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Analyses

Subdued Economic Recovery given Necessary Fiscal Consolidation

Economic Outlook for Austria from 2010 to 2012 (June 2010)

Christian Ragacs,
Klaus Vondra¹

1 Summary

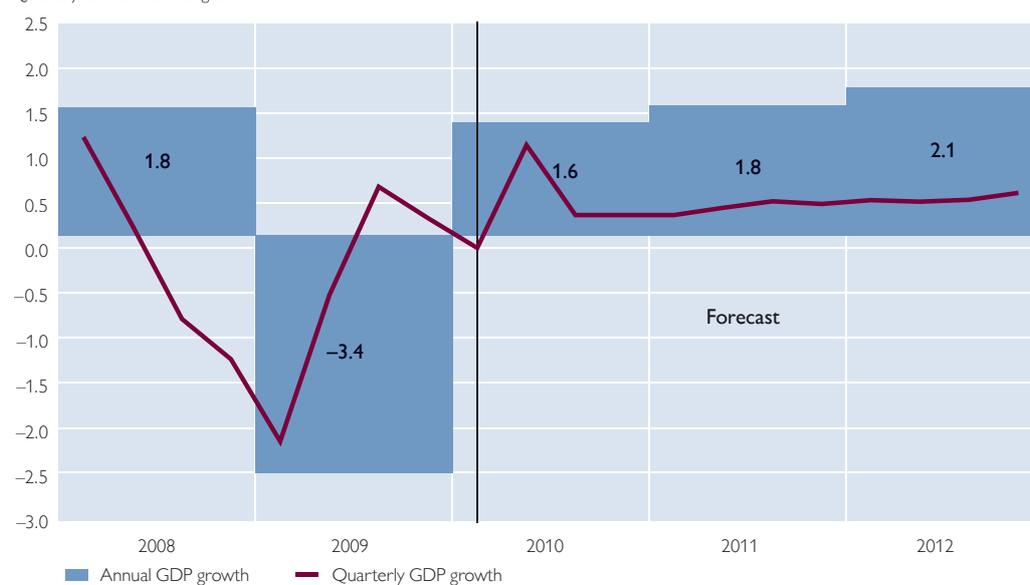
According to the OeNB's June 2010 economic outlook, real economic output is projected to grow by 1.6% in Austria in 2010, after having contracted by 3.4% in 2009. The outlook is even brighter for the years ahead, with a significant acceleration of growth projected for 2011 (1.8%) and especially for 2012 (2.1%). Thus, the economic outlook has improved by 0.4 percentage points for 2010, and by 0.2 percentage points for 2011 over the December 2009 projections, largely thanks to a more rapid recovery of world trade. Real output growth expected for 2012 is in line with Austria's long-term average.

The recovery of the Austrian economy is fueled by the rapid upswing in world trade that has been observed since the summer of 2009. Consequently, the OeNB now expects the annual growth rate of Austrian *exports* to accelerate to 4.6% in 2010, which is still moderate compared with previous recovery episodes. Looking ahead, export growth is, however, projected to reach 5.4% in 2011 and 6.1% in 2012. With regard to business investment, plummeting export demand, tighter financing conditions and the general uncertainty amid the crisis had caused investment in plant and equipment to contract by 8.5%, and gross fixed capital formation as a whole by 7.5% in

Chart 1

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

Quarterly and annual changes in %



Source: Eurostat, OeNB.

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2009. By mid-2010, *gross fixed capital formation* will have moved back into growth territory, yet the annual growth rate for 2010 is expected to remain negative at 4.5%. The growth outlook further ahead, while positive again at 1.5% (2011) and 2.9% (2012), is nonetheless significantly short of historical averages.

Private consumption has had a stabilizing effect on the economy throughout the crisis. Even in 2009, private consumption continued to grow at a moderate rate of 0.8%, reflecting comparatively high wage increases, gains from income tax reform, very low inflation rates and as yet low unemployment rates. Yet some of those effects will cease to operate in 2010; for instance, compensation per employee is going to rise considerably less sharply (1.3%) than in 2009 (2.4%) given lower wage settlements. Conversely, self-employment income and operating surpluses are going to pick up again (1.6%) and, together with net transfers, will stabilize disposable household income. At the same time, rising inflation will, however, cause real disposable household income to stagnate in 2010. With both national accounts data for the first quarter of 2010 and leading indicators signaling ongoing robust growth of consumer demand, private consumption is projected to grow by 1.1% in 2010. In 2011 and 2012, private consumption growth is expected to be dampened given the restrictive public spending policies underlying the projections. The saving ratio is projected to decline to 10.1% in 2010 and to broadly remain at this level in the following two years.

