAX and Euro STOXX50 indices over the past 20 years. However, earnings ratios of ATX companies have mostly been below those in the DAX and Euro STOXX50. In Austria, the stock earnings premium over 10-year government bonds was 2% to 3% for most of the period under review but rose to around 9% in 2017/2018.

A financial conditions index for Austria shows that together with interest rates, lending rates and credit risk were important contributors to the tightening of financial conditions during the financial crisis and have contributed to the loosening of financing conditions during the recovery.

Approximated by two different specifications of a simple hypothetical monetary policy rule, the monetary stance given by the euro area rate has been broadly adequate or slightly on the loose side in relation to economic conditions in Austria.

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