OESTERREICHISCHE NATIONALBANK
EUROSYSTEM

# MONETARY POLICY & THE ECONOMY

## Quarterly Review of Economic Policy

Stability and Security.

Q4/13

*Monetary Policy & the Economy* provides analyses and studies on central banking and economic policy topics and is published at quarterly intervals.


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

***DVR 0031577***
***ISSN 2309–1037 (print)***
***ISSN 2309–3323 (online)***




*Printed according to the Austrian Ecolabel guideline for printed matter.*

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

# Call for Applications: Visiting Research Program

The Oesterreichische Nationalbank (OeNB) invites applications from external researchers for participation in a Visiting Research Program established by the OeNB's Economic Analysis and Research Department. The purpose of this program is to enhance cooperation with members of academic and research institutions (preferably postdoc) who work in the fields of macroeconomics, international economics or financial economics and/or pursue a regional focus on Central, Eastern and Southeastern Europe.

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. Visiting researchers are expected to collaborate with the OeNB's research staff on a prespecified topic and to participate actively in the department's internal seminars and other research activities. They will be provided with accommodation on demand and will, as a rule, have access to the department's computer resources. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. Research visits should ideally last between three and six months, but timing is flexible.

Applications (in English) should include

- a curriculum vitae,
- a research proposal that motivates and clearly describes the envisaged research project,
- an indication of the period envisaged for the research visit, and
- information on previous scientific work.

Applications for 2014 should be e-mailed to *eva.gehringer-wasserbauer@oenb.at* by May 1, 2014.

Applicants will be notified of the jury's decision by mid-June. The following round of applications will close on November 1, 2014.

# Analyses

# Austrian Economy Recovers from Two-Year Weak Patch

## Economic Outlook for Austria from 2013 to 2015 (December 2013)

Gerhard Fenz,
Martin Schneider[1]

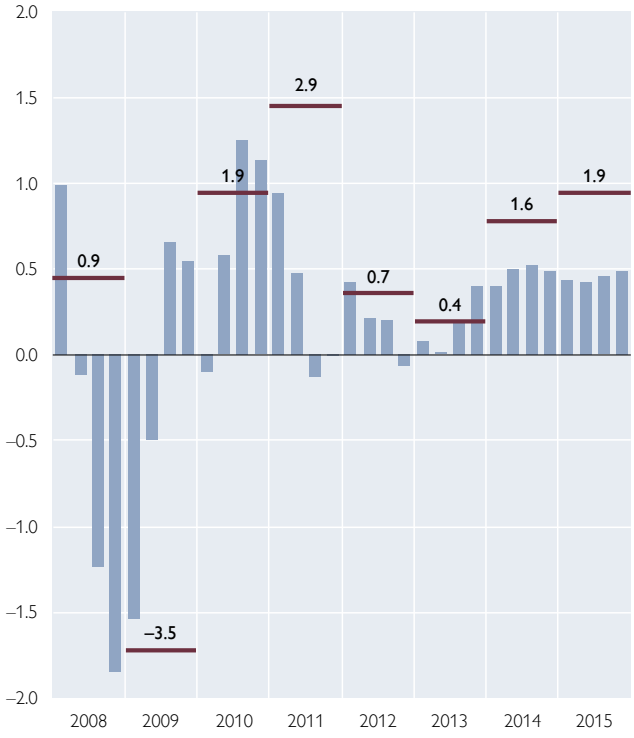
### 1 Summary: Growth Becomes More Broad-Based

In its economic outlook of December 2013, the Oesterreichische Nationalbank (OeNB) projects the Austrian economy to grow by a modest 0.4% in 2013. Following stagnating output in the first half of 2013, the economy is gradually recovering in the second half of the year. Growth will accelerate to 1.6% and 1.9% in 2014 and 2015, respectively. In addition to the recovery of the world economy, domestic demand components are also increasingly contributing to the recovery. Private consumption is benefiting from healthy employment growth and a moderate rise in real wages, and investment activity is being driven by improved sales prospects and deferred replacement investments that will be realized. As a result, Austria's growth prospects look virtually unchanged on the economic outlook of June 2013.

Chart 1

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

*Quarterly change in % (seasonally and working day-adjusted)*

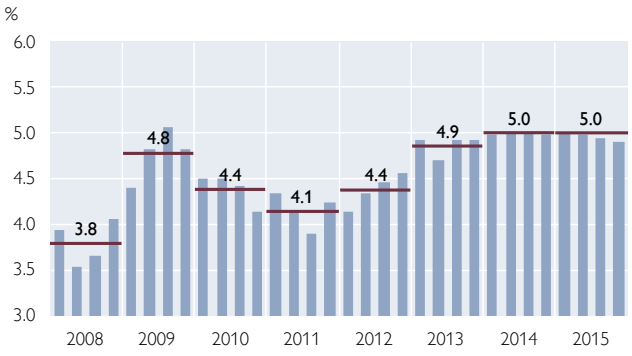



**Harmonized Index of Consumer Prices**

*Annual change in %*


**Unemployment Rate**

%




*Source: Eurostat, OeNB.*

Cutoff date:
November 20, 2013

[1] *Oesterreichische Nationalbank, Economic Analysis Division, gerhard.fenz@oenb.at, martin.schneider@oenb.at. In collaboration with Friedrich Fritzer, Ernest Gnan, Walpurga Köhler-Töglhofer, Doris Prammer, Doris Ritzberger-Grünwald and Alfred Stiglbauer.*

The labor market has been characterized by a sharp rise in labor supply, which means unemployment will climb to 5% despite sustained employment growth. Inflation, which was high in 2011 and 2012, is easing and, at 2.1%, will only just exceed the price stability target in 2013. Inflation is expected to continue falling to 1.7% and to 1.6% in 2014 and 2015, respectively. The general government budget balance will improve significantly in 2013 (–1.6% of GDP) compared with 2012 (–2.5%) but – especially owing to necessary bank transfers – will deteriorate during the rest of the forecast period (2014 and 2015: –2.2% in each year). The current account surplus will widen steadily from 3.0% of GDP in 2013 to 3.5% in 2015.

The world economy is recovering after two years of sluggish growth and is currently on track to modest growth. Economic activity in industrialized nations is gaining momentum while growth forces in emerging economies are slowing down. The subdued growth momentum of emerging economies is attributable to two factors: first, existing structural problems and, second, tighter financing conditions resulting from the anticipated tapering announcement of the U.S. Federal Reserve. Developed economies, by contrast, are visibly gaining steam due to the weakening of factors related to the financial crisis. The U.S. economy is witnessing a robust uptrend; the euro area succeeded in leaving recession behind in the second quarter of 2013. However, aggregated growth in the euro area is concealing a high level of heterogeneity. While core countries such as Germany and Austria will end 2013 with positive GDP growth, the economic output of peripheral euro area countries is contracting so sharply again that annual euro area growth will remain negative in 2013. The euro area economy is set to expand in 2014 and 2015, however.

The recovery of the international economy is making a crucial contribution to the projected upturn in the Austrian economy. The year 2012 and the first three quarters of 2013 registered very muted export growth. For the fourth quarter of 2013, by contrast, the order book is signaling a considerable improvement in export growth. Still, growth in Austrian export markets will prove to be lower than before the crisis. In addition, price competitiveness poses a challenge to Austrian exports. After declining for cyclical reasons in 2013, import growth will reaccelerate on the back of a revival in domestic demand. Despite sluggish export growth, slowing import growth in 2013 will result in a substantial improvement in Austria's current account. The current account surplus will widen from 1.6% of GDP in 2012 to 3.0% in 2013 and is expected to further improve to 3.5% by 2015.

Owing to prevailing uncertainty, companies have been curbing their investment activity since spring 2012. The marked improvement in sentiment indicates however that investment activity will recover soon. Excellent financing conditions and the need for replacement investment suggest, above all, a pronounced cycle of investment in equipment. The negative contributions of inventory changes in 2012 and 2013 will give rise to an inventory build-up over the rest of the forecast period that will support economic growth. High housing demand reflected in the steep rise in real estate prices will trigger an acceleration in housing investment. However, momentum in civil engineering investment currently remains subdued owing to fewer public sector orders. Consumption growth was very muted recently because of faltering real house-

hold income. Private consumption will contract slightly in 2013 as a whole. Sustained employment growth and rising real wages will however result in positive consumption growth in subsequent years.

The labor market situation is mixed. On the one hand, employment is expanding despite sluggish economic activity in 2012 and 2013. On the other hand, joblessness is also rising. This development is attributable to a rise in – particularly foreign – labor supply. Following the liberalization of the Austrian labor market in May 2011 for

Table 1

**OeNB December 2013 Outlook for Austria – Key Results[1]**

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| **Economic activity** | *Annual change in % (real)* | | | |
| Gross domestic product | +0.7 | +0.4 | +1.6 | +1.9 |
| Private consumption | +0.4 | +0.0 | +0.7 | +1.1 |
| Government consumption | –0.3 | +0.7 | +1.3 | +1.3 |
| Gross fixed capital formation | +1.9 | –0.7 | +2.2 | +2.4 |
| Exports of goods and services | +1.7 | +1.6 | +3.7 | +5.2 |
| Imports of goods and services | +0.0 | +0.1 | +3.7 | +5.2 |
| | *% of nominal GDP* | | | |
| Current account balance | +1.6 | +3.0 | +3.3 | +3.5 |
| **Contribution to real GDP growth** | *Percentage points* | | | |
| Private consumption | +0.2 | +0.0 | +0.4 | +0.6 |
| Government consumption | –0.1 | +0.1 | +0.2 | +0.2 |
| Gross fixed capital formation | +0.4 | –0.2 | +0.4 | +0.5 |
| Domestic demand (excluding changes in inventories) | +0.5 | +0.0 | +1.1 | +1.3 |
| Net exports | +0.9 | +0.9 | +0.2 | +0.4 |
| Changes in inventories (including statistical discrepancy) | –0.7 | –0.5 | +0.3 | +0.2 |
| **Prices** | *Annual change in %* | | | |
| Harmonised Index of Consumer Prices (HICP) | +2.6 | +2.1 | +1.7 | +1.6 |
| Private consumption expenditure (PCE) deflator | +2.6 | +2.2 | +1.7 | +1.7 |
| GDP deflator | +1.8 | +1.8 | +1.6 | +1.6 |
| Unit labor costs in the total economy | +3.0 | +2.8 | +1.4 | +1.0 |
| Compensation per employee (at current prices) | +2.5 | +2.5 | +2.3 | +2.2 |
| Productivity (whole economy) | –0.5 | –0.3 | +0.9 | +1.1 |
| Compensation per employee (real) | –0.2 | +0.3 | +0.6 | +0.5 |
| Import prices | +2.3 | –0.9 | +0.4 | +1.1 |
| Export prices | +1.1 | –0.3 | +0.7 | +1.4 |
| Terms of trade | –1.1 | +0.6 | +0.3 | +0.3 |
| **Income and savings** | | | | |
| Real disposable household income | +1.1 | –1.0 | +0.8 | +1.4 |
| | *% of nominal disposable household income* | | | |
| Saving ratio | 7.4 | 6.5 | 6.7 | 7.0 |
| **Labor market** | *Annual change in %* | | | |
| Payroll employment | +1.5 | +0.7 | +0.6 | +0.7 |
| | *% of labor supply* | | | |
| Unemployment rate (Eurostat definition) | 4.4 | 4.9 | 5.0 | 5.0 |
| **Budget[2]** | *% of nominal GDP* | | | |
| Budget balance (Maastricht definition) | –2.5 | –1.6 | –1.6 (–2.2) | –1.6 (–2.2) |
| Government debt | 74.0 | 74.2 | 73.7 (74.3) | 72.8 (74.0) |

*Source: 2012: Eurostat, Statistics Austria; 2013 to 2015: OeNB December 2013 outlook.*

*[1] The outlook was drawn up on the basis of seasonally adjusted and working-day adjusted national accounts data. Therefore, the values for 2012 may deviate from the nonadjusted data released by Statistics Austria.*

*[2] Values in brackets include potential bank aid.*

workers from eight Central and Eastern European countries, the Austrian labor market will be opened also to workers from Romania and Bulgaria on January 1, 2014. Furthermore, the rising labor force participation rate of both older people and women are also supporting labor supply growth. As a result, the unemployment rate (Eurostat definition) climbed from 4.4% in 2012 to 4.9% in 2013. The unemployment rate will stand at 5.0% in both 2014 and 2015.

Inflation almost halved in Austria during the previous twelve months. Falling energy and food prices will trigger a further deceleration in inflation momentum. Overall, the HICP inflation rate will ease from 2.1% in 2013 to 1.7% in 2014 and 1.6% in 2015.

The OeNB's budget forecast is based on a no-policy-change assumption, i.e. only already adopted discretionary measures are included in the forecast. The general government balance will be determined by one-off effects over the forecast horizon. In 2013, positive one-off effects – revenues from the auction of mobile licenses and from the tax agreement with Switzerland – will more than outweigh the negative effects arising from the government's support for the financial sector. As a result, the general government budget balance will improve to –1.6% of GDP in 2013. In 2014 and 2015, however, the budget balance is expected to deteriorate to –2.2% of GDP owing to further possible government assistance to the financial sector. Excluding the assumption of bank aid, the general government deficit ratio would remain at 1.6% of GDP in both 2014 and 2015.

## 2 Technical Assumptions

This forecast is the OeNB's contribution to the Eurosystem's December 2013 staff projections. The forecast horizon ranges from the fourth quarter of 2013 to the fourth quarter of 2015. November 20, 2013, was the cutoff date for data underlying the assumptions on global growth as well as interest rates, exchange rates and crude oil prices. The OeNB used its macroeconomic quarterly model to prepare the projections for Austria. The key data source comprises seasonally and working day-adjusted national accounts data computed by the Austrian Institute of Economic Research (WIFO), which were fully available up to the second quarter of 2013. The data for the third quarter of 2013 are based on GDP flash estimate estimates, which cover only part of the aggregates in the national accounts, however. The short-term interest rates used for the forecast horizon are based on market expectations for the three-month EURIBOR, namely 0.2% (2013), 0.3% (2014) and 0.5% (2015). The long-term interest rates, which are based on market expectations for ten-year government bonds, are set at 2.0% (2013), 2.3% (2014) and 2.7% (2015). The exchange rate of the euro vis-à-vis the U.S. dollar is assumed to stay constant at USD 1.34. The projected development of crude oil prices is based on futures prices. The oil price assumed for 2013 is USD 108.2 per barrel of Brent, while the prices for 2014 and 2015 are set at USD 103.9 and USD 99.2, respectively. The prices of commodities excluding energy are also based on futures prices over the forecast horizon.

## 3 Moderate Recovery of Global Economy – European Debt Crisis Still Hampers Growth

The world economy is gaining momentum after two years of weaker growth, with a regional shift in growth momentum becoming evident. While economic activity in industrialized nations is gaining visible pace, growth in emerging economies is slowing down. A

crucial factor for further growth is the future course of U.S. monetary policy. The rise in U.S. government bond yields since early 2013 has triggered strong capital inflows to the U.S.A. This phenomenon placed the currencies of some emerging economies under strong depreciation pressures, to which the central banks of these countries were forced to react by raising interest rates. In conjunction with existing structural problems, this tightening of financing conditions has led to decelerating growth momentum in key emerging economies.

At the same time, the factors that curbed the momentum of developed economies in the wake of the economic and financial crisis are weakening noticeably. The macroeconomic imbalances prevailing before the crisis were significantly reduced, which crucially contributed to the improvement of sentiment indicators. Despite the strained fiscal situation, the U.S.A. is recovering thanks to robust domestic demand; the euro area started to expand again in the second quarter of 2013. The growth differential between emerging and developed economies is narrowing increasingly.

The *U.S.A.* is currently on track to growth. GDP growth steadily accelerated in the first three quarters of 2013, reaching 0.7% in the third quarter (quarter on quarter). With the exception of government consumption, every demand component contributed to growth. The real estate market revived, and household debt fell substantially. The labor market situation is visibly improving, but the pace of job growth and the decline in unemployment have been slowing recently. This latter factor is likely to defer the exit from the expansionary monetary policy since, besides inflation, the unemployment rate is the most important target for the Federal Reserve. Fiscal policy is currently having a dampening effect on growth. The political deadlock between Democrats and Republicans led to a temporary spending freeze in October 2013, resulting in 800,000 civil servants having to take compulsory leave for a brief period. In mid-October 2013, the debt ceiling was raised to permit the U.S.A. to remain liquid at least until early February 2014. However, a political solution to the budget dispute is still outstanding, which is why the growth outlook for the U.S. economy is subject to corresponding downside risks.

In *Japan,* the economy – fueled by an expansionary economic policy – fared very well in the first half of 2013. Vigorous monetary policy stimuli induced a further reduction in lending rates and weakened the yen, thereby stimulating both private consumption and exports. Fiscal policy is also crucially shaping the way the economy is evolving. The year 2013 was marked by an expansionary fiscal policy in the wake of the reconstruction measures following the natural disaster in March 2011. In the medium term, however, the Japanese government will pursue a policy of fiscal consolidation. The increase in VAT – to take effect in early 2014 – is triggering anticipatory effects fueling private consumption in the second half of 2013. In 2014, however, this boost to demand will be absent, which means growth will also be significantly lower than in 2013.

In *Asian emerging market economies,* growth continued to undershoot expectations recently. Although rising U.S. yields resulted in capital outflows to the U.S.A. as well as in currency depreciations, growth in the region is still strong. In *China,* growth remains at a high level despite having slowed significantly in both 2011 and 2012 (from +11.6% in 2010 to +7.8% in 2012). The slowdown is largely based

on slackening export demand. Owing to a number of factors, however, medium-term growth prospects will also fall short of past levels. The greatest challenge for the Chinese economy lies in transforming its current focus on exports and investment into a more consumer goods-based one. Furthermore, the incipient tightening in labor supply and declining income from investment projects will dampen potential growth. In addition, China faces challenges stemming from the overheating phenomena seen in recent years (strong growth in lending and real estate prices, overinvestment).

In the *euro area,* economic developments are currently very mixed. While core countries such as Germany and Austria are likely to end the year 2013 with positive GDP growth, economic output in the region's peripheral countries is still contracting. However, two core euro area countries – Finland and the Netherlands – were also hit by recession. The years 2014 and 2015 will see the euro area return to growth. Internal devaluations to restore price competitiveness in peripheral countries and falling energy prices have led to a sharp drop in inflation in these countries. As a result, inflation in the euro area will be below the inflation target of just under 2.0%.

*Germany* is maintaining its role as the engine of economic growth in the euro area. Although the sluggish international economy hit German exports in 2013, affecting investment in addition to exports, domestic demand grew sufficiently steadily in order to facilitate modest growth. With the recovery of the global economy, exports will regain their role as the mainstay of growth, supported by robust domestic demand. Private consumption will be fueled by vigorous growth in real wages, steady employment growth and low interest rates. Better sales expectations and favorable financing conditions are driving corporate investment activity. Construction investment is benefiting from the catch-up processes following weather-related losses incurred in the first quarter of 2013 as well as from real estate prices that have risen considerably especially in urban agglomerations. With the strengthening of domestic demand, the high current account surplus will also narrow to some extent.

In *France,* owing to feeble export growth and falling investment, the economy will almost stagnate in 2013. Both private and government consumption will fuel the economy, however. Reforms to strengthen international competitiveness, which were implemented against a backdrop of falling market share in external trade, should prove effective, leading to the stabilization of market shares in this sector. French companies' sluggish profit growth is restricting the potential for the internal financing of investment, which means investment activity is unlikely to recover before 2015. As a result, the French economy will not provide any significant impetus to the euro area economy.

In *Italy,* the economy will continue to contract considerably in 2013. In conjunction with faltering real household income, both the tight budgetary situation and restrictive credit supply conditions are dampening domestic demand. As in 2012, slackening import demand implies a substantial improvement in the current account. The economic indicators available are signaling an end to the recession in the fourth quarter of 2013. Financing conditions will remain difficult owing to the continued need to consolidate bank balance sheets in 2014 as well. The past saw considerable government payment arrears owed to the corporate sector. The repayment of these outstanding

claims should have a positive effect on Italian companies' liquidity situation in 2014. In conjunction with a pick-up in exports, this factor should also fuel investment activity. However, stimuli from private consumption are unlikely, as households are responding to the difficult economic situation by stepping up precautionary saving.

Although peripheral euro area countries achieved considerable progress in making the necessary adjustments, the situation still looks mixed. *Ireland* carried out many successful adjustment measures in the implementation of its reforms, registering growth as early as the second quarter of 2013. *Portugal* – fueled by robust export growth – also exited recession in the second quarter of 2013. In 2013 as a whole, however, growth will remain negative owing to negative growth in previous quarters. Although *Spain* also sees the first positive results of its reforms, the Spanish economy is still feeling the repercussions arising from the correction of macroeconomic imbalances, continued fiscal consolidation and unfavorable financing conditions. Recovery will therefore unfold only gradually over the next few years. The shift from domestic demand to exports as a driver of economic growth will continue. In *Greece,* the economy will contract for the sixth time in a row in 2013. The recession weakened in the first half of 2013, however. Tourism registered a very healthy performance in the summer of 2013. In 2014, the economy should return to modest growth thanks to expanding exports and the implementation of investment projects sponsored with international funds. Owing to the continued decline in income, however, stimuli from private consumption cannot be anticipated.