During the crisis, Austria's *unemployment rate* (Eurostat definition) rose from 3.8% in 2008 to 4.8% in 2009. The good news is that, in March 2010, unemployment started to go down again,

and that the number of job vacancies started to increase somewhat. Austria actually had the second-lowest unemployment rate in the euro area in the first quarter of 2010. The number of hours worked also started to go up again in the first quarter. Given the size of the economic contraction, the comparatively small increase in unemployment by both international and historical standards and the comparatively fast return to positive employment growth come as a surprise. Rather than lay off employees, domestic businesses have evidently made an effort to cut working hours and encourage staff to take accrued vacation leave, wherever possible. This approach was supported through labor market measures, such as state-subsidized short-term working schemes. While labor supply is expected to grow slightly over the forecast horizon, the rate of GDP growth will be too weak to facilitate a reduction of the unemployment rate from the demand side. The unemployment rate will therefore continue to increase slightly to 5.0% in 2010 and to inch up to 5.1% in 2011, where it will remain also in 2012.

HICP inflation has lately risen to 1.8% (March and April 2010), reflecting above all energy price increases. Looking ahead, we expect HICP inflation to remain broadly unchanged in the remainder of 2010. Thus, annual HICP inflation for 2010 should come to 1.7%, compared with an exceptionally low rate of 0.4% in 2009. Following unchanged inflation in 2011, a marginal increase to 1.8% is forecast for 2012 given a slight increase in prices for durable consumer goods.

The fallout from the financial crisis for the real economy has been cushioned by internationally coordinated expansionary *fiscal policy* measures. In Austria, discretionary fiscal policy measures

Table 1

OeNB June 2010 Outlook for Austria – Key Results¹

| | 2009 | 2010 | 2011 | 2012 |
|--|-------|------|------|------|
| Economic activity | | | | |
| <i>Annual change in % (real)</i> | | | | |
| Gross domestic product | -3.4 | +1.6 | +1.8 | +2.1 |
| Private consumption | +0.8 | +1.1 | +0.9 | +1.0 |
| Government consumption | +1.0 | +0.7 | +0.6 | +0.6 |
| Gross fixed capital formation | -7.5 | -4.5 | +1.5 | +2.9 |
| Exports of goods and services | -15.0 | +4.6 | +5.4 | +6.1 |
| Imports of goods and services | -13.1 | +1.3 | +4.3 | +5.2 |
| Contribution to real GDP growth | | | | |
| <i>Percentage points of GDP</i> | | | | |
| Private consumption | +0.4 | +0.6 | +0.5 | +0.5 |
| Government consumption | +0.2 | +0.1 | +0.1 | +0.1 |
| Gross fixed capital formation | -1.6 | -0.9 | +0.3 | +0.6 |
| Domestic demand (excluding changes in inventories) | -1.0 | -0.2 | +0.9 | +1.2 |
| Net exports | -2.0 | +1.8 | +0.9 | +0.9 |
| Changes in inventories (including statistical discrepancy) | -0.4 | +0.0 | +0.1 | +0.0 |
| Prices | | | | |
| <i>Annual change in %</i> | | | | |
| Harmonised Index of Consumer Prices (HICP) | +0.4 | +1.7 | +1.7 | +1.8 |
| Private consumption expenditure (PCE) deflator | +1.2 | +1.7 | +1.8 | +1.8 |
| GDP deflator | +1.8 | +1.7 | +1.7 | +1.8 |
| Unit labor costs in the total economy | +4.8 | -0.1 | +0.6 | +0.7 |
| Compensation per employee (at current prices) | +2.4 | +1.3 | +1.9 | +2.1 |
| Productivity (whole economy) | -2.3 | +1.4 | +1.3 | +1.4 |
| Compensation per employee (real) | +1.2 | -0.4 | +0.1 | +0.3 |
| Import prices | -1.9 | +1.0 | +1.7 | +1.9 |
| Export prices | -1.6 | +1.4 | +1.9 | +1.9 |
| Terms of trade | +0.2 | +0.4 | +0.2 | +0.0 |
| Income and savings | | | | |
| Real disposable household income | -1.1 | +0.1 | +0.8 | +1.5 |
| <i>% of nominal disposable household income</i> | | | | |
| Saving ratio | 11.0 | 10.1 | 10.0 | 10.2 |
| Labor market | | | | |
| <i>Annual change in %</i> | | | | |
| Payroll employment | -0.8 | +0.2 | +0.6 | +0.7 |
| <i>% of labor supply</i> | | | | |
| Unemployment rate (Eurostat definition) | 4.8 | 5.0 | 5.1 | 5.1 |
| Budget | | | | |
| <i>% of nominal GDP</i> | | | | |
| Budget balance (Maastricht definition) | -3.4 | -4.5 | -4.2 | -3.9 |
| Government debt | 66.5 | 69.2 | 71.3 | 72.8 |

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

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

(economic stimulus packages, income tax reform, labor market packages, car scrapping scheme and a range of measures adopted by parliament on September 24, 2008) fueled economic activity in 2009 and will continue to boost GDP growth also in 2010. At the same time, the comprehensive stimula-

tion measures and, in particular, the effects of the automatic stabilizers drove up the general government deficit to 3.4% of GDP in 2009. Given weak wage bill growth and the somewhat lagged reaction of tax revenue to the discretionary stabilization measures (parts of the family package, temporary

provisions for accelerated depreciation, etc.) public revenues are expected to stagnate in 2010; as a result, the deficit will climb further to 4.5% of GDP. The deficit will subsequently start to shrink in 2011 (4.2%) and 2012 (3.9%) following the more restrictive spending policies the government is expected to embrace. In this respect, the deficit-reducing impact of GDP growth will be limited. General government debt is projected to jump from 66.5% at the end of 2009 to close to 73% of GDP in 2012. In line with Eurosystem rules, these projections reflect only fiscal policy measures that have already been enacted, or that have been specified in sufficiently great detail and parliamentary adoption of which is only a matter of time.

In addition to the baseline projections, the OeNB has also estimated an economic outlook scenario which is based on the assumption of compliance with the fiscal consolidation path laid down in Austria's stability program. In line with this scenario, the Maastricht deficit would be smaller than implied by the baseline projections; specifically, it would be 4.0% of GDP rather than 4.2% in 2011, and it would be 3.3% of GDP rather than 3.9% in 2012. At the same time, this scenario yields somewhat lower figures for GDP growth than the baseline scenario, namely 1.7% in the next two years instead of 1.8% (2011) and 2.1% (2012). Additional minor negative effects on economic growth might result from parallel fiscal consolidation in other EU Member States.

The negative growth effects of compliance with stability program commitments beyond the baseline scenario may be overstated insofar as, against the backdrop of high market uncertainty about the sustainability of public debt

levels in the euro area, noncompliance with the stability programs may cause risk premia on European government bonds to rise again to such levels that would cause the growth rates underlying the baseline scenario to become unrealistic.

2 Technical Assumptions

This forecast for Austria is the OeNB's contribution to the Eurosystem's June 2010 staff projections. The forecast horizon ranges from the first quarter of 2010 to the fourth quarter of 2012. May 25, 2010, was the cutoff date for the technical assumptions. The projections were prepared with the OeNB's macroeconomic quarterly model and are essentially based on seasonally and working day-adjusted national accounts data calculated by the Austrian Institute of Economic Research (WIFO). These data were fully available up to the fourth quarter of 2009. With regard to the first quarter of 2010, the projections are based on GDP flash estimates, which cover only part of the national accounts aggregates, though. The underlying short-term interest rate is based on market expectations for the three-month EURIBOR and is assumed to equal 0.8% in 2010, 1.1% in 2011 and 1.7% in 2012. Long-term interest rates, which reflect market expectations for ten-year government bonds, are assumed to equal 3.4% in 2010, 3.8% in 2011 and 4.2% in 2012. The euro's exchange rate against the U.S. dollar is assumed to remain at USD/EUR 1.26. The projected trend in crude oil prices is based on futures prices. Specifically, we assume oil prices to average USD 79.5 per barrel (Brent) in 2010, USD 83.7 in 2011 and USD 86.3 in 2012. The prices of commodities excluding energy are also based on futures prices over the forecast horizon.

3 World Economy Back on Growth Path, Euro Area Lagging Behind

The world economy is recovering at a swifter pace than the OeNB had assumed in its December 2009 projections. The comprehensive support measures for the financial sector have stabilized confidence in financial markets. Furthermore, the very low level of interest rates by historical standards and the host of economic stimulus packages launched world-wide have been supporting economic activity. Even so, the projected GDP growth rates will be too low in many countries to bring down unemployment rates from the prevailing record highs. Moreover, the active and passive stabilization (automatic stabilizers) of the real economy comes at the price of rapidly deteriorating

budget deficits and ballooning public debt levels, which creates the need to undertake comprehensive fiscal consolidation at the latest once the economic crisis is over. Sharply rising debt levels and the ensuing problems of individual euro area Member States to fund themselves in financial markets have shifted the economic policy focus to the need to consolidate public households. The United Kingdom and the United States likewise face the need to phase out public economic stimulus programs and embrace consolidation measures.