Table 2

**Underlying Global Economic Conditions**

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| **Gross domestic product** | *Annual change in % (real)* | | | |
| World GDP growth outside the euro area | +3.8 | +3.3 | +3.9 | +4.1 |
| U.S.A. | +2.8 | +1.7 | +2.6 | +3.2 |
| Japan | +1.9 | +1.8 | +1.3 | +0.9 |
| Asia excluding Japan | +5.9 | +5.6 | +6.1 | +6.0 |
| Latin America | +2.9 | +2.8 | +3.0 | +3.5 |
| United Kingdom | +0.1 | +1.4 | +2.4 | +2.1 |
| CESEE EU Member States[1] | +0.7 | +1.0 | +2.2 | +2.7 |
| Switzerland | +1.0 | +1.9 | +1.9 | +1.9 |
| Euro area[2] | –0.6 | –0.4 | +1.1 | +1.5 |
| **World trade (imports of goods and services)** | | | | |
| World economy | +3.1 | +2.8 | +5.2 | +6.1 |
| Non-euro area countries | +4.5 | +3.9 | +5.6 | +6.4 |
| Real growth of euro area export markets | +4.0 | +3.0 | +5.0 | +5.7 |
| Real growth of Austrian export markets | +1.3 | +1.3 | +4.4 | +5.3 |
| **Prices** | | | | |
| Oil price in USD/barrel (Brent) | 112.0 | 108.2 | 103.9 | 99.2 |
| Three-month interest rate in % | 0.6 | 0.2 | 0.3 | 0.5 |
| Long-term interest rate in % | 2.4 | 2.0 | 2.3 | 2.7 |
| USD/EUR exchange rate | 1.28 | 1.33 | 1.34 | 1.34 |
| Nominal effective exchange rate (euro area index) | 98.91 | 100.32 | 102.34 | 102.29 |

*Source: Eurosystem.*

[1] *Bulgaria, Czech Republic, Hungary, Latvia, Lithuania, Poland and Romania.*
[2] *2013 to 2015: Results of the Eurosystem's December 2013 projections.*

The year 2013 was very muted in most *Central, Eastern and Southeastern European (CESEE) countries*. While GDP shrank in the Czech Republic and in Croatia, it expanded only marginally in the other countries of the region. With the gradual recovery of key export markets, recently sluggish domestic demand in this region will be a major pillar of growth in 2014 and 2015. The positive growth differential vis-à-vis the euro area will remain but no longer reach its pre-crisis level. In the *U.K.*, the economy regained momentum in 2013. In 2014 and 2015, however, the recovery will prove rather subdued owing to the consolidation measures required in both the private and public sector.

## 4 Moderate Upturn in Austria Increasingly Fueled by Domestic Demand

### 4.1 Stagnation in External Trade to Come to an End

According to current data compiled by Statistics Austria, domestic exports have so far been very subdued in 2013. Goods exports grew nominally by a mere 0.6% in the first eight months of 2013. Owing to falling export prices, however, this increase was about 1 percentage point higher in real terms. Order books indicate a significant improvement in export demand for the fourth quarter of 2013. New export orders, which are a component of the Bank Austria Purchasing Managers Index, reached 54.5 points in October 2013, i.e. above the expansion threshold of 50 points for the sixth time in succession.

The weak performance of Austrian exports in 2012 and 2013 was driven by sluggish and, in some cases, negative growth in key export markets. The non-euro area CESEE EU countries, which are important for Austria, did not make a positive contribution to export market growth in these two years (chart 2, right-hand panel). Furthermore, the reduction of the current account deficit in Greece, Spain, Ireland and Italy dampened export market growth. However, these processes have already peaked and will depress export growth to an increasingly lesser extent over the forecast horizon.

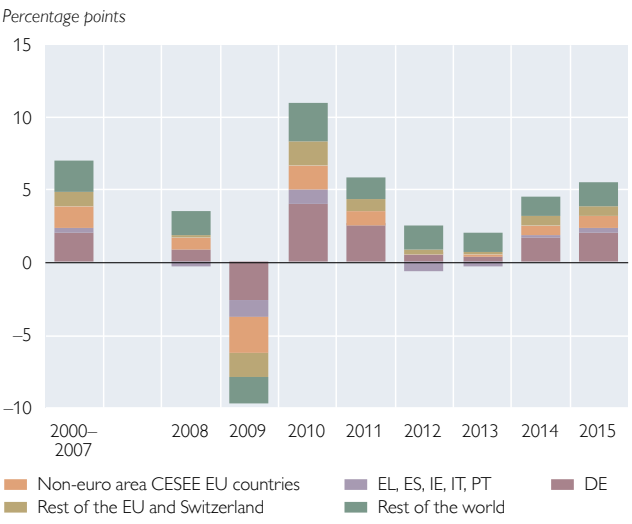
Chart 2

**Exports and Export Market Growth**

**Goods Exports and New Export Orders**


*Source: Statistics Austria.*

**Contributions to Growth of Austrian Export Markets**




*Source: Eurosystem (December 2013 BMPE).*

Against this backdrop and in view of the anticipated global economic upturn, Austrian export market growth will recover gradually in 2014 and 2015. The contribution of the non-euro area CESEE EU countries to the growth of Austrian export markets will also increase again, but in the medium term it will remain well below pre-crisis levels. At an average 4.7%, real import growth of these countries will be 6 percentage points lower in the period from 2014 to 2015 than in the period from 2000 to 2007, dampening Austrian GDP growth by an average 0.3 percentage points per year. While the relative importance of the non-euro area CESEE EU countries for Austrian export growth is diminishing compared with the pre-crisis period, that of Germany, Austria's major trading partner, is increasing. The vigorous domestic economy of Germany – Europe's economic powerhouse – will induce a steep increase in German import demand, from which Austrian exporters will also derive benefit. Growth in the Austrian export market as a whole will accelerate from 1.3% in 2013 to 5.3% in 2015 over the forecast horizon. Growth rates such as those before the crisis are not anticipated to be reached in the forecast period, though.

In addition to more sluggish market growth, price competitiveness will also pose a challenge to Austrian exporters in the forecast period. Owing to sustained wage moderation since the mid-1990s, Austria managed to improve its price competitiveness considerably until the outbreak of the crisis. However, growth in unit labor costs has been accelerating since then. In conjunction with falling unit labor costs in several crisis countries, this situation gives rise to price competition pressures on domestic suppliers. Owing to the excellent profit situation and the high levels of non-price competitiveness, however, this phenomenon will incur only marginal losses of market share over the forecast horizon.

After declining for cyclical reasons in 2013, imports will return to more vigorous growth in 2014 and 2015 owing to a revival in domestic demand and, in particular, to healthy investment activity. This resurgence will reduce

Table 3

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

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| **Exports** | | | | |
| Competitor prices in Austria's export markets | +2.9 | –1.3 | +0.4 | +1.3 |
| Export deflator | +1.1 | –0.3 | +0.7 | +1.4 |
| Changes in price competitiveness | +1.8 | –0.9 | –0.3 | –0.1 |
| Import demand in Austria's export markets (real) | +1.3 | +1.3 | +4.4 | +5.3 |
| Austrian exports of goods and services (real) | +1.7 | +1.6 | +3.7 | +5.2 |
| Austrian market share | +0.3 | +0.3 | –0.8 | –0.2 |
| **Imports** | | | | |
| International competitor prices in the Austrian market | +2.2 | –0.9 | +0.6 | +1.4 |
| Import deflator | +2.3 | –0.9 | +0.4 | +1.1 |
| Austrian imports of goods and services (real) | +0.0 | +0.1 | +3.7 | +5.2 |
| **Terms of trade** | –1.1 | +0.6 | +0.3 | +0.3 |
| | *Percentage points of real GDP growth* | | | |
| **Contribution of net exports to GDP growth** | +0.9 | +0.9 | +0.2 | +0.4 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook, Eurosystem.*

Table 4

**Austria's Current Account**

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *% of nominal GDP* | | | |
| **Balance of trade** | 2.3 | 3.9 | 4.2 | 4.4 |
| Balance of goods | –2.3 | –1.3 | –1.3 | –1.2 |
| Balance of services | 4.6 | 5.2 | 5.4 | 5.5 |
| **Balance on income** | 0.0 | 0.0 | 0.1 | 0.2 |
| **Balance on current transfers** | –0.7 | –0.9 | –1.0 | –1.0 |
| **Current account** | 1.6 | 3.0 | 3.3 | 3.5 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

net exports' contribution to growth from 0.9% in 2013 to 0.2% in 2014 and 0.4% in 2015.

Slowing import growth in 2013 will mean a significant improvement in Austria's current account, despite sluggish export growth. The current account surplus will widen from 1.6% of GDP in 2012 to 3.0% in 2013. A further modest improvement to 3.5% is expected by 2015.

### 4.2 Surge in Investment Activity Expected

As the second most important domestic demand component after private consumption, investment activity was very sluggishly up to the third quarter of 2013. The level of real gross fixed capital formation had declined by more than 1.0% since early 2012. Cyclically sensitive investment in equipment was particularly badly hit (–3.6%), while housing investment performed somewhat better in this period (+1.8%). Many prevailing factors would have provided the basis for much stronger investment growth, though: Owing to the steep increase in companies' financial assets thanks to their healthy profit situation in recent years, the potential for the internal financing of investment is very good. The extremely low level of interest rates is also making debt financing easier. The results of the bank lending survey show moreover that banks have recently eased their lending conditions to some extent. Investment restraint to date is therefore attributable to low sales expectations.

With the recently marked improvement in sentiment, however, we anticipate a surge in investment activity shortly. This phenomenon is most clearly reflected in the sharp increase in new export orders but also imports of machines and vehicles – which largely constitute investment goods – are already showing initial uptrends (see chart 3). Improved sales expectations are a necessary requirement for favorable investment conditions to take their full effect in the forecast period.

Investment in equipment, which will benefit also from the need to carry out replacement investment after a long period of investment restraint, is expected to have a particularly pronounced investment cycle. Housing investment follows a far longer cycle compared with general economic developments. With a share of some 6.5% of GDP, it peaked in the mid-1990s, falling to just above 4.0% by the time the crisis broke out. However, housing investment has trended slightly upward since the crisis. Favorable financing conditions and rising real estate prices should help accelerate growth in housing activity in the forecast period.

Chart 3

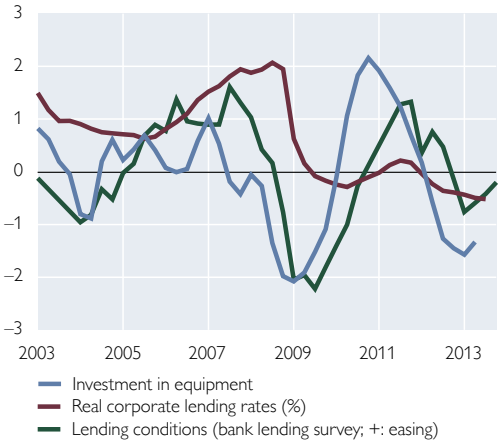
## Determinants of Investment in Equipment

**Imports of Machinery and Transport Equipment**

*Annual change in %, standardized*


**Financing Conditions**

*Annual change in %, standardized*




*Source: Statistics Austria.*

However, momentum in civil engineering investment will remain subdued owing to fewer public sector orders.

Major growth impetus will also come from the inventory cycle in the coming quarters. Inventory rundown dampened GDP growth in the period from 2011 to 2013. Leading indicators such as the inventory indicator, which measures purchasing managers' assessment of new orders in relation to stocks of finished products, are signaling the need for companies to build up their inventories again in the anticipated

Table 5

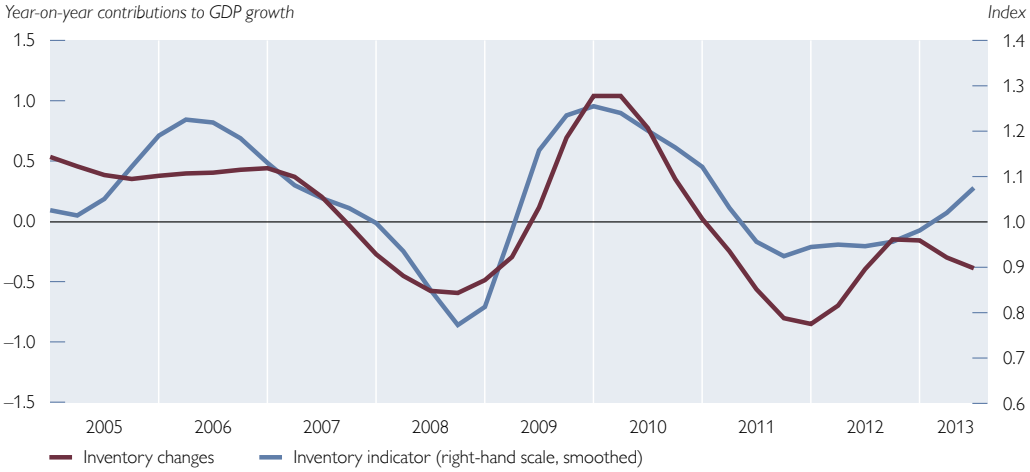
## Investment Activity in Austria

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Total gross fixed capital formation | +1.9 | –0.7 | +2.2 | +2.4 |
| *of which: investment in plant and equipment* | *+2.1* | *–2.0* | *+3.4* | *+3.2* |
| *residential construction investment* | *+1.0* | *+1.2* | *+1.8* | *+2.5* |
| *nonresidential construction investment and other investment* | *+1.8* | *–0.2* | *+1.1* | *+1.5* |
| *government investment* | *+1.3* | *+3.9* | *+3.9* | *+3.9* |
| *private investment* | *+1.9* | *–1.0* | *+2.1* | *+2.3* |
| | *Contribution to total gross fixed capital formation growth in percentage points* | | | |
| Investment in plant and equipment | +0.9 | –0.8 | +1.4 | +1.3 |
| Residential construction investment | +0.2 | +0.3 | +0.4 | +0.5 |
| Nonresidential construction investment and other investment | +0.7 | –0.1 | +0.4 | +0.6 |
| Government investment | +0.1 | +0.2 | +0.2 | +0.2 |
| Private investment | +1.8 | –0.9 | +2.0 | +2.2 |
| | *Contribution to real GDP growth in percentage points* | | | |
| Inventory changes | –0.5 | –0.3 | +0.2 | +0.2 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

Chart 4

## Inventory Changes




*Source: Statistics Austria, Bank Austria.*

economic upturn. After –0.3 percentage points in 2013, this means that at +0.2 percentage points the contribution of changes in inventories to GDP growth will move back into the black in both 2014 and 2015.

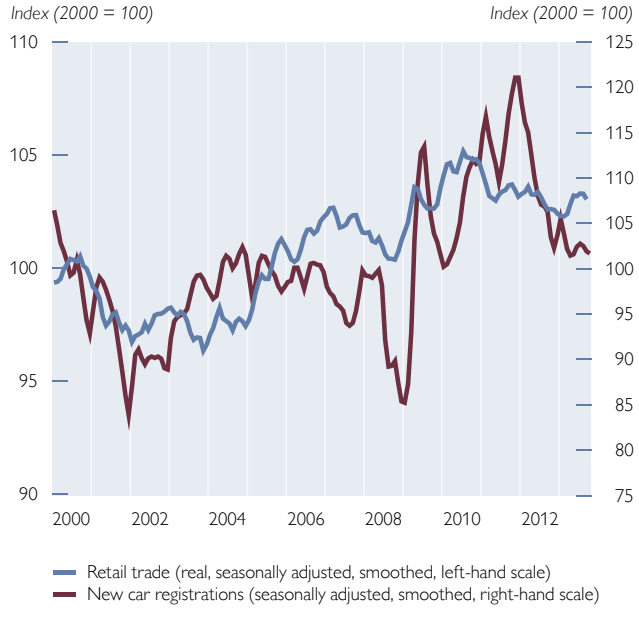
### 4.3 Revival in Consumer Demand

Household consumer spending was very muted owing to declining household income. For instance, real disposable household income was down by 5.0% year on year in the first half of

Chart 5

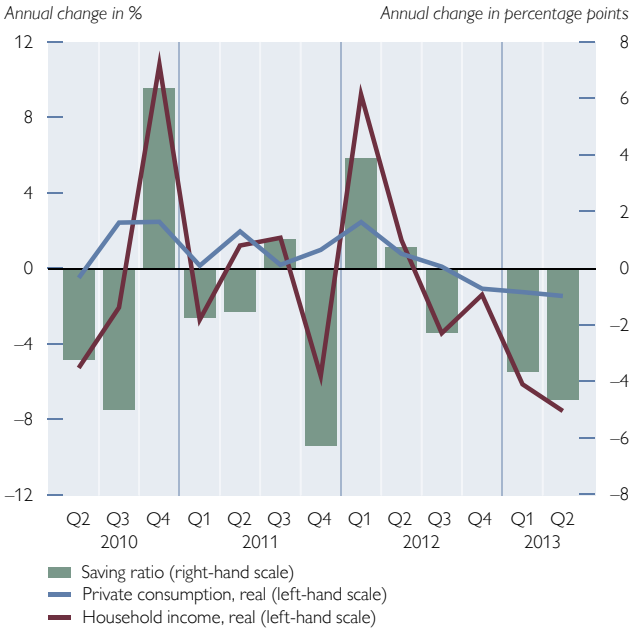
## Private Consumption

**Retail Trade and New Car Registrations**




*Source: Statistics Austria.*

**Income, Consumption and Saving Ratio**




*Source: Statistics Austria, WIFO.*

2013. However, households reacted to this loss of income only to some extent by reducing consumer spending (–0.2%). Consumption levels were financed by a decline in the saving ratio, which plummeted sharply in the first half of 2013.

Financial account data currently available up to the third quarter of 2013 indicate a continued slide in financial investment, thereby signaling a further drop in the saving ratio. However, these data are difficult to reconcile with the available information on consumer spending and income growth. Although consumption growth was positive in the third quarter of 2013, at +0.1% it was still very modest compared with the previous quarter. In addition, key income components such as the compensation of employees grew more strongly than private consumption, suggesting rather a slight increase in the saving ratio. New car registrations and retail trade point to a modest acceleration in consumption growth in the coming months. Given the subdued growth in private consumption in 2013, however, the OeNB anticipates real household consumer spending will stagnate in 2013 as a whole.

Nominal household income in 2014 will be fueled by comparatively high collective wage settlements (+2.5%). At +2.3%, gross compensation per employee will accelerate somewhat more slowly. The slightly negative wage drift (–0.2 percentage points) will stem from a shift of employment to low-wage sectors and from a growing share of part-time employees. "Bracket creep" will result in net compensation of employees per employee of 1.9%, down by almost 0.4 percentage points. For the first time since 2009, on the back of falling inflation, in 2014 net real wages will grow – albeit by a modest 0.2% – in the year as a whole.

In line with the economic recovery, other income components will also make a higher contribution to household income growth from 2014. After falling unexpectedly sharply in 2013, investment income is expected to grow in line with its long-term average. As in the past, self-employment income has been following general economic developments; it is expected to evolve similarly in 2015.

Overall, real disposable household income will climb by 0.8% in 2014 and

Table 6

**Determinants of Nominal Household Income in Austria**

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Payroll employment | +1.5 | +0.7 | +0.6 | +0.7 |
| Wages per employee | +2.5 | +2.5 | +2.3 | +2.2 |
| Compensation of employees | +4.0 | +3.2 | +2.9 | +2.9 |
| Property income | +13.8 | –5.1 | +3.6 | +4.5 |
| Self-employment income and operating surplus (net) | +3.2 | +3.2 | +5.1 | +4.8 |
| | *Contribution to disposable household income growth in percentage points* | | | |
| Compensation of employees | +3.4 | +2.7 | +2.5 | +2.5 |
| Property income | +1.3 | –0.5 | +0.3 | +0.4 |
| Self-employment income and operating surplus (net) | +0.7 | +0.6 | +1.0 | +1.0 |
| Net transfers minus direct taxes[1] | –1.8 | –1.0 | –0.9 | –0.8 |
| Disposable household income (nominal) | +3.7 | +1.2 | +2.5 | +3.1 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

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

Table 7

**Private Consumption in Austria**

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Disposable household income (nominal) | +3.7 | +1.2 | +2.5 | +3.1 |
| Private consumption expenditure (PCE) deflator | +2.6 | +2.2 | +1.7 | +1.7 |
| Disposable household income (real) | +1.1 | –1.0 | +0.8 | +1.4 |
| Private consumption (real) | +0.4 | +0.0 | +0.7 | +1.1 |
| | *% of nominal disposable household income* | | | |
| Saving ratio | 7.4 | 6.5 | 6.7 | 7.0 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

by 1.5% in 2015. Households will not however increase their consumer spending to the same extent but use a portion of the income growth to boost their total savings, which have shrunk significantly in the last few years. The saving ratio will increase gradually from 6.5% in 2013 to 7.0% in 2015.

## 5 Unemployment Rate Stabilizes at 5.0%

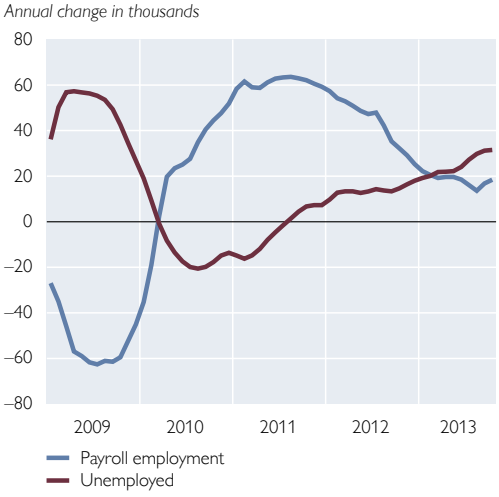
In view of the previous quarters' sluggish economic developments, current employment growth continues to be unexpectedly positive. According to the national accounts, the number of those in payroll employment rose by 28,000 persons (0.75%) year on year in the first three quarters of 2013. Employment is expected to rise at a similar pace in 2013 as a whole.

The relatively robust increase in payroll employment clearly overstates underlying employment momentum, however. As in previous years, labor market adjustments are increasingly taking place through changes in working hours. Total hours worked will grow by

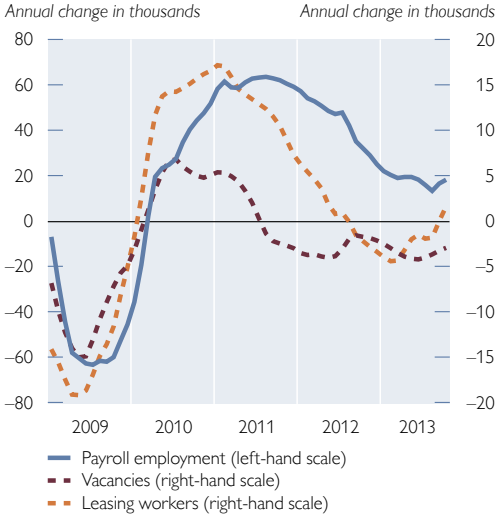
Chart 6

**Labor Market**

**Employment and Unemployment**




**Employment Leading Indicators**




*Source: Statistics Austria.*

Table 8

**Labor Market Developments in Austria**

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| **Total employment** | +1.3 | +0.7 | +0.7 | +0.7 |
| *of which: payroll employment* | *+1.5* | *+0.7* | *+0.6* | *+0.7* |
| *self-employment* | *–0.2* | *+0.6* | *+1.1* | *+0.8* |
| *public sector employment* | *–0.2* | *–0.1* | *–0.1* | *–0.1* |
| Registered unemployment | +6.2 | +12.6 | +4.1 | +0.0 |
| Labor supply | +1.5 | +1.2 | +0.8 | +0.7 |
| | *% of labor supply* | | | |
| **Unemployment rate (Eurostat definition)** | 4.4 | 4.9 | 5.0 | 5.0 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

only 0.2% in 2013, i.e. far less steeply than the number of those in payroll employment.

The available leading indicators for the labor market are currently not giving a clear signal. The number of reported vacancies is falling steadily, signaling a further cooling of the labor market. By contrast, the employment growth of leasing workers, which typically leads employment momentum by some months, seems to have already bottomed out. Employment growth is therefore expected to stabilize at the current level in the coming quarters. Since the labor market responds with a lag to economic developments, employment growth at +0.6% will prove somewhat weaker overall in 2014 than in 2013 and will accelerate to +0.7% only in 2015.

Despite positive employment growth, jobless numbers have risen steeply in 2013 so far (+25,000). This development is attributable to growth in labor supply – in particular, the supply of foreign labor. Since the Austrian labor market was fully liberalized in May 2011 for workers from eight Member States that joined the EU in 2004, 67,000 additional workers (as of September 2013) from this region found employment in Austria. This figure corresponds to about 80% of total employment growth. The inflow was still some 20,000 persons in the first nine months of 2013 (year on year). Although it will decrease in the forecast period, at least 5,000 additional Romanian and Bulgarian workers, to whom the Austrian market will be opened on January 1, 2014, are also expected annually. We expect total foreign labor supply growth of +23,000 and +17,000 persons for 2014 and 2015, respectively. In addition, owing to rising labor force participation rates of both women and older persons, domestic labor supply will increase by the order of some +15,000 persons per year.

After rising by ½ percentage point to 4.9% in 2013, unemployment will stabilize at around 5.0% in both 2014 and 2015 owing to relatively steady employment growth and weaker labor supply growth.

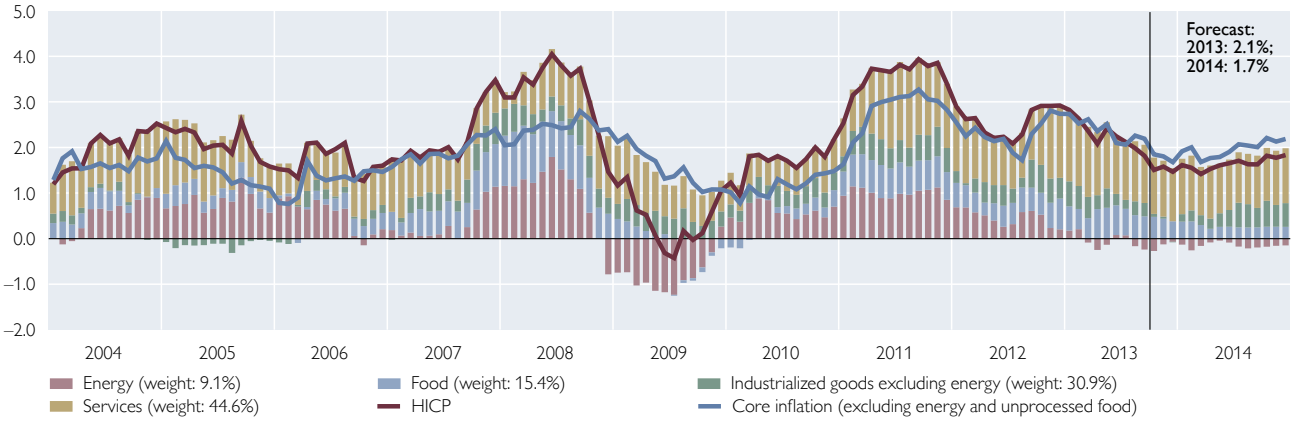
## 6 Inflation Falls below 2.0% Mark

Inflation in Austria almost halved in the previous twelve months. HICP inflation stood at 1.5% in October 2013, i.e. 1.4 percentage points lower than the same month a year ago. Core inflation (excluding energy and unprocessed food) was 1.9%. This decline was primarily attributable to falling energy

Chart 7

## Austrian HICP Inflation and Contributions of Subcomponents

*Annual change in % (HICP and core inflation) and percentage points (contributions to inflation)* *Latest observation: September 2013*




*Source: OeNB, Statistics Austria.*

prices and the slowing rate of price increases in the services sector.

A further modest drop in inflation is expected by end-2013. Oil prices will fall marginally over the forecast period as a whole in line with market expectations, dampening price growth. Inflation in the services sector will be heavily influenced by wage costs. In view of only marginally decelerating wage growth in 2014 and 2015, inflation in this sector will hover fairly steadily around the 2.5% mark. Conversely, inflation in industrial goods excluding energy will reaccelerate in 2014 – from a very low current level – owing to base effects and improved demand for consumer durables.

Overall, the HICP inflation rate will ease from 2.1% in 2013 to 1.7% in

Table 9

## Selected Price and Cost Indicators for Austria

| | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|
| | *Annual change in %* | | | |
| Harmonised Index of Consumer Prices (HICP) | +2.6 | +2.1 | +1.7 | +1.6 |
| HICP energy | +5.1 | –1.0 | –1.6 | –0.3 |
| HICP excluding energy | +2.3 | +2.4 | +2.0 | +1.8 |
| Private consumption expenditure (PCE) deflator | +2.6 | +2.2 | +1.7 | +1.7 |
| Investment deflator | +2.0 | +1.4 | +1.1 | +1.2 |
| Import deflator | +2.3 | –0.9 | +0.4 | +1.1 |
| Export deflator | +1.1 | –0.3 | +0.7 | +1.4 |
| Terms of trade | –1.1 | +0.6 | +0.3 | +0.3 |
| GDP at factor cost deflator | +1.7 | +1.7 | +1.9 | +1.6 |
| Unit labor costs | +3.0 | +2.8 | +1.4 | +1.0 |
| Compensation per employee | +2.5 | +2.5 | +2.3 | +2.2 |
| Labor productivity | –0.5 | –0.3 | +0.9 | +1.1 |
| Collective wage agreements | +3.3 | +2.6 | +2.5 | +2.3 |
| Profit margins[1] | –1.4 | –1.1 | +0.5 | +0.6 |

*Source: 2011: Eurostat, Statistics Austria; 2013 to 2015: OeNB December 2013 outlook.*

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

2014 and 1.6% in 2015. Core inflation excluding energy will exceed HICP inflation by around ¼ percentage point over the forecast horizon. The positive inflation differential between Austria and Germany narrowed to 0.3 percentage points as early as October 2013 and will almost entirely close in the forecast period. Owing to improved growth prospects and to related higher wage settlements, an average inflation differential of ½ percentage point will persist compared with the euro area.

## 7 External Downside Risks and Balanced Domestic Risks

Most external risks to growth remain pointed to the downside. Although progress in reducing macroeconomic imbalances was evident in the euro area and in CESEE countries, the risk of setbacks remains high in view of elevated unemployment levels, the fragmentation of European financial markets and the necessary reduction in debt levels in many countries and sectors. Another deterioration in the European debt crisis therefore still represents the central downside risk to the forecast. Potential negative consequences stemming from the U.S. budget dispute also represent an external risk. Moreover, renewed market turmoil might arise in some emerging economies in the event the nonstandard U.S. monetary policy measures are discontinued.

Domestic economic risks are considered to be largely balanced. The recent sharp drop in the saving ratio involves the risk that consumers reduce spending in order to boost their saving levels. However, the current data situation relating to the saving ratio is subject to some uncertainty. Conversely, the investment cycle may prove far more pronounced than assumed in the forecast. In the event of further improving sales expectations, we see scope for additional investment in equipment in the short term. In addition, the recent sharp rise in real estate prices and the favorable financing opportunities may be reflected in an increase in construction activity that is stronger than assumed in the forecast.

Whereas the forecast risks to growth remain tilted to the downside on the whole, the risks to inflation are considered to be largely balanced. Only accelerating commodity price inflation represents an upside risk.

## 8 No Significant Forecast Revisions

The external environment has barely changed since the OeNB June 2013 outlook. The underlying assumptions on the growth of global trade had to be marginally revised downward. The growth of Austrian export markets is expected to be 0.4 and 0.3 percentage points lower in 2014 and 2015, respectively. Oil futures prices are up slightly: by USD 3.9 per barrel of Brent in 2014 and by USD 3.0 in 2015. The assumptions on the exchange rate of the euro vis-à-vis the U.S. dollar and the nominal effective exchange rate imply a modest appreciation. Short-term interest rates are almost unchanged and long-term interest rates are 20 to 30 basis points higher on the June 2013 outlook.

The effects of these new external assumptions were simulated using the OeNB macroeconomic model. Table 11 lists the reasons for revising the outlook in detail. Apart from the impact of changed external assumptions, the impact of new data and a residual have played a role. The influence of new data includes the effects of the revisions of both the historical data already available at the time of the previous economic outlook (i.e. data up to the first quarter of 2013) and the forecasting

Table 10

## Change in the External Economic Conditions since the OeNB June 2013 Outlook

| | December 2013 | | | June 2013 | | | Difference | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 |
| | *Annual change in %* | | | | | | | | |
| Growth of Austria's export markets | +1.3 | +4.4 | +5.3 | +1.6 | +4.9 | +5.8 | –0.3 | –0.5 | –0.5 |
| Competitor prices in Austria's export markets | –1.3 | +0.4 | +1.3 | –0.3 | +1.2 | +1.5 | –1.0 | –0.8 | –0.2 |
| Competitor prices in Austria's import markets | –0.9 | +0.6 | +1.4 | –0.1 | +1.3 | +1.6 | –0.8 | –0.7 | –0.2 |
| | *USD per barrel (Brent)* | | | | | | | | |
| Oil price | 108.2 | 103.9 | 99.2 | 105.5 | 100.0 | 96.2 | +2.7 | +3.9 | +3.0 |
| | *Annual change in %* | | | | | | | | |
| Nominal effective exchange rate (exports) | –1.2 | –0.3 | +0.0 | –0.9 | +0.0 | +0.0 | –0.3 | –0.3 | +0.0 |
| Nominal effective exchange rate (imports) | –0.7 | –0.2 | +0.0 | –0.5 | +0.0 | +0.0 | –0.2 | –0.2 | +0.0 |
| | % | | | | | | | | |
| Three-month interest rate | 0.2 | 0.3 | 0.5 | 0.2 | 0.3 | 0.5 | +0.0 | +0.0 | +0.0 |
| Long-term interest rate | 2.0 | 2.3 | 2.7 | 1.8 | 2.1 | 2.4 | +0.2 | +0.2 | +0.3 |
| | *Annual change in %* | | | | | | | | |
| U.S. GDP (real) | +1.7 | +2.6 | +3.2 | +1.9 | +2.6 | +3.0 | –0.2 | +0.0 | +0.2 |
| | *USD/EUR* | | | | | | | | |
| USD/EUR exchange rate | 1.33 | 1.34 | 1.34 | 1.31 | 1.31 | 1.31 | +0.02 | +0.03 | +0.03 |

*Source: Eurosystem.*

errors of the previous outlook for the periods now published for the first time (i.e. data for the second and third quarters of 2013). The residual includes new expert opinions regarding the development of domestic variables, such as government consumption or wage settlements, as well as any changes to the model.

The marginal upward revision of growth prospects for 2013 (+0.1 percentage points) is explicable by the publication of new data. The upward revision of historical data up to the first

Table 11

## Breakdown of Forecast Revisions

| | GDP | | | HICP | | |
|---|---|---|---|---|---|---|
| | 2013 | 2014 | 2015 | 2013 | 2014 | 2015 |
| | *Annual change in %* | | | | | |
| **December 2013 outlook** | +0.4 | +1.6 | +1.9 | +2.1 | +1.7 | +1.6 |
| **June 2014 outlook** | +0.3 | +1.5 | +1.8 | +2.0 | +1.7 | +1.8 |
| **Difference** | +0.1 | +0.1 | +0.1 | +0.1 | +0.0 | –0.2 |
| **Due to:** | *Percentage points* | | | | | |
| External assumptions | +0.0 | –0.3 | –0.3 | +0.0 | +0.0 | –0.1 |
| New data | +0.1 | –0.1 | +0.0 | +0.0 | +0.0 | +0.0 |
| *of which: Revision of historical data until Q1 13* | *+0.3* | *+0.0* | *x* | *+0.0* | *+0.0* | *x* |
| *Projection errors for Q2 and Q3 13* | *–0.2* | *–0.1* | *x* | *+0.0* | *+0.0* | *x* |
| Other[1] | +0.0 | +0.5 | +0.4 | +0.1 | +0.0 | –0.1 |

*Source: OeNB June 2013 and December 2013 outlooks.*

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

quarter of 2013 has resulted in higher growth for 2013 as a whole; for the second and third quarters of 2013, GDP growth has proved to be weaker than was expected in June 2013. Projected GDP growth for 2014 and 2015 was slightly revised upward despite slightly worse external economic conditions. Owing to lower demand, 2014 and 2015 export growth was revised downward on the June 2013 outlook. However, this revision is offset by the assumption of brisker investment activity. In view of very sluggish investment growth recently, replacement investment should also be carried out over the next two years. The modest downward revisions of the inflation forecast for 2015 are essentially based on the effects of the new external assumptions.

# Appendix

Table 12

## Demand Components (Real Prices)

Chained volume data (reference year = 2005)

| | 2012 | 2013 | 2014 | 2015 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| | *EUR million* | | | | *Annual change in %* | | | |
| Private consumption | 145,377 | 145,425 | 146,464 | 148,080 | +0.4 | +0.0 | +0.7 | +1.1 |
| Government consumption | 49,723 | 50,085 | 50,724 | 51,399 | –0.3 | +0.7 | +1.3 | +1.3 |
| Gross fixed capital formation | 56,365 | 55,949 | 57,159 | 58,539 | +1.9 | –0.7 | +2.2 | +2.4 |
| *of which: Investment in plant and equipment* | 23,132 | 22,668 | 23,437 | 24,193 | +2.1 | –2.0 | +3.4 | +3.2 |
| *Residential construction investment* | *11,351* | *11,493* | *11,703* | *12,000* | *+1.0* | *+1.2* | *+1.8* | *+2.5* |
| *Investment in other construction* | *22,070* | *22,019* | *22,270* | *22,597* | *+1.8* | *–0.2* | *+1.1* | *+1.5* |
| Changes in inventories (including statistical discrepancy) | 2,480 | 1,220 | 1,991 | 2,514 | × | × | × | × |
| Domestic demand | 253,946 | 252,678 | 256,339 | 260,532 | –0.2 | –0.5 | +1.4 | +1.6 |
| Exports of goods and services | 156,930 | 159,375 | 165,193 | 173,734 | +1.7 | +1.6 | +3.7 | +5.2 |
| Imports of goods and services | 139,447 | 139,561 | 144,750 | 152,319 | +0.0 | +0.1 | +3.7 | +5.2 |
| Net exports | 17,483 | 19,814 | 20,444 | 21,415 | × | × | × | × |
| **Gross domestic product** | 271,428 | 272,492 | 276,783 | 281,946 | +0.7 | +0.4 | +1.6 | +1.9 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

Table 13

## Demand Components (Current Prices)

| | 2012 | 2013 | 2014 | 2015 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| | *EUR million* | | | | *Annual change in %* | | | |
| Private consumption | 168,736 | 172,457 | 176,633 | 181,552 | +3.0 | +2.2 | +2.4 | +2.8 |
| Government consumption | 58,160 | 59,419 | 61,220 | 63,158 | +2.1 | +2.2 | +3.0 | +3.2 |
| Gross fixed capital formation | 65,617 | 66,071 | 68,254 | 70,718 | +3.9 | +0.7 | +3.3 | +3.6 |
| Changes in inventories (including statistical discrepancy) | 3,979 | 1,840 | 2,905 | 3,383 | × | × | × | × |
| Domestic demand | 296,492 | 299,787 | 309,013 | 318,811 | +2.2 | +1.1 | +3.1 | +3.2 |
| Exports of goods and services | 176,049 | 178,210 | 186,016 | 198,346 | +2.8 | +1.2 | +4.4 | +6.6 |
| Imports of goods and services | 165,671 | 164,267 | 171,138 | 182,008 | +2.3 | -0.8 | +4.2 | +6.4 |
| Net exports | 10,378 | 13,943 | 14,878 | 16,338 | × | × | × | × |
| **Gross domestic product** | 306,870 | 313,731 | 323,891 | 335,149 | +2.5 | +2.2 | +3.2 | +3.5 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

Table 14

## Deflators of Demand Components

| | 2012 | 2013 | 2014 | 2015 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| | *2005 = 100* | | | | *Annual change in %* | | | |
| Private consumption | 116.1 | 118.6 | 120.6 | 122.6 | +2.6 | +2.2 | +1.7 | +1.7 |
| Government consumption | 117.0 | 118.6 | 120.7 | 122.9 | +2.5 | +1.4 | +1.7 | +1.8 |
| Gross fixed capital formation | 116.4 | 118.1 | 119.4 | 120.8 | +2.0 | +1.4 | +1.1 | +1.2 |
| Domestic demand (excluding changes in inventories) | 116.3 | 118.5 | 120.4 | 122.3 | +2.5 | +1.9 | +1.6 | +1.6 |
| Exports of goods and services | 112.2 | 111.8 | 112.6 | 114.2 | +1.1 | –0.3 | +0.7 | +1.4 |
| Imports of goods and services | 118.8 | 117.7 | 118.2 | 119.5 | +2.3 | –0.9 | +0.4 | +1.1 |
| Terms of trade | 94.4 | 95.0 | 95.2 | 95.5 | –1.1 | +0.6 | +0.3 | +0.3 |
| **Gross domestic product** | 113.1 | 115.1 | 117.0 | 118.9 | +1.8 | +1.8 | +1.6 | +1.6 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

Table 15

## Labor Market

| | 2012 | 2013 | 2014 | 2015 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| | *Thousands* | | | | *Annual change in %* | | | |
| Total employment | 4,197.2 | 4,226.8 | 4,254.4 | 4,286.2 | +1.3 | +0.7 | +0.7 | +0.7 |
| *of which: Private sector employment* | *3,669.5* | *3,699.7* | *3,727.9* | *3,760.0* | *+1.5* | *+0.8* | *+0.8* | *+0.9* |
| Payroll employment (national accounts definition) | 3,648.9 | 3,675.2 | 3,696.7 | 3,724.0 | +1.5 | +0.7 | +0.6 | +0.7 |
| | *% of labor supply* | | | | | | | |
| Unemployment rate (Eurostat definition) | 4.4 | 4.9 | 5.0 | 5.0 | x | x | x | x |
| | *EUR per real output unit x 100* | | | | | | | |
| Unit labor costs (whole economy)[1] | 65.3 | 67.2 | 68.1 | 68.8 | +3.0 | +2.8 | +1.4 | +1.0 |
| | *EUR thousand per employee* | | | | | | | |
| Labor productivity (whole economy)[2] | 64.7 | 64.5 | 65.1 | 65.8 | –0.5 | –0.3 | +0.9 | +1.1 |
| | *EUR thousand* | | | | | | | |
| Real compensation per employee[3] | 36.4 | 36.5 | 36.7 | 36.9 | –0.2 | +0.3 | +0.6 | +0.5 |
| | *At current prices in EUR thousand* | | | | | | | |
| Gross compensation per employee | 42.2 | 43.3 | 44.3 | 45.3 | +2.5 | +2.5 | +2.3 | +2.2 |
| | *At current prices in EUR million* | | | | | | | |
| Total gross compensation of employees | 154,166 | 159,124 | 163,769 | 168,536 | +4.0 | +3.2 | +2.9 | +2.9 |

*Source: 2012: Eurostat; 2013 to 2015: OeNB December 2013 outlook.*

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

Table 16

## Current Account

| | 2012 | 2013 | 2014 | 2015 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|
| | *EUR million* | | | | *% of nominal GDP* | | | |
| **Balance of trade** | 6,933.0 | 12,132.5 | 13,524.2 | 14,580.5 | 2.3 | 3.9 | 4.2 | 4.4 |
| Balance of goods | –7,162.0 | –4,202.7 | –4,077.6 | –3,940.8 | –2.3 | –1.3 | –1.3 | –1.2 |
| Balance of services | 14,095.0 | 16,335.3 | 17,601.8 | 18,521.3 | 4.6 | 5.2 | 5.4 | 5.5 |
| **Balance on income** | 102.0 | 126.5 | 405.7 | 506.5 | 0.0 | 0.0 | 0.1 | 0.2 |
| **Balance on transfers** | –2,106.0 | –2,926.4 | –3,240.2 | –3,351.4 | –0.7 | –0.9 | –1.0 | –1.0 |
| **Current account** | 4,929.0 | 9,332.6 | 10,689.7 | 11,735.5 | 1.6 | 3.0 | 3.3 | 3.5 |

*Source: 2012: OeNB; 2013 to 2015: OeNB December 2013 outlook.*

Table 17

## Quarterly Outlook Results

| | 2013 | 2014 | 2015 | 2013 | | | | 2014 | | | | 2015 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| **Prices, wages and costs** | *Annual change in %* | | | | | | | | | | | | | | |
| HICP | +2.1 | +1.7 | +1.6 | +2.6 | +2.2 | +2.0 | +1.4 | +1.5 | +1.6 | +1.7 | +2.0 | +1.6 | +1.6 | +1.7 | +1.7 |
| HICP (excluding energy) | +2.4 | +2.0 | +1.8 | +2.8 | +2.6 | +2.3 | +1.8 | +1.9 | +1.9 | +2.1 | +2.3 | +1.8 | +1.8 | +1.9 | +1.9 |
| Private consumption expenditure (PCE) deflator | +2.2 | +1.7 | +1.7 | +2.6 | +2.3 | +2.1 | +1.7 | +1.6 | +1.7 | +1.7 | +1.8 | +1.8 | +1.7 | +1.6 | +1.6 |
| Gross fixed capital formation deflator | +1.4 | +1.1 | +1.2 | +1.9 | +1.5 | +1.3 | +1.1 | +1.1 | +1.1 | +1.1 | +1.1 | +1.1 | +1.1 | +1.2 | +1.2 |
| GDP deflator | +1.8 | +1.6 | +1.6 | +2.0 | +1.8 | +1.6 | +1.9 | +1.8 | +1.8 | +1.8 | +1.2 | +1.5 | +1.6 | +1.6 | +1.6 |
| Unit labor costs | +2.8 | +1.4 | +1.0 | +2.7 | +2.9 | +3.0 | +2.5 | +2.1 | +1.5 | +1.0 | +0.9 | +0.9 | +1.0 | +1.1 | +1.2 |
| Nominal wages per employee | +2.5 | +2.3 | +2.2 | +2.6 | +2.5 | +2.4 | +2.4 | +2.3 | +2.3 | +2.3 | +2.3 | +2.2 | +2.2 | +2.1 | +2.1 |
| Productivity | –0.3 | +0.9 | +1.1 | –0.1 | –0.4 | –0.6 | –0.1 | +0.2 | +0.8 | +1.3 | +1.3 | +1.3 | +1.2 | +1.0 | +0.9 |
| Real wages per employee | +0.3 | +0.6 | +0.5 | +0.0 | +0.2 | +0.4 | +0.7 | +0.7 | +0.6 | +0.6 | +0.5 | +0.4 | +0.5 | +0.5 | +0.5 |
| Import deflator | –0.9 | +0.4 | +1.1 | –0.3 | –1.2 | –1.3 | –0.9 | –0.2 | +0.4 | +0.7 | +0.8 | +1.0 | +1.0 | +1.1 | +1.2 |
| Export deflator | –0.3 | +0.7 | +1.4 | +0.1 | –0.4 | –0.6 | –0.4 | +0.1 | +0.6 | +1.0 | +1.1 | +1.3 | +1.4 | +1.4 | +1.5 |
| Terms of trade | +0.6 | +0.3 | +0.3 | +0.4 | +0.8 | +0.7 | +0.5 | +0.3 | +0.2 | +0.3 | +0.3 | +0.3 | +0.4 | +0.3 | +0.3 |
| **Economic activity** | *Annual and/or quarterly changes in % (real)* | | | | | | | | | | | | | | |
| GDP | +0.4 | +1.6 | +1.9 | +0.1 | +0.0 | +0.2 | +0.4 | +0.4 | +0.5 | +0.5 | +0.5 | +0.4 | +0.4 | +0.5 | +0.5 |
| Private consumption | +0.0 | +0.7 | +1.1 | +0.0 | +0.1 | +0.1 | +0.2 | +0.2 | +0.2 | +0.2 | +0.3 | +0.3 | +0.3 | +0.3 | +0.3 |
| Government consumption | +0.7 | +1.3 | +1.3 | +0.1 | +0.2 | +0.4 | +2.2 | –0.7 | –0.2 | +0.1 | +0.4 | +0.6 | +0.3 | +0.3 | +0.2 |
| Gross fixed capital formation | –0.7 | +2.2 | +2.4 | –0.5 | +0.0 | +0.1 | +0.6 | +0.6 | +0.7 | +0.7 | +0.6 | +0.5 | +0.6 | +0.6 | +0.7 |
| Exports | +1.6 | +3.7 | +5.2 | +0.4 | +0.3 | +0.2 | +0.9 | +1.0 | +1.1 | +1.2 | +1.2 | +1.3 | +1.3 | +1.4 | +1.5 |
| Imports | +0.1 | +3.7 | +5.2 | +0.0 | +0.1 | +0.1 | +0.8 | +1.2 | +1.2 | +1.2 | +1.2 | +1.2 | +1.4 | +1.4 | +1.4 |
| | *Contribution to real GDP growth in percentage points* | | | | | | | | | | | | | | |
| Domestic demand | +0.0 | +1.1 | +1.3 | –0.1 | +0.1 | +0.2 | +0.7 | +0.1 | +0.2 | +0.3 | +0.3 | +0.4 | +0.3 | +0.3 | +0.3 |
| Net exports | +0.9 | +0.2 | +0.4 | +0.2 | +0.1 | +0.1 | +0.1 | +0.0 | +0.0 | +0.1 | +0.1 | +0.1 | +0.1 | +0.1 | +0.1 |
| Changes in inventories | –0.5 | +0.3 | +0.2 | –0.1 | –0.2 | +0.0 | –0.4 | +0.3 | +0.2 | +0.2 | +0.1 | +0.0 | +0.0 | +0.0 | +0.0 |
| **Labor market** | *% of labor supply* | | | | | | | | | | | | | | |
| Unemployment rate (Eurostat definition) | 4.9 | 5.0 | 5.0 | 4.9 | 4.7 | 4.9 | 4.9 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 4.9 |
| | *Annual and/or quarterly changes in %* | | | | | | | | | | | | | | |
| Total employment | +0.7 | +0.7 | +0.7 | +0.2 | +0.2 | +0.3 | +0.1 | +0.1 | +0.1 | +0.1 | +0.2 | +0.2 | +0.2 | +0.3 | +0.3 |
| *of which: Private sector employment* | *+0.8* | *+0.8* | *+0.9* | *+0.2* | *+0.2* | *+0.3* | *+0.2* | *+0.2* | *+0.2* | *+0.2* | *+0.2* | *+0.2* | *+0.2* | *+0.3* | *+0.3* |
| Payroll employment | +0.7 | +0.6 | +0.7 | +0.2 | +0.1 | +0.2 | +0.1 | +0.1 | +0.1 | +0.1 | +0.1 | +0.2 | +0.2 | +0.3 | +0.3 |
| **Additional variables** | *Annual and/or quarterly changes in % (real)* | | | | | | | | | | | | | | |
| Real disposable household income | –1.0 | +0.8 | +1.4 | –1.4 | –2.2 | +6.2 | +0.9 | –1.2 | –0.9 | –0.7 | –0.1 | +0.8 | +0.7 | +0.9 | +1.0 |
| | *% of real GDP* | | | | | | | | | | | | | | |
| Output gap | –1.2 | –1.1 | –0.8 | –0.9 | –1.2 | –1.4 | –1.3 | –1.3 | –1.2 | –1.0 | –0.9 | –0.9 | –0.8 | –0.7 | –0.6 |

*Source: OeNB December 2013 outlook (based on seasonally and working-day adjusted data).*

Table 18

## Comparison of Current Economic Forecasts for Austria

| Indicator | OeNB | | | WIFO | | IHS | | OECD | | | IMF | | European Commission | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | December 2013 | | | October 2013 | | October 2013 | | November 2013 | | | October 2013 | | November 2013 | | |
| | 2013 | 2014 | 2015 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | 2015 | 2013 | 2014 | 2013 | 2014 | 2015 |
| **Key results** | *Annual change in %* | | | | | | | | | | | | | | |
| GDP (real) | +0.4 | +1.6 | +1.9 | +0.4 | +1.7 | +0.5 | +1.8 | +0.4 | +1.7 | +2.2 | +0.4 | +1.6 | +0.4 | +1.6 | +1.8 |
| Private consumption (real) | +0.0 | +0.7 | +1.1 | +0.0 | +0.9 | –0.2 | +0.9 | –0.2 | +0.5 | +1.1 | × | × | +0.0 | +0.9 | +1.0 |
| Government consumption (real) | +0.7 | +1.3 | +1.3 | +0.5 | +1.0 | +0.5 | +0.5 | +0.8 | +0.5 | +0.4 | × | × | +0.9 | +0.8 | +0.8 |
| Gross fixed capital formation (real) | –0.7 | +2.2 | +2.4 | –1.4 | +3.0 | –1.6 | +2.5 | –2.5 | +2.6 | +4.5 | × | × | –1.7 | +2.2 | +3.0 |
| Exports (real) | +1.6 | +3.7 | +5.2 | +2.7 | +5.2 | +3.0 | +6.2 | +1.5 | +4.0 | +5.6 | +2.1 | +4.8 | +1.6 | +4.7 | +5.8 |
| Imports (real) | +0.1 | +3.7 | +5.2 | +0.7 | +5.1 | +0.5 | +5.8 | –0.5 | +2.7 | +5.0 | +0.6 | +5.9 | +0.4 | +4.5 | +5.6 |
| GDP per employee | –0.3 | +0.9 | +1.1 | –0.2 | +0.8 | –0.1 | +1.0 | × | × | × | × | × | –0.1 | +0.9 | +1.0 |
| GDP deflator | +1.8 | +1.6 | +1.6 | +2.1 | +2.0 | +2.1 | +1.7 | +1.9 | +1.3 | +1.4 | × | × | +2.1 | +1.7 | +1.7 |
| CPI | × | × | × | +2.0 | +1.9 | +2.1 | +1.9 | × | × | × | × | × | × | × | × |
| HICP | +2.1 | +1.7 | +1.6 | +2.1 | +1.9 | × | × | +2.0 | +1.6 | +1.7 | +2.2 | +1.8 | +2.2 | +1.8 | +1.8 |
| Unit labor costs | +2.8 | +1.4 | +1.0 | +2.3 | +1.3 | × | × | × | × | × | × | × | +2.5 | +0.9 | +0.8 |
| Payroll employment | +0.7 | +0.7 | +0.7 | +0.7 | +0.8 | +0.6 | +0.8 | × | × | × | +0.5 | +0.5 | +0.5 | +0.7 | +0.8 |
| | *% of labor supply* | | | | | | | | | | | | | | |
| Unemployment rate (Eurostat definition) | 4.9 | 5.0 | 5.0 | 5.1 | 5.2 | 4.9 | 4.9 | 4.8 | 4.7 | 4.3 | +4.8 | +4.8 | +5.1 | +5.0 | +4.7 |
| | *% of nominal GDP* | | | | | | | | | | | | | | |
| Current account | 3.0 | 3.3 | 3.5 | 3.1 | 3.4 | × | × | 3.1 | 3.4 | 3.8 | 2.8 | 2.4 | 2.5 | 2.8 | 3.1 |
| Budget balance (Maastricht definition) | –1.6 | –2.2 | –2.2 | –2.6 | –1.6 | –2.2 | –1.7 | –2.3 | –1.9 | –1.2 | –2.6 | –2.4 | –2.5 | –1.9 | –1.5 |
| **External assumptions** | | | | | | | | | | | | | | | |
| Oil price in USD/barrel (Brent) | 108.2 | 103.9 | 99.2 | 108.0 | 105.0 | 110.0 | 112.0 | 110.0 | 115.0 | 120.0 | 104.5 | 101.4 | 108.8 | 105.8 | 99.7 |
| Short-term interest rate in % | 0.2 | 0.3 | 0.5 | 0.2 | 0.2 | 0.2 | 0.4 | 0.2 | 0.1 | 0.3 | 0.2 | 0.5 | 0.2 | 0.4 | 0.7 |
| USD/EUR exchange rate | 1.33 | 1.34 | 1.34 | 1.30 | 1.30 | 1.32 | 1.30 | 1.38 | 1.38 | 1.38 | 1.33 | 1.35 | 1.33 | 1.36 | 1.36 |
| | *Annual change in %* | | | | | | | | | | | | | | |
| Euro area GDP (real) | –0.4 | +1.1 | +1.5 | –0.4 | +1.1 | –0.5 | +1.2 | –0.4 | +1.0 | +1.6 | –0.4 | +1.0 | –0.4 | +1.1 | +1.7 |
| U.S. GDP (real) | +1.7 | +2.6 | +3.2 | +1.8 | +2.5 | +1.8 | +2.5 | +1.7 | +2.9 | +3.4 | +1.6 | +2.6 | +1.6 | +2.6 | +3.1 |
| World GDP (real) | +2.8 | +3.5 | +3.7 | +3.2 | +3.8 | × | × | +2.7 | +3.6 | +3.9 | +2.9 | +3.6 | +3.2 | +4.0 | +4.3 |
| World trade | +2.8 | +5.2 | +6.1 | +2.5 | +5.0 | +2.3 | +5.0 | +3.0 | +4.8 | +5.9 | +2.9 | +4.9 | +2.8 | +5.2 | +6.0 |

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

# Are Recent Increases of Residential Property Prices in Vienna and Austria Justified by Fundamentals?

Martin Schneider

*Residential property prices in Vienna have risen sharply since 2005 and to a lesser degree throughout Austria as well. This paper assesses whether the upward movement is justified by fundamental factors or whether it is exaggerated, using a fundamental residential property price indicator for Vienna and Austria to identify deviations between actual and fundamental real estate prices.*

*The indicator consists of seven subindicators that address a variety of perspectives, including those related to households, investors and systemic factors. For Vienna, the indicator points to an increasing degree of overvaluation in property prices (by 20% in the second quarter of 2013). The primary driver behind this trend, which has recently experienced an especially pronounced surge, is the relative real estate price (compared to rentals, consumer prices and construction costs), which is only weakly mitigated by the increased affordability of home ownership. Of note, the overvaluation evident in the indicator does not suggest that an abrupt price correction will occur in the near future. Rather, such imbalances may subside gradually, as happened in the wake of the price hikes experienced in the early 1990s. For Austria overall, the indicator points to a persistent 6% undervaluation, despite a recent uptick in prices. Diminishing loan growth and declining household indebtedness suggest that a high percentage of equity financing is being used in property investments. At present, therefore, the recent increases of residential property prices in Vienna and Austria do not pose a serious threat to financial stability.*

*JEL classification: G12, R31*
*Keywords: residential property prices, indicator, Austria, Vienna*

The strong upward surge in property prices that has been underway in Vienna – and to a lesser extent throughout Austria – since 2005, combined with accelerated hikes during 2012, have stoked fears of an emerging real estate price bubble. Since real estate is indeed the most important component of household wealth, and housing expenditures represent a major part of households' budgets, property prices are not only significant determinants of households' consumption and savings behavior, but also have a major impact on the economic activity of the construction sector. Furthermore, real estate loans play a pivotal role in bank portfolios. Therefore, price bubbles represent a serious threat to the stability of a nation's economy and financial system. However, surging prices alone do not constitute a price bubble. What is much more important is the extent to which price increases are justified by fundamental factors, i.e., all objective supply-side and demand-side elements that affect price formation. These elements include demographics, the general level of prosperity, institutional factors (including taxes, housing construction subsidies, financial sector development, etc.), the availability of land, consumer preferences (higher residential standards), expected income (from rentals), interest rates and various other elements. By contrast, personal expectations of future selling prices are subjective in nature and thus do not constitute fundamental factors. Accordingly, a run-up in housing prices driven by adjustments to changed fundamental conditions cannot be considered a bubble. Instead, a bubble is deemed to exist when prices deviate substantially and for prolonged periods from their estimated fundamental values. When

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analyzing property price trends, therefore, it is essential to determine the justifiable price that is supported by fundamentals.

In this paper, the fundamental residential property price indicator for Vienna and Austria will be used to determine the extent to which residential property prices are fundamentally justified or otherwise deviate from their fundamental values. The article is structured as follows: Section 1 provides an overview of residential property price trends in Austria, followed by a discussion of approaches to estimating fundamental prices in section 2. Section 3 introduces the fundamental residential property price indicator for Vienna and Austria. The implications for financial stability are described in section 4. Section 5 closes with a summary of findings and conclusions from the research.

## 1 Residential Property Price Trend in Austria

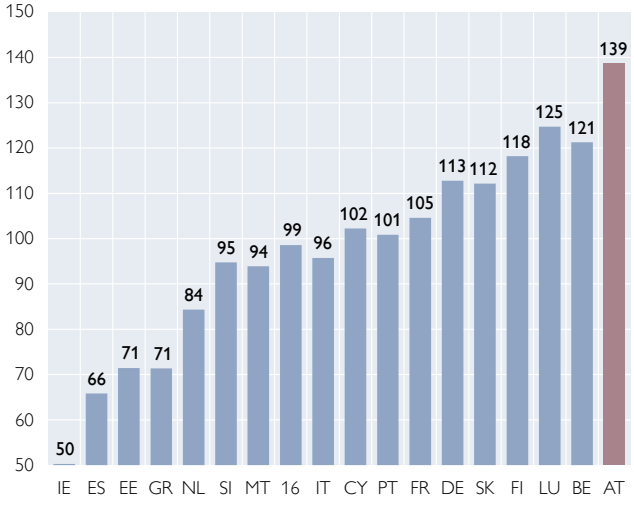
Compared to the rest of the euro area, Austrian residential property prices reflect an atypical trend. While some euro area countries (e.g., Greece, Spain) started to experience a pronounced upswing at the beginning of the 2000s and others (Ireland, Netherlands, Finland) noted the same trend as early as the second half of the 1990s, prices in Austria remained stagnant until 2005, when a marked upward trend emerged. In recent years, in fact, Austria posted the sharpest property price increases in the euro area. From early 2007 to mid-2013, prices rose by 39%, a pattern that differs markedly from the stagnating prices still evident in the rest of the euro area. On average, the situation in euro area countries such as Ireland, Spain, Estonia and Greece is characterized by declining prices following the bursting of their respective economic bubbles. Of those countries that did

Chart 1

**International Comparison of Residential Property Prices**

**Residential Property Prices for Euro Area Countries in Q2 13**

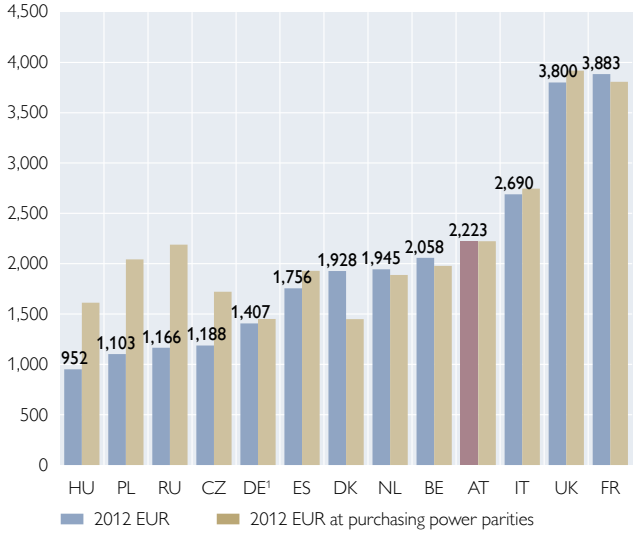
*Index (2007Q1=100)*




*Source: ECB.*

**Residential Property Prices for Selected EU Countries in 2012**

*EUR/m²*




*Source: Deloitte (2013), OECD (PPP).*

*¹ Bid price.*

register an upward movement, none comes even close to matching the pace of price developments seen in Austria.

Because international time series data on residential property prices generally consist of indices, information about prices in absolute terms is typically unavailable. According to a comparison of residential property prices for particular European countries published by Deloitte (2013), Austria ranked fourth among a total of 13 EU countries in 2012. Considering country-specific differences in purchasing power, Eastern European countries display significantly higher price levels.

Within Austria, price trends varied widely among regions and segments. In Vienna, for example, the movement of prices over the past two decades stands in stark contrast to the patterns noted in many other major European cities, where prices for the most part posted a steady upward trend, while prices in Vienna had stagnated for more than a decade after having doubled in the run-up to the 1995 World's Fair (which was eventually cancelled). By 2004, in fact, residential property prices in real terms had even dropped by more than 25%. Since then, growth increased steadily at an average annual rate of 7%, while prices surged suddenly to 15.7% in 2012. This pattern persisted during the first half of 2013, albeit at a slower pace.[1]

Box 1

### The Housing Situation of Austrian Households

*By international comparison, the housing situation of Austrian households reflects a rather low proportion of home ownership. According to the 2012 Austrian microcensus, 56.4% of primary residences were owned by households (or their relatives), 41.2% were rented (40.1% under master lease agreements and 1.0% under sublease agreements) and 2.4% fell into some other legal category. The share of residences rented under master leases shows a significant disparity between rural and urban areas, ranging from 14% in Burgenland to 75% in Vienna (Baumgartner, 2013). EU-wide, Austria ranks next to last in home ownership rates (57.5% in 2011) followed only by Germany (53.4%). Across the EU-27, the average rate of home ownership is 70.7%. The high proportion of rented residential units versus owner-occupied units in Austria is attributable primarily to the dominant role of subsidized low-rent apartments in the general rental market. In 2012, more than half of the residences rented under master leases fell into that market segment. Of those, 19% were municipal apartments, which are units in an apartment complex owned and operated by a municipality in order to provide low-cost public housing, while 41% were categorized as housing association (cooperative) apartments, i.e., units within an apartment complex owned and operated by a cooperative association. Households in Austria primarily purchase homes to live in rather than for investment purposes. Indeed, just 5% of all residential real estate owned by households are used for rental purposes (Albacete and Wagner, 2009). This phenomenon can be explained by the fact that compared to other countries, Austria has a comparatively high degree of tenant protection, while the tax incentives that favor home ownership are limited. Combined, this makes home ownership for rental purposes rather unattractive.*

[1] *The residential property price indices used for this paper were commissioned from the Vienna University of Technology (TU Wien) by the OeNB. Hedonic regression models were used to estimate quality-adjusted property prices for detached single-family homes and old and new, condominiums for Vienna and the rest of Austria using the offer and transaction prices published on the online real estate portal Austria Immobilienbörse (AiB). Price indices for building plots and rentals (houses, apartments, offices and total rent) were also developed.*

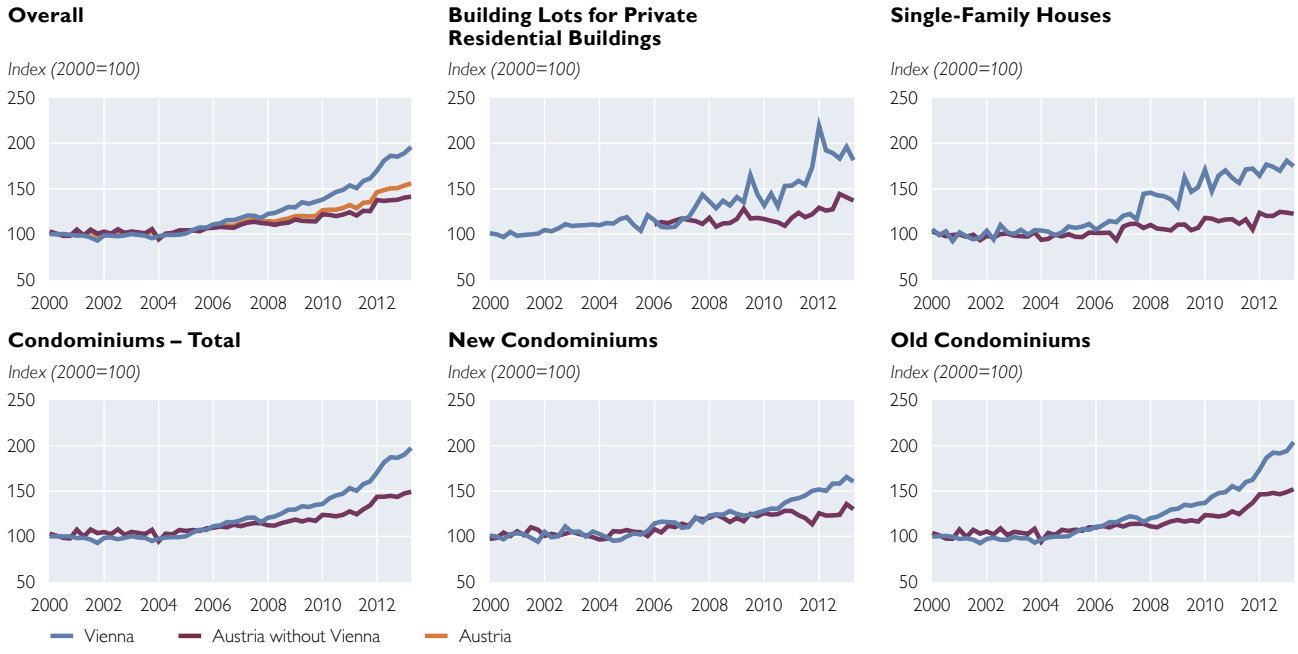
An analysis of cumulative price increases from 2000 to mid-2013 indicates that the sharpest jumps involved old condominiums (owner-occupied apartments) (+104%), a category that represents Vienna's largest property market segment. That upward trend is noticeably less steep among new condominiums (+60%), building lots for homes (+82%) and single-family houses (+75%). Rental prices, by contrast, posted only a modest rise (+29%) during the same period. In the Austrian provinces (excluding Vienna), the price trend was also far less precipitous. While prices in Vienna surged by 96% during the 2000 to mid-2013 period, those in the rest of Austria experienced only a 41% gain (chart 2 and table A-1). Assessed by market segment, the situation throughout the Austrian provinces is similar to the trend observed for Vienna: the sharpest price gains are associated with old condominiums while those for new condominiums and single-family houses were significantly slower.

## 2 Approaches to Estimating Fundamental Prices

Fundamental prices are determined by objective fundamental factors on the supply and demand sides. As the fundamental price of real estate cannot be observed directly, it must be estimated. For that purpose, empirical studies employ a variety of methods. The *present value model* calculates the fundamental price by discounting the total expected future returns (rental income) and comparing them to the property price. The *user cost method* compares the ongoing expenditures of home ownership to market rentals. The factors typically considered include the opportunity costs of the capital deployed, taxes (property tax less any deductible interest payments on loans), maintenance costs, expected appreciation or depreciation and a risk premium. The property

Chart 2

**Development of Residential Property Prices in Austria**




*Source: OeNB; TU Vienna.*

Box 2

## Definition of a "Real Estate Bubble"

*When analyzing sharp spikes in property prices, the assumption may be made that a price bubble is to blame. Most attempts to define the term "bubble," which scientific studies still fall short of explaining, typically focus on one or more of the three perspectives (Rombach, 2011) presented in the following paragraphs.*

### *Chart-Based Perspective*

*Chart-based perspectives focus exclusively on price movements and do not consider any contributing factors, claiming essentially that sudden spikes in prices suggest a bubble in the making. This approach is problematic, however, especially since sudden pronounced price gains may very well be justified by fundamental factors. Distinguishing between a boom and a bubble – characterized by the latter's inherent tendency to burst – is virtually impossible. Other approaches (e.g., that used by Cecchetti, 2005: "Bubbles – by what I mean booms followed by crashes…") thus incorporate an abrupt correction of the bubble (boom-bust scenario) in the definition. As they only provide ex post evidence, such definitions contribute nothing to the early recognition of price bubbles and also fail to provide an explanation of bubbles' origins.*

### *Fundamental Perspective*

*According to the fundamental perspective, a price bubble exists when observed market prices deviate from values justified by underlying fundamental factors, which include all of the supply-side and demand-side factors that influence real estate prices, such as demographic factors (population growth and household size), the prevailing level of prosperity, institutional factors (taxes, housing construction subsidies, financial sector development), the availability of land, consumer preferences (higher residential standards), expected income (from rentals), interest rates and various other elements. The empirical literature strives to estimate the fundamentally justified price in order to identify an emerging price bubble.*

### *Behavior-Based Perspective*

*Behavior-based approaches to explaining real estate bubbles focus on the mood and behavior of the players in the property market. Relevant factors such as speculation, excessively high expectations and irrational exuberance are used to assess the behavior of market buyers. In speculative buying, expected appreciation takes precedence over rental income. Such properties are often purchased as investment properties rather than for use as a domicile by the owner. While investors may already know that the price is too high, they are still looking to sell the property at the right time and for a profit (the "greater fool" theory). Where overblown expectations are involved, investors believe that the previously observed price increase will persist in the future (the "sure thing" mentality), which means that they ignore risks that are hiding in plain sight. A concept related closely to the sure thing mentality is "irrational exuberance," a term coined by Alan Greenspan in 1996, which describes a mood of exaggerated optimism on the asset markets.*

*In addition to chart-based aspects, the definition offered by Kindleberger (1987) includes elements that incorporate market players' behavior.*

*"A bubble may be defined loosely as a sharp rise in price of an asset or a range of assets in a continuous process, with the initial rise generating expectations of further rises and attracting new buyers – generally speculators interested in profits from trading rather than in its use or earning capacity. The rise is then followed by a reversal of expectations and a sharp decline in price, often resulting in severe financial crisis – in short, the bubble bursts."*

*Stiglitz (1990) provided one of the most commonly used definitions for a price bubble, which includes both behavior-based and fundamental aspects. According to Stiglitz, a bubble exists when the level of prices has been bid up by expectations of future increases beyond what is consistent with underlying fundamentals: "The basic intuition is straightforward: if the reason that the price is high today is only because investors believe that the selling price will be high tomorrow – when 'fundamental' factors do not seem to justify such a price – then a bubble exists."*

market is considered to be in a state of equilibrium when the ongoing costs of home ownership match rental costs. A specific branch of the literature attempts to identify fundamental prices by using a broad range of *econometric approaches* (Gurkaynak, 2005; Berlemann et al., 2012), which include estimation methods such as modified cointegration tests (Campbell and Shiller, 1987), quantile regressions (Gerdesmeier et al., 2012), Markov switching models (Schaller and van Norden, 2002) and state-space models (Kizys and Pierdzioch, 2009). The Deutsche Bundesbank (2013) estimates fundamental residential property prices for Germany by using panel regression analysis. Structural time series models are another method for estimating fundamental data. Gattini and Hiebert (2010) apply a vector error correction model to estimate fundamental property prices for the euro area, an approach that also facilitates forecasting and the identification of structural shocks.

All of the techniques used to estimate fundamental prices are subject to substantial uncertainty. When a number of different indicators coincidentally signal overvaluation, however, the conclusion is more reliable. The *multiple indicator approach,* which uses a number of indicators to capture both supply-side and demand-side factors, is therefore quite promising, since the individual indicators are weighted and aggregated. In Switzerland, for example, UBS (2012) has been calculating the "UBS Swiss Real Estate Bubble Index" since 2011 in an effort to identify imbalances and risks in the Swiss residential property market. The UBS index consists of six subindicators that track the following ratios: purchase prices to rental prices, house prices to household income, house prices to inflation, mortgage debt to income, construction activity to gross domestic product (GDP) and loan applications for rental properties to total loan applications of UBS retail clients.

## 3 A Fundamental Residential Property Price Indicator for Vienna and Austria

This section presents a fundamental residential property price indicator for Vienna and Austria calculated on the basis of seven subindicators that address a variety of perspectives. The *household perspective* is based on two indicators that represent different affordability aspects of home ownership. The *investor perspective* comprises two indicators that reflect the profitability of real estate investments. The three indicators that capture the *system perspective* attempt to map interrelationships between the property market, macroeconomics and financial stability.

### 3.1 Household Perspective

#### Real Residential Property Prices

Long-term studies using international data have found that real property prices (corrected for consumer price inflation) are stationary in the long run. Here, the length of the observation period is crucial, and in this context, "long term" implies centuries, since there may even be periods of several decades during which real property prices are nonstationary. Therefore, a marked hike in real prices may be an indicator of overheating, while the predictive power for short-term corrections is low. In Vienna, real residential property price levels doubled between 1987 and 1992, and subsequently dropped by one-fourth from 1992 to 2004. Since then, they have gone up by 63% (as at mid-2013). Austria overall experienced a similar

trend until 2004, but since then saw a less pronounced rise in real price levels (+29%).

### Affordability

The level of disposable household income is a key determinant of a household's purchasing power. When it comes to purchases of big-ticket items such as real estate, however, the level of interest rates also plays a crucial role, since it determines the maximum affordable mortgage payment based on a given household income. To account for both income level and interest rates, a "hypothetical borrowing volume" is defined, assuming that a household will have a fixed percentage of its income $(c*Y_t)$ available for mortgage payments. At a given interest rate $R_t$ and a given term (repayment period) $T$, the maximum borrowing volume is $K$. $R_t$ is defined as the gross interest rate, which corresponds to 1 plus the mean nominal interest rate on mortgage loans. The repayment period was set at $T=20$ years. Based on these values, the amount of the hypothetical borrowing volume can be calculated according to the following formula:

$$K = \frac{c * Y_t \left[ \frac{1 - R_t^{T+1}}{1 - R_t} \right]}{R_t^T} \qquad (1)$$

Affordability is defined as the ratio of hypothetical borrowing volume to property prices. That ratio reflects the affordability of properties more accurately than analyses based on household income alone, such as are often found in empirical studies. The inverted loan-bearing capacity is included in the composite indicator.

In the early 1990s, Germany's post-reunification economic boom prompted the Deutsche Bundesbank to raise interest rates substantially. As a result, interest rates reached record highs in Austria as well. Combined with soaring property prices in Vienna during the early 1990s, affordability dropped to an all-time low. A subsequent reduction in interest rates steadily improved affordability until 2005. Affordability started to decline again when prices were hiked sharply during the past several years. In the rest of Austria, however, affordability remained stable at the 2005 level.

## 3.2 Investor Perspective

### Price-to-Rent Ratio

The price-to-rent ratio constitutes a fundamental parameter in the real estate market and represents the relative cost of home ownership versus renting. In the long term, the ratio should be stationary, since rising relative prices for residential properties make renting a more attractive option, in turn leading to reduced demand for home ownership. The data series used refers only to new rentals of condominiums. It does not cover new rentals of traditional Viennese housing association apartments and municipal or cooperative apartments, nor does it address rental price trends under existing leases. In Vienna, residential property prices rose at a substantially faster pace than average rental rates, leading to an upward trend in Vienna's price-to-rent ratio, while the rest of Austria saw a much less pronounced jump in prices and thus experienced a stagnating trend during the same period.

### Residential Property Prices to Construction Costs

Construction costs are an important supply-side cost factor, an element that contributes to explaining the development of residential property prices in the long term. The association between construction costs and property prices

is measured by Tobin's *q*, a company performance indicator calculated by dividing the market value of a company by its replacement cost. If the resulting coefficient is greater than 1, a company's stock is considered overvalued. Applied to properties, the cost factor is calculated as the property price divided by the construction costs. Since property prices and construction costs are available only in index form, the extent of overvaluation or undervaluation cannot be stated with absolute certainty; rather, only the change may be interpreted. An inherent limitation in this concept is that it fails to consider land prices, a decisive factor in urban agglomerations. In Austria, construction costs grow at a higher rate than the harmonized index of consumer prices (HICP). Between 2000 and mid-2013, they went up 45% compared to an HICP increase of only 30%. During the same period, property prices spiked by 96% in Vienna and rose to a somewhat lesser extent (56%) in Austria overall.

### 3.3 System Perspective

#### Loan-Bearing Capacity

This indicator measures households' ability to repay home loans by relating the hypothetical borrowing volume to the aggregate amount of home loans actually granted to them by Austrian banks. An increase in this indicator implies that higher income or lower interest rates place households in a better position to meet the repayment obligations for their outstanding loans, thereby reducing banks' exposure to systemic risk. The inverted loan-bearing capacity is included in the composite indicator.

Between 1999 and 2008, this indicator doubled, i.e., the volume of loans granted to households grew twice as much as their loan-servicing capacity,[2] but subsequently dropped sharply after the onset of the economic and financial crisis and the resultant interest rate cuts. New borrowing decreased in proportion to loan-servicing capacity.

#### Housing Investment-to-GDP Ratio

The ratio of housing investment to GDP, the housing construction rate in short, represents the supply side. A building sector that accounts for a disproportionately high percentage of GDP implies a state of overheating, which can be interpreted as a sign of a housing bubble. Conversely, rising property prices stimulate construction, which should dampen price spikes in the medium term. Nationwide, the housing construction rate peaked out in the mid-1990s and has been declining ever since. In Vienna, that trend is even more pronounced than in the rest of Austria.

#### Interest Rate Risk

The role interest rates play in the evaluation of bubbles is unclear. Interest rates are a fundamental factor in real estate markets: Low interest rate levels drive improved housing affordability and thus appear to fundamentally justify higher property prices.[3] From the

[2] *The growth in home loans observed since the late 1990s has probably been pushed upward artificially by the strong rise in foreign currency loans during that period. Since foreign currency loans are generally bullet loans, the borrower is responsible only for making the current interest payments, and invests the funds required for the bullet payment in a repayment vehicle. As a result, the outstanding (gross) loan volume (excluding the amount accumulated in the repayment vehicle) remains constant throughout the term of the loan, while normal euro loans are repaid on an ongoing basis and thus reduce the loan volume throughout the entire loan term.*

[3] *According to Hott and Jokipii (2012), house prices in their sample of 14 OECD countries were driven up primarily by interest rates that were persistently too low (relative to their Taylor-implied rates).*

macroeconomic perspective, however, interest rates are an endogenous factor. Central banks set interest rates according to the prevailing macroeconomic environment, a practice that prompts concern about whether current interest rates actually suit the macroeconomic environment. If they are too low, there is an additional risk of a subsequent interest rate rise, which leads to a slump in affordability wherever variable-interest loans (the most common type in Austria) are involved.

The question of whether interest rates are suited to the macroeconomic environment can be answered by using the "Taylor rule," which provides a simple description of a central bank's behavior: The appropriate interest rate depends on the equilibrium real interest rate $\bar{r}_t$, the target inflation rate $\bar{\pi}$, the output gap $\hat{Y}_t$ (percentage deviation of actual output from potential output) and the gap between the actual inflation rate $\pi_t$ and the target inflation rate (equation (2)).

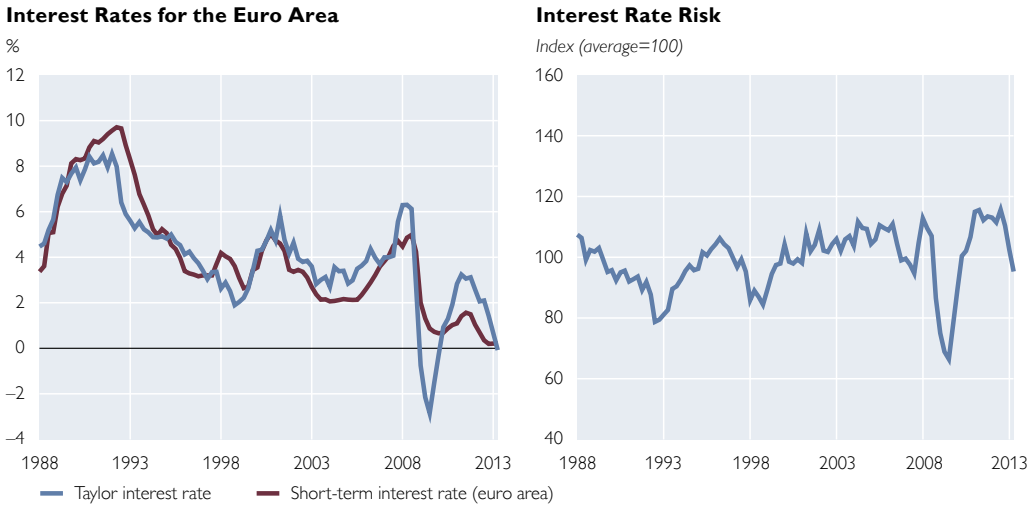
$$R_t^T = \bar{r}_t + \bar{\pi} + \alpha_1 * \hat{Y}_t + \alpha_2 * (\pi_t - \bar{\pi}) \quad (2)$$

The Taylor rule estimation was based on euro area data, with trend growth in the euro area serving as a proxy for the equilibrium real rate.[4] The target inflation rate was set at 1.9%, and the adjustment coefficients selected were 0.5 ($\alpha_1$) and 1.5 ($\alpha_2$).

Although short-term interest rates dipped as much as 1.8 percentage points below the levels implied by the Taylor rule in the past three years, that gap closed again in the second quarter of 2013 due to declining inflation and the continued widening of the negative output gap (chart 3, left-hand panel). To ensure comparability with other subindicators, a hypothetical borrowing volume (see above) is calculated at different interest rates (i.e., the three-

Chart 3

**Euro Area Interest Rates and Interest Rate Risk**

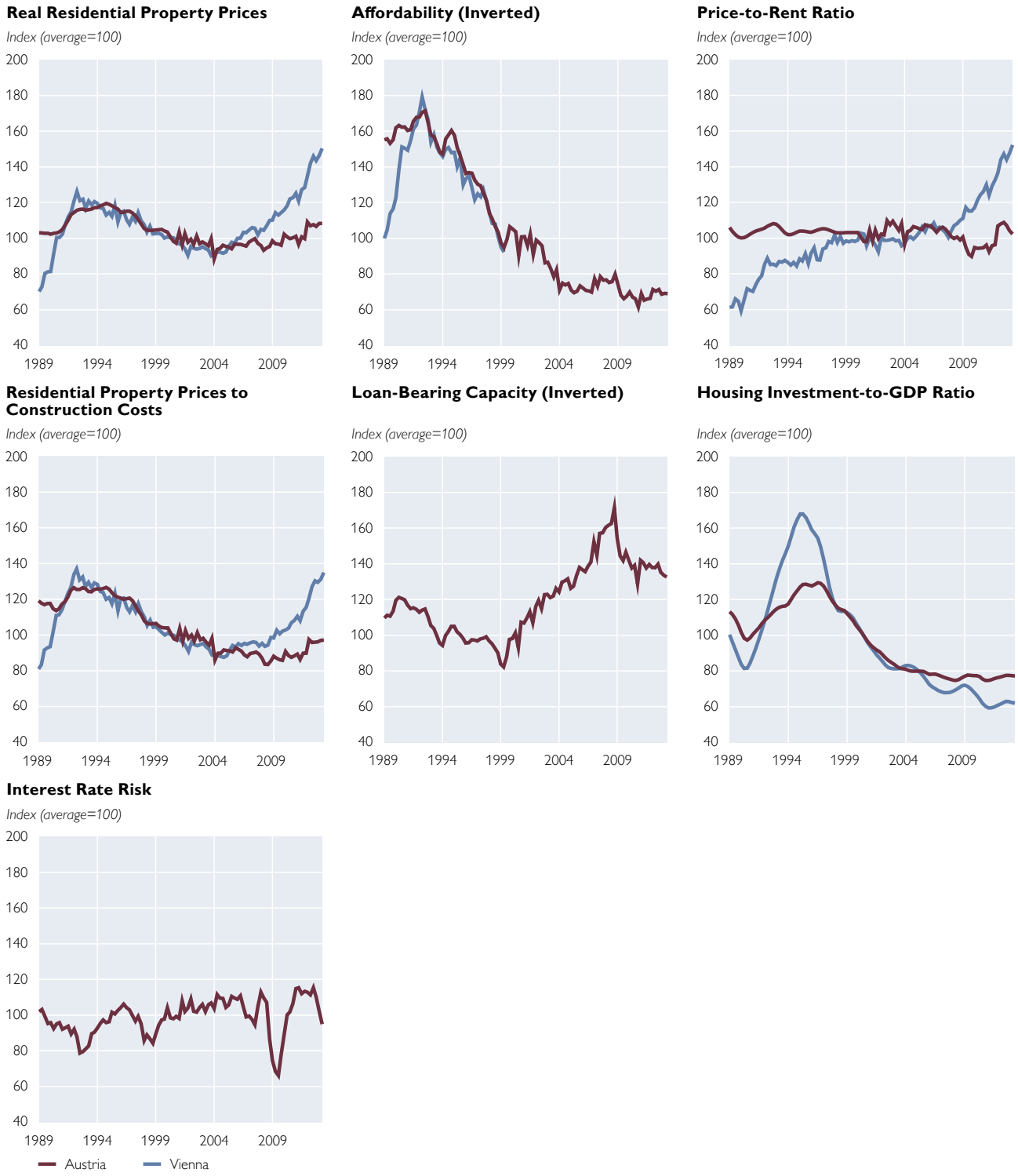



Source: ECB, author's calculations.

[4] *Trend growth was determined using an HP filter. Empirical studies routinely use multivariate Kalman filters and univariate filters to estimate equilibrium real rates (Orphanides and Williams, 2002; Laubach and Williams, 2003; Garnier and Wilhelmsen, 2005).*

Chart 4

## Subindikators Comprising the Fundamental Residential Property Price Indicator for Vienna and Austria




*Source: Author's calculations.*

month interest rate and the Taylor interest rate). The subindicator represents the ratio of the two resulting hypothetical borrowing volumes (chart 3, right-hand panel).

Chart 4 depicts the subindicators comprising the fundamental residential property price indicator for Vienna and Austria. Because no proxy variables were available for regionalization, the value for Austria was applied to Vienna to facilitate calculation of loan-bearing capacity and interest rate risk.

Box 3

## Indicator Construction

*Based on the subindicators discussed in the foregoing sections, the fundamental residential property price indicator was calculated separately and in two steps for Vienna and Austria.*

***Trend adjustment:*** *The percentage of deviation from a historical average was calculated for each subindicator with mean values adopted for most indicators (real property prices, affordability, property prices versus construction costs, property prices versus rentals, interest rate risk). A linear trend was applied to the housing construction rate since – as with all other components of domestic demand – it shows a downward trend spurred by steadily increasing internationalization. To account for the assumed distortion caused by foreign currency bullet loans, a smooth HP trend ($\lambda$=7200) was used for the loan-bearing capacity. Affordability and loan-bearing capacity were inverted to enable comparability with the other subindicators (a positive value indicates overvaluation).*

***Aggregation:*** *The seven subindicators for Vienna and Austria overall were aggregated into the respective overall indicator. The required weighting factors were determined by applying a principal components analysis.[1] Each of the seven subindicators was expressed through a linear combination of factors:*

$$x_{i,t} = a_{i1}F_{1,t} + a_{i2}F_{2,t} + \ldots a_{ij}F_{j,t} + \varepsilon_i,$$

*where $F_{j,t}$ represents factor $j$ and $\alpha_{i,j}$ represents the factor loading of variable $i$ on factor $j$. The number of factors used was selected to permit explanation of the highest possible fraction of variance in the dataset using the smallest possible number of factors. In the case at hand, three factors explain 86% of the dataset variance for Vienna and 90% for Austria. The indicator is determined by calculating a weighted sum of the subindicators*

$$I_t = \sum_i^I v_i x_i .$$

*The weights for variable $v_i$ were calculated by multiplying the squared factor loading of variables $i$ on factor $j$*

$$v_i = a_{ij}^2 \varphi_j$$

*with the explained fraction of dataset variance by factor j*

### Subindicator Weights

| Indicator | Vienna | Austria |
|---|---|---|
| Real residential property prices | 0.1454 | 0.1834 |
| Affordability (inverted) | 0.1999 | 0.1051 |
| Price-to-rent ratio | 0.1216 | 0.1616 |
| Residential property prices to building costs | 0.2126 | 0.1935 |
| Loan-bearing capacity (inverted) | 0.1762 | 0.1326 |
| Housing investment-to-GDP ratio | 0.0825 | 0.0991 |
| Interest rate risk | 0.0618 | 0.1246 |

*Source: Author's calculations.*

[1] *This approach is used to construct leading indicators (Bierbaumer-Polly, 2010; OECD, 2008) in which the cyclical co-movement is derived from a series of individual indicators.*

$$\left(\varphi_j = \sigma_j^2 / \sum_{j=1}^{J} \sigma_j^2\right),$$

*where factor $j$ represents the factor on which variable $i$ has the highest loading*

$$\left(j = \arg\max\left(abs(a_{ij}^2)\right)\right).$$

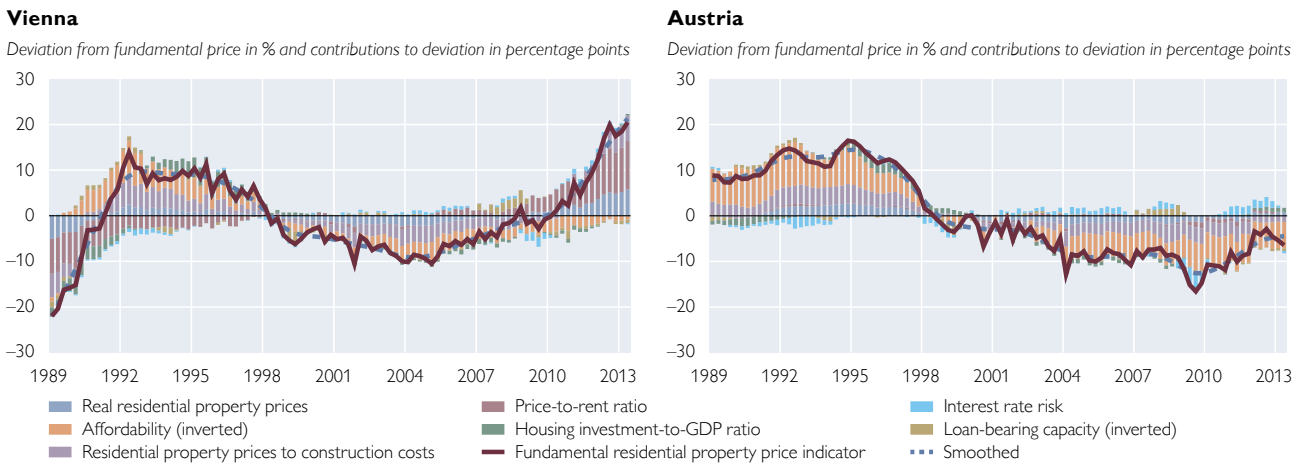
*The sum of the weights for all variables was normalized to 1.*

Chart 5 shows the fundamental real property price indicator for Vienna and Austria and the contributions made by each of the subindicators. For Vienna, the indicator reflects a pattern of increasing overvaluation, which currently (second quarter of 2013) stands at 20%. That conclusion coincides with recent findings by the Deutsche Bundesbank (2013), which identified overvaluations of 5% to 10% in urban housing markets and up to 20% in attractive major cities. The sharp gains seen recently have been driven primarily by the relative prices of property (in proportion to rentals, HICP and construction costs). Unlike during the phase of soaring prices in the early 1990s, affordability is not contributing to an increase in the indicator. The steady drop in interest rates observed since the early 1990s improved affordability until 2004, before it took another decline in Vienna and subsequently returned to its present historical average. No significant contribution to the overall indicator comes from the loan-bearing capacity, housing construction rate and interest rate risk.

Conditions in *Austria* differ markedly from those in Vienna. Specifically, real property prices fell continuously for more than a decade after peaking in the mid-1990s, and marked spikes were only noted in early 2012. As a result, the fundamental property price

Chart 5

**Contribution of the Subindicators to the Fundamental Residential Property Price Indicator for Vienna and Austria**




*Source: OeNB.*

indicator shows a persistent undervaluation (–6% in the second quarter of 2013) despite the recent uptick in prices.

### 3.4 Interpretation of the Findings

The indicator presented in this paper is intended to provide a broad guide to the extent of overvaluation or undervaluation and the current housing price momentum. The actual numerical results should not be overstated because an indicator of that type is naturally subject to a number of limitations. The fundamentally justified price for a given period is derived by comparing the values of the subindicators for the relevant period with the historic average values posted throughout the observation period. The level of the variables (e.g., international comparison of the property price level) is not factored into the analysis. For some important determinants (e.g., foreign capital inflows), no data are available at all, or the time series are not sufficiently long for a definite conclusion.

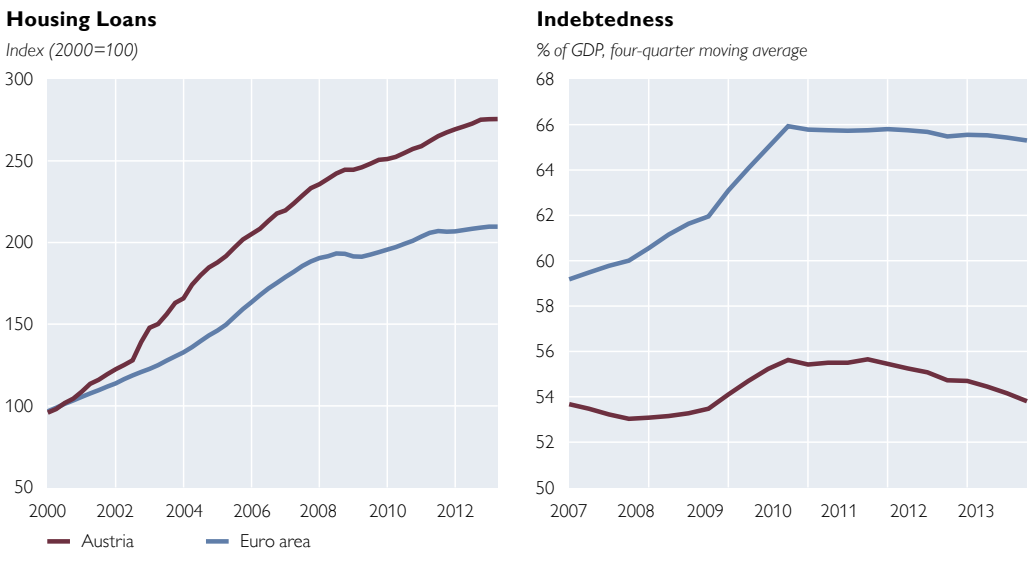
## 4 Forms of Financing and Implications for Financial Stability

An abrupt decline in property prices poses a threat to financial stability. The degree of danger involved depends largely on the extent of debt financing obtained for real estate purchases. With a 176% increase in the volume of housing loans granted to households since 2000, Austria has clearly outpaced the euro area average of +110%. However, the statistically measured growth in housing loans may be upward biased (see footnote 2). In Austria, household sector indebtedness relative to GDP is not only significantly lower than in the euro area, but also exhibits a downward trend.

Due to the financial and economic crisis, demand for low-risk investment options has increased, which prompted greater capital investments in the property market. In Austria, such investments appear to have concentrated primarily on Vienna. Anecdotal evidence also suggests that a large part of prop-

Chart 6

**Housing Finance and Indebtedness of the Household Sector**




Source: Eurostat.

erty acquisitions were equity financed. In light of these observations, the danger to financial stability is estimated to be low.

## 5 Summary and Conclusions

This paper presents a fundamental residential property price indicator for Vienna and Austria, which examines deviations between actual prices and their fundamental values. It is based on seven subindicators that address a variety of perspectives (household perspective, investor perspective, system perspective). Although the indicator suggests an increasing overvaluation for Vienna, that result does not necessarily imply that an abrupt price correction will occur in the near future. Rather, such imbalances may subside gradually, as happened in the wake of the price hikes experienced in the early 1990s. Ultimately, the question of whether a real estate bubble exists in Vienna cannot be answered conclusively. As a whole, Austria still exhibits a tendency toward undervaluation despite the upward trend observed recently in residential property prices.

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# Annex 1

Table A1

## Residential Property Prices and Rents

| | Q2 13 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|
| | *Index 2000=100* | *Change on previous year in %* | | | | | | |
| **Price indices Vienna University of Technology** | | | | | | | | |
| **Austria** | | | | | | | | |
| Residential property prices | 156.0 | +0.8 | +0.6 | +0.3 | –1.9 | +5.0 | +4.1 | +4.7 |
| Prices for single-family houses | × | × | × | × | × | × | –2.2 | +5.4 |
| Prices for condominiums | × | × | × | × | × | × | × | × |
| Rents (CPI) | 147.8 | +2.8 | +1.7 | +4.4 | +3.5 | +3.4 | +2.3 | +2.0 |
| **Austria without Vienna** | | | | | | | | |
| Residential property prices | 141.2 | +2.4 | +0.2 | +0.4 | –2.8 | +4.5 | +2.7 | +4.5 |
| Prices for single-family houses | 122.6 | –2.6 | +1.4 | +0.1 | –2.5 | +2.7 | +0.5 | +10.1 |
| Prices for buildung lots | × | × | × | × | × | × | × | +1.7 |
| Prices for condominiums | 149.2 | +4.5 | –0.3 | +0.5 | –2.9 | +5.3 | +3.5 | +2.4 |
| Prices for new condominiums | 130.1 | +6.1 | –4.1 | +0.2 | –0.8 | +3.0 | +4.1 | +7.0 |
| Prices for old condominiums | 152.0 | +4.3 | +0.2 | +0.5 | –3.2 | +5.6 | +3.5 | +1.7 |
| Rents for single-family houses | 99.4 | +0.9 | –6.6 | +3.5 | +2.8 | –5.4 | +6.6 | +7.4 |
| Rents for apartmemts | 157.7 | +9.6 | –8.0 | +4.4 | –0.0 | +2.1 | +4.1 | +3.6 |
| **Vienna** | | | | | | | | |
| Residential property prices | 196.0 | –3.4 | +1.8 | –0.0 | +0.5 | +6.2 | +8.0 | +5.1 |
| Prices for single-family houses | 174.9 | –2.4 | +5.0 | –0.3 | –0.3 | +6.7 | +1.7 | +13.8 |
| Prices for buildung lots | 181.5 | –0.6 | +7.0 | +3.3 | +2.5 | +0.7 | –3.2 | +15.9 |
| Prices for condominiums | 197.5 | –3.5 | +1.6 | +0.0 | +0.5 | +6.2 | +8.5 | +4.5 |
| Prices for new condominiums | 160.4 | –0.4 | +4.3 | –0.0 | –5.4 | +4.7 | +12.2 | –1.1 |
| Prices for old condominiums | 203.8 | –4.0 | +1.1 | +0.0 | +1.6 | +6.4 | +7.9 | +5.4 |
| Rents | 128.7 | –0.2 | –0.8 | +1.2 | –0.6 | +1.8 | +4.9 | +8.2 |
| Rents for single-family houses | 108.6 | +3.5 | –1.4 | –1.7 | +1.0 | +2.0 | +3.5 | +15.7 |
| Rents for condominiums (market) | 131.4 | –1.6 | –0.9 | +0.2 | –0.3 | +2.1 | +5.4 | +8.0 |
| Rents for condominiums (administered rents) | 126.9 | –2.2 | –0.6 | +3.3 | –0.4 | +0.9 | +5.1 | +8.3 |
| Rents for offices | 120.3 | +0.0 | +2.0 | +1.6 | –2.4 | –0.6 | +0.7 | +2.7 |
| **Other price indices for Austria** | | | | | | | | |
| Residential property prices ECB | 156.0 | +0.8 | +0.6 | +0.3 | –1.9 | +5.0 | +4.1 | +4.7 |
| Residential property prices Statistics Austria | × | × | × | × | × | × | × | × |

*Source: OeNB, Vienna University of Technology, Statistics Austria.*

Tabelle A1 continued

## Residential Property Prices and Rents

| | 2008 | 2009 | 2010 | 2011 | 2012 | Q3 12 | Q4 12 | Q1 13 | Q2 13 |
|---|---|---|---|---|---|---|---|---|---|
| | *Change on previous year in %* | | | | | | | | |
| **Price indices Vienna University of Technology** | | | | | | | | | |
| **Austria** | | | | | | | | | |
| Residential property prices | +1.1 | +3.9 | +6.2 | +4.2 | +12.4 | +11.9 | +11.5 | +4.9 | +5.0 |
| Prices for single-family houses | –0.7 | +0.8 | +2.5 | +2.7 | +4.9 | +4.4 | +8.0 | +4.5 | +7.6 |
| Prices for condominiums | +4.3 | +2.7 | +6.2 | +7.9 | +9.5 | +11.0 | +10.7 | +9.7 | +9.0 |
| Rents (CPI) | +1.3 | +4.7 | +3.4 | +3.3 | +4.4 | +4.2 | +4.1 | +4.1 | +2.9 |
| **Austria without Vienna** | | | | | | | | | |
| Residential property prices | –0.6 | +2.9 | +5.5 | +2.3 | +10.8 | +9.3 | +9.9 | +1.9 | +3.4 |
| Prices for single-family houses | –2.7 | +1.6 | +7.5 | –3.4 | +8.7 | +3.3 | +18.3 | +0.2 | +2.0 |
| Prices for buildung lots | –1.8 | +6.5 | –5.4 | +6.2 | +9.3 | +7.3 | +18.3 | +8.9 | +8.8 |
| Prices for condominiums | +0.3 | +3.4 | +4.7 | +4.6 | +11.6 | +11.6 | +7.0 | +2.5 | +3.9 |
| Prices for new condominiums | +3.5 | +0.6 | +3.8 | –3.5 | +2.2 | +2.5 | +9.0 | +8.1 | +5.8 |
| Prices for old condominiums | –0.2 | +3.8 | +4.9 | +5.9 | +12.9 | +12.8 | +6.8 | +1.8 | +3.7 |
| Rents for single-family houses | +4.0 | –10.1 | +0.3 | –4.6 | –2.5 | –5.5 | +3.3 | +3.2 | +6.0 |
| Rents for apartmemts | +5.9 | +17.9 | +0.8 | +1.6 | –2.8 | –0.8 | +7.7 | +26.0 | +14.2 |
| **Vienna** | | | | | | | | | |
| Residential property prices | +5.3 | +6.4 | +7.8 | +8.5 | +15.7 | +17.5 | +14.9 | +11.4 | +8.3 |
| Prices for single-family houses | +12.9 | +3.9 | +10.5 | +1.4 | +3.5 | +1.7 | –1.4 | +10.1 | –1.0 |
| Prices for buildung lots | +4.8 | +9.8 | –4.3 | +14.4 | +22.5 | +22.7 | +5.5 | –10.5 | –5.7 |
| Prices for condominiums | +4.7 | +6.6 | +7.6 | +9.1 | +16.7 | +18.8 | +16.2 | +11.4 | +8.9 |
| Prices for new condominiums | +9.3 | –0.3 | +5.9 | +9.8 | +7.0 | +9.0 | +5.3 | +9.0 | +6.8 |
| Prices for old condominiums | +3.9 | +7.7 | +7.8 | +9.0 | +18.2 | +20.3 | +17.9 | +11.8 | +9.2 |
| Rents | +1.7 | –0.4 | +1.1 | +2.8 | +4.4 | +3.1 | +5.9 | +2.9 | +2.5 |
| Rents for single-family houses | +7.5 | –2.2 | +2.2 | –8.1 | –4.1 | –10.1 | –3.7 | –10.8 | –13.3 |
| Rents for condominiums (market) | +2.6 | –0.1 | –0.3 | +3.7 | +6.3 | +5.5 | +6.8 | +2.4 | +3.1 |
| Rents for condominiums (administered rents) | +1.6 | –0.5 | +2.1 | +2.2 | +3.2 | +1.6 | +5.3 | +3.2 | +2.0 |
| Rents for offices | +4.0 | –1.8 | –5.9 | +9.4 | +9.6 | +3.1 | +0.7 | –2.8 | –0.9 |
| **Other price indices for Austria** | | | | | | | | | |
| Residential property prices ECB | +1.1 | +3.9 | +6.2 | +4.2 | +12.4 | +11.9 | +11.5 | +4.9 | +5.0 |
| Residential property prices Statistics Austria | x | x | +0.6 | –4.7 | x | x | x | x | x |

*Source: OeNB, Vienna University of Technology, Statistics Austria.*

## Annex 2

### Data Sources and Regionalization of Data for Vienna

The most challenging obstacle to constructing the indicator was the lack of available data. Since some of the variables used were not available for the entire period (Q1 1989 to the present), they were extrapolated by means of other time series. It was also necessary to regionalize some of the indicators for Vienna based on various proxy variables. Data that were only available as annual figures (e.g., historical lending series) were interpolated to a quarterly basis using a cubic spline.

Table A2

**Data Sources and Proxies Used for Regionalization and Extrapolation of Times Series**

| Variable | Data source – Austria | Data source – Vienna/proxy for regionalization |
|---|---|---|
| Property prices | 1989–2000: Austrian Federal Economic Chamber<br>From 2000: Vienna University of Technology | Vienna University of Technology |
| Rents | 1989–2000: Austrian Federal Economic Chamber<br>From 2000: Vienna University of Technology, own aggregation | Vienna University of Technology |
| Harmonised index of consumer prices | Statistics Austria | – |
| Construction input prices index | Statistics Austria | – |
| Disposable income of households | Quarterly National Accounts (WIFO) | 1989–1994: Trend-based extrapolation of share 1995–2010<br>1995–2010: Regional SNA (WIFO)<br>From 2011: Regional employment |
| Housing investment | Quarterly National Accounts (WIFO) | Building permits |
| Gross domestic product | Quarterly National Accounts (WIFO) | 1989–1994: Trend-based extrapolation of share 1995–2010<br>1995–2010: Regional SNA (WIFO)<br>From 2011: Regional employment |
| Home loans | 1989–1994: Mortgage and public-sector loans (OeNB)<br>1995–2002: Loans for home purchase and improvement (OeNB)<br>From 1999: Loans for housing development and improvement (ECB monetary statistics) | – |
| Home loan interest rates | 1988–2002: Return on 10-year Austrian government bonds<br>From 2003: Weighted average of customer interest rates for each range of maturities | – |

| Variable | Euro Area Data Source |
|---|---|
| Gross domestic product | Eurostat |
| Harmonized index of consumer prices | Eurostat |
| Three-month interest rate | ECB |

*Source: Author's compilation.*

# The Austrian System of Individual Pension Accounts – An Unfinished Symphony

Markus Knell[1]

*The new Austrian pension system based on individual accounts is a clear improvement over the former system. A serious shortcoming of the new system, however, is that it does not react to demographic changes, in particular to increases in life expectancy. I contrast the Austrian and the Swedish pension account systems to demonstrate how and why the latter is able to react to demographic changes. I also show how the Austrian system could be adapted to include such an automatic adjustment mechanism. In particular, this would require a continuous modification of the "key formula" 80/65/45 (80% replacement rate after 45 contribution years at a retirement age of 65). In a next step I argue why an increase in the average retirement age seems to be the most appropriate and viable reaction to the increase in life expectancy and why alternative adjustment policies have their limits. Finally, I discuss some commonly expressed objections to this adjustment strategy. I also sketch how a system of individual accounts could be amended in order to take some of these objections into account.*

*JEL classification: H55, J1, J26*
*Keywords: pension system, demographic change, life expectancy*

The reorganization of the Austrian pay-as-you-go (PAYG) pension system into a regime based on individual accounts is a major achievement that has eliminated many weaknesses of the older defined benefit system, like the short assessment period, the insufficient method of revaluation and the strong incentives for early retirement (see Knell et al., 2006). The new system is an important step in order to advance financial sustainability, to improve the extent of intra- and intergenerational fairness and to strengthen the incentives for later retirement. By the beginning of 2014, also the transparency of the individual accounts will be enhanced since the pre-reform pension entitlements of all insured person born after 1955 will be transformed into "initial credits" that are then transferred to the individual accounts.

These laudable reforms, however, have certainly not solved all present or future problems. Current challenges concern, e.g., disability pensions, the equalization of the statutory pension age for men and women and the full harmonization of all the different pension schemes that still exist in Austria. In this article I will focus on one aspect that is of crucial importance and that is still neglected in the new system: the steady and foreseeable increase in life expectancy.

The available data show that in Austria period life expectancy at birth (average for men and women) increased from 68.7 (in 1960) to 80.8 (in 2011) in an almost perfectly linear manner. In other words, for each calendar year life expectancy increased by 3 months. Using the concept of remaining life expectancy at the age of 60 one can also observe an almost perfect linear trend although the increase is only 1.5 to 2 months for each calendar year. In the demographic literature there exists a controversy about the best prediction of future developments but it is quite common to assume a continuation of the linear increase in life expectancy, at least for the next 100 years (see Oeppen and Vaupel, 2002).[2] This, how-

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[2] *In fact, this also corresponds to the most recent demographic forecast of Statistics Austria that expects an (almost) linear increase in average life expectancy to 86 (in 2040) and 89 (in 2070).*

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Conny Olovsson,
Sveriges Riksbank

ever, would put the Austrian pension system under severe stress since in its current form it does not include *any* mechanism in order to react to this development in an automatic manner.

In this paper I will deal with this fundamental deficiency of the new Austrian pension system. In section 1 I describe the main features of the Austrian system and I compare it to the Swedish model (which is also based on individual pension accounts). In section 2 I use examples to show why the Austrian version of the model leads to problems as life expectancy increases and why this is not the case for the Swedish variant. I will also show how the Austrian system *could* be adapted in order to include an automatic adjustment factor to life expectancy changes. This, however, would involve a continuous (and rather complicated) adjustment of crucial parameters like the accrual rate and the reference retirement age. In section 3 I briefly discuss whether an increase in the retirement age is the only viable answer to an increase in life expectancy while in section 4 I deal with various frequently raised objections to this policy. Section 5 concludes.

## 1 Pension Account Systems in Austria and in Sweden

In this section I describe the main elements of the pension account systems in Austria and in Sweden and discuss similarities and differences.[3]

### 1.1 The Austrian System

The centerpiece of the harmonized pension system is an individual defined benefit pension account specified in the General Pension Act (Allgemeines Pensionsgesetz, APG). The target benefit level is expressed by the formula "80/65/45:" After 45 years of insurance and retirement at the age of 65, the system provides an initial pension that corresponds to 80% of average lifetime income. This target is implemented by means of an accrual rate ("Kontoprozentsatz"). Every year 1.78% of total earnings (up to a ceiling) are credited to the account while past credits are revalued by the growth rate of the average contribution basis.[4] For early or late retirement within an age corridor between 62 and 68 there are annual deductions and supplements of 5.1% (starting in 2017, before that 4.2%). Only persons with a record of at least 37.5 years of insurance can use the pension corridor.

The uniformly applied contribution rate stands at 22.8%, of which 10.25% are paid by employees and 12.55% by employers (there are some exceptions for farmers and for self-employed persons). Existing pensions are (typically) adjusted for the rate of inflation. For non-contributory qualifying periods (due to childcare, unemployment, sickness etc.) the pension accounts are credited with specified amounts that are financed from the general government budget. Pension entitlements that were acquired before 2005 will be captured by initial credits to be transferred in 2014 to the pension accounts of all persons born after 1955.

### 1.2 The Swedish System

The most prominent example of a PAYG system that is based on pension accounts is the Swedish "notional defined contribution" (NDC) system. For the sake of comparison with the Austrian

[3] *This section is in part based on Knell (2005), which also includes a comparison with the German system of "earnings points."*

[4] *After 45 years of contributions this amounts to a value of 80% (1.78×45=80.1).*

model I want to briefly describe the main elements of the NDC framework.[5]

The contribution rate is 18.5% (7.5% paid by employees and 11% by employers). 16% of the contributions are paid into the PAYG-based pension account while the remaining 2.5% are used for investment in a funded (capital market-based) pillar. The contributions to the notional account are revalued by a "notional interest rate" defined as the growth rate of average earnings. At retirement this accumulated "notional capital" is transformed into an annual pension payment. In the simplest version of this annuitization the notional capital is simply divided by the remaining life expectancy.[6] An increase in life expectancy will thus lead to an automatic reduction in benefits. Current pensions are also adjusted by the "notional interest rate" (again the Swedish model is slightly more complicated). For non-contributory qualifying periods the system also credits the individual accounts with tax-financed contributions.

### 1.3 Similarities and Differences between the Austrian and the Swedish Systems

The Austrian and the Swedish systems have a number of characteristics in common:

- There exists a lifelong assessment period and each year of contributions counts equally for the calculation of pension benefits.
- Past contributions are "revalued" in an adequate manner based on the development of earnings.
- There are deductions and supplements for early and late retirement.
- There are non-contributory qualifying periods (e.g. for childcare).
- There exists a minimum pension.
- Both systems use transparent individual accounts and provide (annual) statements.

Besides these similarities there exists, however, also one crucial difference.

- The Swedish model reacts in an automatic manner to demographic developments (in particular to an increase in life expectancy) while such a mechanism is absent in the Austrian model.

In light of the numerous common features this difference might look like a minor detail. Contrary to this first impression it is, however, of central importance as I will explain in the next section.

## 2 Shortcomings of the Austrian Pension Account System

In order to illustrate the central difference between the Swedish and Austrian systems I will use a simple numerical example. The example is meant to capture the main components of the two systems. The parameter values, however, do not exactly follow the real-world models but are rather chosen to facilitate the calculations and comparisons.[7]

### 2.1 The Case of a Stable Demographic Environment

I start with a stylized situation where it is assumed that both the size of generations and their life expectancy are con-

[5] *Detailed accounts of the system can be found in the collective volumes Holzmann and Palmer (2006) and Holzmann et al. (2012). These books also discuss many other advantageous properties of NDC system like transparency, flexibility and portability.*

[6] *The Swedish model is slightly more complicated since it "frontloads" part of the expected future pension adjustment (Palmer, 2000, Appendix 1).*

[7] *In a longer background manuscript (written in German) I provide more examples and a sometimes more extensive discussion of various issues that are only touched upon in the present article (see Knell, 2013).*

stant. I focus on one representative (male) individual that enters the labor market in the year 2010 at the age of 20, works without interruption until the age of 65 and receives a pension until his death at the age of 80. The contribution rate is assumed to be equal to 25%. The pension account of this individual is shown in table 1. Column 3 reports his annual earnings while column 4 shows the growth rate of average earnings, which is important for the revaluation of past contributions.

In columns 5 to 7 I show the statements of a *defined contribution system* that follows the Swedish model. The values in the table are calculated from: *7,500=0.25×30,000, 7,650=0.25×30,600* etc. The notional capital is given by the sum of current contributions and the revalued notional capital of the previous period, i.e. *15,300=7,650+7,500×1.02, 23,409=7,803+15,300×1.02* etc.[8]

When the individual retires at the age of 65 the accumulated notional capital (that is once more revalued from 2054 to 2055) is divided by the remaining life expectancy that is assumed to be 15 in the current example. The initial annual pension payment is thus given by *54,852=822,776/15*. The adjustment of current pensions will be discussed below.

Columns 8 to 10 show the pension calculations and the statements of a *defined benefit pension account system* that follows the Austrian model. I have constructed the example in such a manner that the pension payment is the same as

Table 1

**Benchmark Case – Constant Life Expectancy**

| | | | | Defined Contribution Account (Sweden) Contribution rate: 25% | | | Defined Benefit Account (Austria) Target (at 65 after 45 CP): 75% Accrual rate: 1.67% | | |
|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Year | Age | Individual earnings | Average earnings (growth in %) | Annual contributions | Total Capital | Pension | Annual credit | Total credit | Pension |
| 2010 | 20 | 30,000 | 2 | 7,500 | 7,500 | | 500 | 500 | |
| 2011 | 21 | 30,600 | 2 | 7,650 | 15,300 | | 510 | 1,020 | |
| 2012 | 22 | 31,212 | 2 | 7,803 | 23,409 | | 520 | 1,561 | |
| 2013 | 23 | 31,836 | 2 | 7,959 | 31,836 | | 531 | 2,122 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | | ⋮ | ⋮ | |
| 2053 | 63 | 70,296 | 2 | 17,574 | 773,252 | | 1,172 | 51,550 | |
| 2054 | 64 | 71,702 | 2 | 17,925 | 806,643 | | 1,195 | 53,776 | |
| 2055 | 65 | | 2 | | 822,776 | 54,852 | | 54,852 | 54,852 |
| 2056 | 66 | | 2 | | | 55,949 | | | 55,949 |
| 2057 | 67 | | 2 | | | 57,068 | | | 57,068 |
| ⋮ | ⋮ | | ⋮ | | | ⋮ | | | ⋮ |
| 2068 | 78 | | 2 | | | 70,957 | | | 70,957 |
| 2069 | 79 | | 2 | | | 72,376 | | | 72,376 |

*Source: Author's calculations.*

*Note: The table compares a Swedish defined contribution (columns 5 to 7) and an Austrian defined benefit (columns 8 to 10) pension account model. For both cases it is assumed that the contribution rate is 25%. The example looks at a ficticious individual that started work in 2010 at the age of 20, has an earnings pattern as shown in column 3 and retires at the age of 65. The real growth rate of average earnings (that is needed for revaluation) is assumed to be constant at 2%. CP=contribution periods.*

[8] *For the sake of simplicity I assume that the real growth rate of wages is constant at 2% and that the earnings of the individual also grow at the same rate. In other words, I look at a "representative" member of a birth cohort. The starting value of 30,000 is broadly in line with the average contribution basis of the Austrian pension system which was about 32,500 in 2011.*

in the Swedish model. In particular, I assume that after 45 contribution years at a retirement age of 65 the system provides a replacement rate of 75%.[9] This target implies an accrual rate of 1.67%.[10] The annual credit ("Teilgutschrift") follows from: *500=0.0167×30,000, 510=0.0167×30,600* etc. The total credit ("Gesamtgutschrift") on the account (column 9) is the sum of this annual credit and the (revalued) total credit of the previous period. The initial pension at the age of 65 equals the total credit at the end of the working life and is in the present example again 54,852.

For appropriately chosen parameter values, the two systems will thus lead to identical initial pensions. Obviously, also the following pension payments will be the same if both models use the same method of pension adjustment. Assuming, e.g., an indexation to the growth rate of average earnings (as is done in table 1), the pension in the year 2056 will be 55,949 in each of the two cases. The Austrian APG stipulates that current pensions are adjusted only by the rate of inflation. This, however, does not affect the general observation that in a constant demographic environment a Swedish defined contribution and an Austrian defined benefit system can be designed in a way that they lead to identical outcomes.

Finally, it is important to note that both pension accounts shown in table 1 are associated with a financially balanced pension system under the assumption of a constant demographic structure. This is not immediately obvious from the reported example but can be shown with a little bit of algebra (see Knell, 2012).[11]

### 2.2 The Case of Early Retirement

I stick to the assumption of a stable demographic environment but now assume that the insured individual enters retirement at the age of 60 after 40 years of contributions. The pension calculations for the two pension account systems are shown in table 2.

The *Swedish defined contribution system* reacts in an automatic manner to early retirement. At the moment of annuitization (i.e. when the initial pension is calculated) the notional capital that has been accumulated until the age of 60 will now be divided by the higher remaining life expectancy (20 years). The pension will be: *33,121=662,412/20.* While for retirement at the age of 65 the pension level (or the replacement rate) amounted to 75% *(54,852/73,136)* it is now reduced to 50% *(33,121/66,241)* for early retirement at the age of 60. Due to this automatic reduction the budget of the entire system remains in balance.[12]

[9] *"Replacement rate" defines the ratio of the initial pension to average (revalued) lifetime earnings. In the present example this replacement rate also corresponds to the "pension level," which is defined as the ratio of the pension to current, economy-wide earnings. See, e.g., Knell et al. (2006) and OECD (2012).*

[10] *As described in section 2.1 in the APG the target level is 80% with a corresponding accrual rate of 1.78%. In this case, a balanced system would require a contribution rate of 26.67%. I use a value of 25% in order to make it easier to check the calculations.*

[11] *The sustainability of the pension models can be easily grasped by referring to a case where earnings are constant. In particular, assume that they are fixed at 30,000 and that each cohort has 100 members. Total revenues of the system in each year are then given by the product of the contribution rate (0.25), average earnings (30,000), the cohort size (100) and the number of working cohorts (45), i.e. 0.25×30,000×100×45=33,750,000. Total expenditures, on the other hand, are the product of the average pension (22,500), the cohort size (100) and the number of retired cohorts (15), i.e. 22,500×100×15=33,750,000. Total expenditures are thus equal to total revenues and the system is in balance.*

[12] *This can again be illustrated by an example similar to the one in footnote 11.*

Table 2

**Early Retirement**

| | | | | Defined Contribution Account (Sweden) Contribution rate: 25% | | | Defined Benefit Account (Austria) Target (at 65 after 45 CP): 75% Accrual rate: 1.67% | | |
|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Year | Age | Individual earnings | Average earnings (growth in %) | Annual contributions | Total capital | Pension | Annual credit | Total credit | Pension (no deductions) |
| 2010 | 20 | 30,000 | 2 | 7,500 | 7,500 | | 500 | 500 | |
| 2011 | 21 | 30,600 | 2 | 7,650 | 15,300 | | 510 | 1,020 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | | ⋮ | ⋮ | |
| 2049 | 59 | 64,942 | 2 | 16,236 | 649,423 | | 1,082 | 43,295 | |
| 2050 | 60 | | 2 | | 662,412 | 33,121 | | 44,161 | 44,161 |
| 2051 | 61 | | 2 | | | 33,783 | | | 45,044 |
| ⋮ | ⋮ | | ⋮ | | | ⋮ | | | ⋮ |
| 2068 | 78 | | 2 | | | 47,304 | | | 63,073 |
| 2069 | 79 | | 2 | | | 48,250 | | | 64,334 |

*Source: Author's calculations.*

*Note: See table 1. In contrast to table 1, it is assumed here that the individual retires at the age of 60.*

A *defined benefit pension account,* on the other hand, would – in the absence of any additional corrections – grant higher pension payments, which would lead to deficits in the social security system. This can be seen in column 10 of table 2, where the total credit at the age of 60 is 44,161, which would imply an initial pension that considerably exceeds the Swedish pension of 33,121 (67% replacement rate instead of 50%). The reason for this outcome lies in the fact that the defined benefit system takes account of only *one* consequence of earlier retirement, namely the smaller number of contribution years, which reduces total pension credits. The second consequence, however, the larger number of benefit years is neglected. A stable financial balance of a defined benefit system thus also needs a framework of deductions and supplements. In the current example the appropriate, financially affordable pension benefit is the Swedish one given by 33,121. This can be achieved by applying a total deduction of 25% (since *33,121=0.75× 44,161).* This total deduction corresponds to an annual deduction of 5% (arithmetic mean) or 5.59% (geometric mean). In fact, the deductions/supplements that are specified in the Austrian APG (5.1%) are within the range of these "appropriate" values.[13]

Summing up, early retirement leads to an actuarial appropriate automatic reduction of pension benefits in the Swedish model while in the Austrian model a system of additional deductions and supplements is required to achieve a similar result.

### 2.3 The Case of Increasing Life Expectancy

In the next step I will lift the assumption of a stable demographic environment and I assume in this section that life expectancy increases. In particular, I take the example of table 1 but now assume that life expectancy increases

[13] *The calculation of appropriate deductions is not a trivial task (cf. Brunner and Hoffmann, 2010; Gasche, 2012).*

by 4 years. For the further considerations the reaction of the insured individuals is of crucial importance. I want to deal with two scenarios:

- *Scenario 1:* Each cohort increases (on average) the retirement age in such a manner that the (average) replacement rate stays constant (table 3).
- *Scenario 2:* The retirement age stays constant at 65 years (table 4).

*Scenario 1* captures the optimistic situation that each cohort postpones retirement in response to the increase in life expectancy. In particular, I assume that the retirement age is adjusted such as to keep the replacement rate constant at 75%. This means for the present example that three years out of the four additional years of life are spent in the labor market and one year in retirement.[14] The intuition behind this result is straightforward. Before the assumed increase in life expectancy the representative member of a cohort paid contributions for 45 years (from age 20 to 64) and received a pension for 15 years (from age 65 to 79). The ratio of retirement years to working years was *15/45=1/3*. When life expectancy increases by 4 years then this additional lifetime has to be divided in the same proportion in order to preserve the financial balance of the system with constant contribution and replacement rates. This amounts to three additional working periods and one additional year of retirement such that again *16/48=1/3*. The "neutralizing" *reference retirement* age is a crucial measure in the Swedish and even more so in the Austrian pension account system, as I am going to argue below.[15]

Table 3

**Increase in Life Expectancy – Scenario 1 (Higher Retirement Age)**

| | | | | Defined Contribution Account (Sweden) Contribution rate: 25% | | | Defined Benefit Account (Austria) Target (at 68 after 48 CP): 75% Accrual rate: 1.56% | | |
|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Year | Age | Individual earnings | Average earnings (growth in %) | Annual contributions | Total capital | Pension | Annual credit | Total credit | Pension |
| 2010 | 20 | 30,000 | 2 | 7,500 | 7,500 | | 469 | 469 | |
| 2011 | 21 | 30,600 | 2 | 7,650 | 15,300 | | 478 | 956 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | | ⋮ | ⋮ | |
| 2054 | 64 | 71,702 | 2 | 17,925 | 806,643 | | 1,120 | 50,415 | |
| 2055 | 65 | 73,136 | 2 | 18,284 | 841,060 | | 1,143 | 52,566 | |
| 2056 | 66 | 74,598 | 2 | 18,650 | 876,530 | | 1,166 | 54,783 | |
| 2057 | 67 | 76,090 | 2 | 19,023 | 913,084 | | 1,189 | 57,068 | |
| 2058 | 68 | | 2 | | 931,345 | 58,209 | | 58,209 | 58,209 |
| 2059 | 69 | | 2 | | | 59,373 | | | 59,373 |
| ⋮ | ⋮ | | ⋮ | | | ⋮ | | | ⋮ |
| 2072 | 82 | | 2 | | | 76,806 | | | 76,806 |
| 2073 | 83 | | 2 | | | 78,342 | | | 78,342 |

*Source: Author's calculations.*

*Note: See table 1. In contrast to table 1, it is assumed here that life expectancy is 84 (instead of 80) and that the individual retires at the age of 68.*

[14] *This "sharing rule" is not only true for the present example but also holds in general, e.g. for a continuous increase in life expectancy, as shown in Knell (2012).*

[15] *For a discussion and an empirical analysis of the reference retirement age in the Swedish NDC system, see Lowén and Settergren (2012).*

The *defined contribution model* organizes the adjustment to the increased life expectancy and the increased retirement age in an automatic fashion. As shown in table 3 the longer working life leads to a higher final notional capital (931,345). The remaining life expectancy is now 16 years and this implies an initial pension of *58,209=931,345/16*. This corresponds to a replacement rate of 75%.

In the *defined benefit model* this is more complicated. In this case it is indispensable to calculate the reference retirement age in order to determine the annual accrual rate that corresponds to the target benefit level. In the present example the reference retirement age is 68 and the new reference contribution periods 48. For an intended replacement rate of 75% this implies an accrual rate of *1.56=75/48*. Using this value one gets again identical pension benefits as in the Swedish system. This means, however, that the crucial formula "80/65/45" has to be adjusted in annual (or at least regular) steps to the increase in life expectancy in order to keep the system in balance. For a life expectancy of 84 the formula has to be changed to "80/68/48" and for a further increase to 85 and 86 years to "80/68.75/48.75", "80/69.5/49.5" etc. If one fails to adjust the formula and keep the accrual rate constant (in the present example at 1.67) then the initial pension would amount to 62,090 (corresponding to a replacement rate of 80%). This, however, would lead to a constant (and increasing) deficit in the pension system. A continuous adjustment of the key formula is certainly possible, although it has to be said that it might be somewhat intransparent (each cohort would have its own formula and its own accrual rate) and arguably also subject to frequent political controversy.

For *scenario 2* I look at a more "pessimistic" (or realistic?) situation in which despite the increase in life expectancy the retirement age remains at 65. Table 4 shows the pattern of pension payments in the two account models. In the defined

Table 4

**Increase in Life Expectancy – Scenario 2 (Constant Retirement Age)**

| | | | | Defined Contribution Account (Sweden) Contribution rate: 25% | | | Defined Benefit Account (Austria) Target (at 68 after 48 CP): 75% Accrual rate: 1.56% | | |
|---|---|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Year | Age | Individual earnings | Average earnings (growth in %) | Annual contributions | Total capital | Pension | Annual credit | Total credit | Pension (no deductions) |
| 2010 | 20 | 30,000 | 2 | 7,500 | 7,500 | | 469 | 469 | |
| 2011 | 21 | 30,600 | 2 | 7,650 | 15,300 | | 478 | 956 | |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | | ⋮ | ⋮ | |
| 2054 | 64 | 71,702 | 2 | 17,925 | 806,643 | | 1,120 | 50,415 | |
| 2055 | 65 | | 2 | | 822,776 | 43,304 | | 51,423 | 51,423 |
| 2056 | 66 | | 2 | | | 44,170 | | | 52,452 |
| 2057 | 67 | | 2 | | | 45,053 | | | 53,501 |
| ⋮ | ⋮ | | ⋮ | | | ⋮ | | | ⋮ |
| 2072 | 82 | | 2 | | | 60,636 | | | 72,005 |
| 2073 | 83 | | 2 | | | 61,849 | | | 73,445 |

*Source: Author's calculations.*

*Note: See table 1. In contrast to table 1, it is assumed here that life expectancy is 84 (instead of 80) and that the individual retires at the age of 65.*

contribution system, the increase in life expectancy at a constant retirement age leads to an automatic reduction in pension benefits. The initial pension is now given as *43,304=822,776/19,* which corresponds to a replacement rate of only 58.2%. The entire system again remains in balance as has already been the case for all previous examples in tables 1 to 3 (see footnote 11). In the defined benefit model, however, one needs again additional deductions and supplements if an individual exits the labor market before the reference retirement age. Without these deductions, the new accrual rate of 1.56% would again imply a higher initial pension of 51,423, which corresponds to a replacement rate of 70.3%. The "actuarially fair" deduction can be calculated as 5.57%, which is slightly below the previous deduction rate of 5.59%.[16]

Summing up, it can be said that the Swedish model reacts automatically to increases in life expectancy, and the system remains in balance in the medium to long run. The adjustment mechanism follows from the principle of annuitization at retirement, according to which both the number of contribution years and the number of retirement years play a role – the former through the size of the notional capital and the latter through the remaining life expectancy at the moment of retirement. The Austrian model, on the other hand, is not inherently designed in a way such as to accommodate a continuously increasing life expectancy. It *could* be adapted to such an environment but this would require a continuous (preferably an annual) adjustment of four crucial parameters: first, the cohort-specific reference retirement age (currently 65); second, the cohort-specific reference contribution years (currently 45); third, the cohort-specific accrual rate (currently 1.78); and fourth, the deduction and supplements (currently 5.1%). In addition, it might also be advisable to adjust the bounds of the pension corridor (currently 62 and 68, respectively) in lockstep with the increase in the reference retirement age. The necessity of explicit continuous adjustments is certainly a disadvantage of the defined benefit system that might – as a consequence – appear more complicated and less transparent and probably be regularly subject to intense public and political debates.

### 2.4 The Case of Fluctuations in the Cohort Size

So far I have focused on two specific demographic situations: a constant environment (sections 2.1 and 2.2) and increasing life expectancy (section 2.3). There exists, however, another important demographic trend: fluctuations and permanent changes in the average size of working cohorts.[17] The financial stability of a PAYG system crucially depends on total revenues, which are significantly influenced by the size of the labor force. There are three important potential causes for fluctuations in the size of working cohorts: first, baby boom-and-bust cycles, second, the extent of net migration, and third, changes in (age-dependent) labor force participation.

[16] *At first glance it might look astonishing that despite the increase in life expectancy the deduction rate is now lower. This, however, is straightforward. A longer life means that there are more pension payments and a specific deduction rate leads to a higher reduction in "total pension wealth." The annual deduction rate can thus be lower in order to achieve the same total reduction.*

[17] *In addition to adapting to demographic changes, it is of course important that a PAYG system is also capable of dealing with other macroeconomic shocks, e.g. with business cycle fluctuations. A thorough examination of these aspects is, however, beyond the scope of this article.*

One could again construct numerical examples similar to the ones presented in tables 3 and 4 to illustrate the reaction of different pension systems to fluctuations in the average cohort size. For the sake of brevity, however, I will only make a few short comments on this topic.[18] For a defined contribution system it is again rather straightforward to account for this situation. One could, e.g., use the growth rate of the contribution base instead of the growth rate of the *average* contribution base as the notional interest rate in order to take fluctuations in the labor force into account. Under certain assumptions the system will then again be kept in balance. A similar strategy could be used in a defined benefit system but this is currently not planned in the Austrian model and I know of no studies that have discussed such an approach in a systematic manner.

## 3 Alternatives to an Increase in the Retirement Age?

Both pension account models discussed in section 2 are characterized by the fact that the contribution rate is fixed and that all adjustments to increasing life expectancy are based on a combination of increasing retirement age and lower annual pension benefits. In order to get an idea about the real world dimension and to also discuss possible alternative adjustment strategies it is instructive to look at a realistically calibrated example. In particular, I assume that the size of birth cohorts is constant while the annual increase in life expectancy is 2 months. Starting from a life expectancy of 80 in the year 2010 this implies an increase to 87 (in 2060) and 94 (in 2110). In box 1 I discuss the benchmark equation of every PAYG system on which this simulation exercise is based.

I start the simulations with values that roughly correspond to the current Austrian situation. In particular, I assume that the contribution rate is 22.8%, the government contribution rate is 25%, the average pension level is 60%, the average retirement age is 60 and the dependency ratio is 50% (i.e. there are two pensioners for each employed person).[19] In the following I will report how the system has to adjust to accommodate the increase in life expectancy if only one instrument is changed at a time. In order to keep the system in balance one has to ….

- … increase the contribution rate from 22.8% to 31% and then to 39% (if life expectancy increases from 80 to 87 and later to 94).
- … increase government contributions from 25% to 45% and then to 56%.
- … reduce the average replacement rate from 60% to 44% and then to 35%.
- … or increase the retirement age from 60 to 65 and then to 70 (again if life expectancy increases from 80 to 87 and later to 94).

Summarizing these calculations one can say that if the retirement age remains at its current value of 60 and if there are no changes in the calculation of benefits, demographic developments have to be absorbed by considerable increases in the contribution rate or an even more extensive increase in government contributions (from 25% to more than 50%). If, by contrast, the (individual and government) contribution rates remain constant (together with the retirement age) then pension benefits

[18] *A more extensive discussion of the case of fluctuating cohort sizes can be found in Knell (2010) (where I focus on the German sustainability factor) and in Knell (2012) (where I focus on the Swedish system).*

[19] *Details on the sources of these starting values can be found in Knell (2013).*

Box 1

**The Basic Equation of PAYG Systems**

*The budget of a PAYG system in year t is given by:*

$$\tau_t W_t L_t + B_t = P_t R_t,$$

*where $\tau_t$ is the contribution rate, $W_t$ the average contribution base (or average earnings), $P_t$ the average pension payment, $L_t$ the number of contributors, $R_t$ the number of pensioners and $B_t$ the contributions of the government ("Bundesbeitrag"). This equation has to be fulfilled at the end of a year, independent of how these six parameters are actually determined. In Austria, e.g., this is done by a government guarantee („Ausfallshaftung"), which implies that $B_t$ will increase if total contributions $\tau_t W_t L_t$ turn out to be lower than total expenditures $P_t R_t$. The equation can also be rewritten as:*

$$\frac{\tau_t}{1-b_t} = q_t \frac{R_t}{L_t}$$

*where $q_t \equiv \frac{P_t}{W_t}$ stands for the average pension level (or – somewhat sloppily – the average replacement rate) and $b_t \equiv \frac{B_t}{P_t R_t}$ measures government contributions as a percentage of total expenditures. The dependency ratio $\frac{R_t}{L_t}$ can increase if – for a constant life expectancy – the working population decreases (which reduces the denominator) or if – for constant cohort sizes – life expectancy increases (which will increase the numerator) or if both of these two processes are present at the same time.*

have to be reduced substantially. At the end of the simulation period the average pension level would be around the poverty line (35% replacement rate). In this scenario one would almost unavoidably need extra payments, either via a second or third pillar or through government supplements ("Ausgleichszulage"). In the first case this would again correspond to additional contributions (since the second and third pillars have to be funded), while in the latter case one would again face an increase in government, tax-financed support. In the light of these alternatives the last variant – an increase in the retirement age – seems to be the most "natural" approach.[20] The numerical values of the example also indicate that the necessary increases in the retirement age seem to be feasible. Until the year 2060 (when life expectancy could reach 87) the average retirement age would have to increase to 65, and in the year 2110 (with an assumed life expectancy of 94) the average employee would have to remain in the labor force until the age of 70.

In the public discussion, two additional claims are often raised about how the funding of the pension system can be secured. First, it is proposed that the costs of ageing can simply be financed from expected productivity gains. The argument is based on the observation that higher real incomes allow larger transfers to retired cohorts without leading to lower net incomes of the contributing generations. What is typi-

[20] *This is also the conclusion of N. Barr in a recent report on the Swedish system: "The problem of paying for pensions is largely the result of rising life expectancy with a fixed retirement age. The obvious solution is that pensionable age should rise in a rational way as life expectancy increases" (Barr, 2013, p. 94).*

cally not mentioned by its supporters is, however, that this proposal is basically identical to an increase in the contribution rate.

The second proposal that can often be heard is that the financial stability of PAYG systems can be guaranteed by increasing the number of contributors. This can be accomplished by promoting an increase in the fertility rate, net migration or – what the supporters mainly have in mind – labor market participation. A high labor force participation rate is undoubtedly an important goal in itself. It would, however, be illusive to expect too much from this measure since the participation rates for prime-aged individuals (25–54) are already rather high in Austria (around 90% for men and 80% for women). For older individuals there is certainly room for improvement but any policies to this end are basically synonymous to an increase in the effective average retirement age. Furthermore, one has to take into account that expanding labor market participation in order to account for increasing life expectancy is a rather short-sighted policy. Today's contributors are tomorrow's pensioners and the financing problems return in the future with added strength (for a numerical example see Knell, 2013).

## 4 Discussion

The results of the previous sections suggest that the most appropriate reaction to an increase in life expectancy is a parallel (although less than 1:1) increase in the retirement age. This raises a number of questions concerning possible objections to this policy. I will mention some of these issues below.

- *Are there enough jobs?*
  It is sometimes argued that a general prolongation of working life will reduce the number of jobs available for younger cohorts, thereby increasing their unemployment rates. While it seems reasonable to assume that a sudden jump in the activity rates of older individuals will lead to labor market ramifications this is much less likely for a slowly moving process that follows the similarly steady rise in life expectancy. In fact, countries with high participation rates of older workers typically do not face higher unemployment (or non-employment) rates of young people. This is, e.g., documented by the OECD (2011, chapter 4). A comparison between the employment rates of older (aged 55–59) and younger people (aged 20–24) shows a significantly positive (instead of negative) relationship, which leads the authors to the conclusion that the lump-of-labor hypothesis is a fallacy.

  In the same publication the OECD, however, also shows that there is some empirical basis for the concern that high seniority wages might make it more difficult for older workers to keep their jobs (or to find a new job after dismissals). It might thus be important to continue the process of redesigning the earnings curves (in particular for white-collar workers) and to also make employment at older ages more attractive for both employers and employees (see, e.g., OECD, 2006).
- *Will people be able to work longer?*
  It is also often stated that declining health will limit people's capacity to work at older ages. Again, however, this claim is not supported by empirical evidence. Many studies have documented the significant "compression of morbidity" that could be observed over the past decades, i.e. the phenomenon that "the age of onset of chronic illness […] [is] postponed more than the age of death and squeezing most of the morbidity in life into

a shorter period with less lifetime disability" (Fries et al., 2011, p.1). Of course this is only an observation about the average member of each cohort and it will be necessary to develop an appropriate and efficient system of disability pensions in order to guarantee the standard of living for those individuals that are no longer able to work due to health problems.

- *Is it enough to just focus on the design of the pension system?*
  An appropriate design of the old-age pension system seems to be a necessary but not a sufficient condition for an increase in the retirement age. First, as mentioned above, also the supply side has to be taken into account and firms have to be encouraged to offer adequate jobs. Second, recent studies suggest that it is important to look at the entire system of social support (including disability pensions and unemployment benefits). Increases in the statutory retirement ages often just lead to higher claims of disability pensions or old-age-unemployment (although these are associated with considerable cuts in pension benefits), thereby leaving the average age of exit from the labor market almost unchanged.[21]
- *Is it unfair to use average demographic parameters?*
  It is a well-documented fact that the socio-economic status (as measured by income, wealth or education) and life expectancy are positively correlated. Gaudecker and Scholz (2007), e.g., report that in Germany the difference in remaining life expectancy at the age of 65 between the individuals with the highest pensions and the lowest pensions is almost 6 years. Waldron (2007) has shown a similar pattern for the U.S.A., where persons with incomes in the top half of the earnings distribution live on average 5 years longer than persons in the lower half. Klotz and Doblhammer (2008), finally, show that in Austria male (female) life expectancy at the age of 35 differs by 6 years (3 years) between people with tertiary and with primary education. This is a difficult issue beyond the scope of this paper, but the following aspects should be considered: First, each pension system contains an (ex-ante) insurance against longevity and the (ex-post) redistribution from short-lived to long-lived individuals is just the mirror image of this arrangement. A potential problem only arises due to the fact that there exists a systematic correlation between the insured event and certain socio-demographic characteristics. In order to decide whether this represents an unfair treatment of certain groups one has to determine whether the lower life expectancy is primarily due to different kinds of jobs with different working conditions or due to personal lifestyle choices (involving, e.g., smoking, alcohol consumption, physical activity, and diet). Second, one has to note that this objection applies to all types of pension systems that are based on uniform retirement rules. Funded systems typically also use identical life expectancy data for calculating annuities (although they mostly distinguish between men and women) and defined benefit PAYG system are also usually based on general rules that do not condition on socio-economic status. Third, NDC

[21] *Staubli and Zweimüller (2013), e.g., study the spillover effects of an increased early retirement age legislated in the Austrian pension reforms 2000 and 2003 on the claims of disability and unemployment benefits.*

systems could in principle take life expectancy differences into consideration by using one-time compensatory payments to the individual accounts (see next point).

- *Is a self-sustained pension system an appropriate goal?*
  Another frequently expressed objection to automatic life expectancy factors and in particular to the NDC system is that it works as a purely self-sustained system that is financed solely by the contributions of the insured population. This absolves the government from any responsibility for the pension system and eliminates all elements of redistribution and solidarity. This argument, however, is not correct. First, even a standard NDC system (like the Swedish) includes various payments that stem from the general, tax-financed government budget. This refers to all compensations for non-contributory qualifying periods (due to unemployment, sickness, childcare or military service) and also to the payments necessary to ensure minimum pensions, which are financed from the general government budget. Furthermore, however, one could also think about an extended NDC system that uses the individual accounts to pursue specific redistributive goals. In particular, at the moment of retirement the system could transfer one-time payments to the notional accounts to compensate the insured individuals for different working conditions, different life expectancies or other intra-generational differences that are inadequately captured by the existing benefits for non-contributory periods. In fact, if one had the intention to freeze government contributions at a specific level (e.g. at 15%, which roughly corresponds to the current government subsidies to the ASVG system) one could even provide *each* insured person with some extra credit at retirement age. All of these one-time payments would not impair the functioning of the system and its automatic reaction to demographic changes, which is characteristic of NDC systems. The redistributive measures would, however, be more transparent than in many of the current PAYG systems. Discussing the design of such an "equitable NDC system" is again beyond the scope of this article but it would be a highly interesting topic for further examinations.

## Summary

In this article I have presented an overview of the new Austrian pension account system that was established under the pension reforms of 2003 and 2004 and modified under the stability law of 2012. As mentioned in the introductory section, the new system must be applauded since it eliminated many of the shortcomings of the older system. On the other hand, however, the system is still not flawless, in particular as it includes no mechanism to deal with demographic changes. To illustrate this point I have contrasted the Austrian defined benefit pension account system to its Swedish defined contribution counterpart. I have used various numerical examples to account for the differences between the two systems and to highlight why the Austrian system in its current form is not able to react to the expected increase in life expectancy in an appropriate, self-stabilizing manner. I have also pointed out how the Austrian system *could* be adapted in order to incorporate such an automatic adjustment mechanism. In particular, this would amount to a continuous modification of the "key formula" 80/65/45 in order to account for demographic shifts. Although tech-

nically feasible, it could be argued that such a continuously changing yardstick might challenge the comprehensibility, transparency, communication and political implementation of the new system. In later sections of the paper I have also examined some (alleged) alternatives to an increase in the retirement age as the prime answer to increasing life expectancy, and I have briefly discussed some common objections to this strategy. I have argued that the system of individual accounts could be amended in order to take some of these objections into account.

To end on a positive note it must be stressed that by introducing a framework of individual accounts, Austria has established a sound basic structure for a transparent, fair and sustainable pension system. For its completion the framework only requires one additional major movement. Beyond this, however, one could also imagine a further orchestrated account system that functions as the cornerstone of a modern welfare state, documenting and organizing the flows of contributions and benefits between the insured population and the social security system.

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## Facts on Austria and Its Banks — English | twice a year

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

*www.oenb.at/Publikationen/Finanzmarkt/Fakten-zu-Oesterreich-und-seine-Banken.html*
*www.oenb.at/en/Publications/Financial-Market/Facts-on-Austria-and-its-banks.html*

## Financial Stability Report — English | twice a year

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

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

## Focus on European Economic Integration — English | quarterly

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

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

## Statistiken – Daten & Analysen — German | quarterly

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

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

## Statistiken – Daten & Analysen: Sonderhefte
German | irregularly

## Statistiken – Daten & Analysen: Special Issues
English | irregularly

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

## Research Update
English | quarterly

This online newsletter informs international readers about selected research findings and activities of the OeNB's Economic and Analysis and Research Department. It offers information about current publications, research priorities, events, conferences, lectures and workshops. Subscribe to the newsletter at:
*www.oenb.at/en/Publications/Economics/Research-Update.html*

## CESEE Research Update
English | quarterly

This online newsletter informs readers about research priorities, publications as well as past and upcoming events with a regional focus on Central, Eastern and Southeastern Europe. Subscribe to the newsletter at:
*www.oenb.at/en/Publications/Economics/CESEE-Research-Update.html*

## OeNB Workshop Proceedings
German, English | irregularly

This series, launched in 2004, documents contributions to OeNB workshops with Austrian and international experts (policymakers, industry experts, academics and media representatives) on monetary and economic policymaking-related topics.
*www.oenb.at/en/Publications/Economics/CESEE-Research-Update.html*

## Working Papers
English | irregularly

This online series provides a platform for discussing and disseminating economic papers and research findings. All contributions are subject to international peer review.
*www.oenb.at/en/Publications/Economics/Working-Papers.html*

## Proceedings of the Economics Conference
English | annually

The OeNB's annual Economics Conference provides an international platform where central bankers, economic policymakers, financial market agents as well as scholars and academics exchange views and information on monetary, economic and financial policy issues. The proceedings serve to document the conference contributions.
*www.oenb.at/en/Publications/Economics/Economics-Conference.html*

## Proceedings of the Conference on European Economic Integration
English | annually

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

## Publications on Banking Supervisory Issues
German, English | irregularly

Current publications are available for download; paper copies may be ordered free of charge.
*www.oenb.at/en/Publications/Financial-Market/Publications-of-Banking-Supervision.html*

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