China has been at the vanguard of global recovery. While its current account surplus shrunk from close to 10% of GDP in 2008 to about 6% in the crisis year 2009, the evidence for the years ahead points to a prolongation of the macroeconomic imbalances until

Table 2

Underlying Global Economic Conditions

| | 2009 | 2010 | 2011 | 2012 |
|--|--------|--------------|--------------|--------|
| <i>Annual change in % (real)</i> | | | | |
| Gross domestic product | | | | |
| World GDP growth outside the euro area | -0.4 | +4.7 | +4.1 | +4.6 |
| U.S.A. | -2.4 | +3.1 | +2.2 | +2.8 |
| Japan | -5.2 | +2.1 | +1.7 | +2.0 |
| Asia excluding Japan | +5.2 | +8.3 | +7.0 | +7.6 |
| Latin America | -1.9 | +4.0 | +3.2 | +4.0 |
| United Kingdom | -4.9 | +1.2 | +2.4 | +2.4 |
| New EU Member States ¹ | -3.0 | +1.4 | +3.0 | +3.9 |
| Switzerland | -1.5 | +1.4 | +1.9 | +2.2 |
| Euro area ² | -4.1 | +0.7 to +1.3 | +0.2 to +2.2 | x |
| World trade (imports of goods and services) | | | | |
| World economy | -11.1 | +9.1 | +5.9 | +7.0 |
| Non-euro area countries | -11.0 | +11.3 | +6.9 | +7.9 |
| Real growth of euro area export markets | -11.7 | +8.6 | +6.0 | +7.0 |
| Real growth of Austrian export markets | -11.7 | +7.4 | +4.7 | +6.0 |
| Prices | | | | |
| Oil price in USD/barrel (Brent) | 61.9 | 79.5 | 83.7 | 86.3 |
| Three-month interest rate in % | 1.2 | 0.8 | 1.1 | 1.7 |
| Long-term interest rate in % | 3.9 | 3.4 | 3.8 | 4.2 |
| USD/EUR exchange rate | 1.39 | 1.29 | 1.26 | 1.26 |
| Nominal effective exchange rate (euro area index) | 111.70 | 104.48 | 102.66 | 102.66 |

Source: Eurosystem.

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

² 2010 to 2011: Results of the Eurosystem's December 2010 projections. The ECB presents the result in ranges based upon average differences between actual outcomes and previous projections.

the end of the forecast horizon. *Japan* suffered the single biggest setback from the contraction in world trade, seeing its GDP performance fall back to 2003 levels in 2009. Yet, driven by rising exports particularly into other Asian countries and rebounding domestic demand, the Japanese economy reverted to a growth path in the fourth quarter of 2009.

The *U.S. economy* has recovered a lot faster than anticipated in the December 2009 outlook. Even so, the stabilization of the economy has been brought about almost exclusively by economic policy measures, which are gradually being phased out. Unemployment has risen to European averages and has been depressing private consumption. Compared with previous crisis episodes, we thus continue to expect a relatively slow recovery of economic activity in the United States.

The *United Kingdom* had been in recession already in mid-2008, which further deepened in 2009. Unlike many euro area countries, the United Kingdom saw economic activity decline mainly as a result of contracting domestic demand. In 2010, the United Kingdom should, however, return to a positive growth path thanks to rising exports fueled by a depreciation of the British pound as well as by economic policy measures. The general government deficit jumped to more than 12% of GDP in 2009. Therefore, the government has adopted a consolidation package for 2010, which should bring the deficit for 2010 down to below 9.5%. The *Swiss* economy, while unable to insulate itself from the global eco-

nomical meltdown, did not contract as sharply as other economies in 2009 (1.5%). In 2010 and 2011, the Swiss economy is expected to revive, but the revival will go hand in hand with a rise in unemployment that will be surprisingly sharp by Swiss standards.

The *euro area* economy had bottomed out in the second quarter of 2009, only to stagnate again in the fourth quarter following comparatively robust (quarter-on-quarter) growth from July to September 2009. The first quarter of 2010 brought very subdued growth. The unemployment rate came to 10% in March 2010. The average euro area public deficit corresponded to 6.3% of GDP in 2009 (2008: 2.0%), and the public debt ratio (Maastricht definition) climbed to 74.3% of GDP (2008: 62.3%). The crisis has unveiled the broad-based macroeconomic imbalances which continue to prevail within the euro area in terms of GDP growth, unemployment, productivity as well as deficit and debt ratios of public households.

The debt crisis of Greece illustrates not only the problems that arise from a lack of fiscal credibility but also the problems of living with sustained macroeconomic imbalances within a monetary union. Triggered by the (re)financing problems Greece² faced in capital markets, the need arose to adopt a European financial stabilization mechanism on May 9, 2010 (based on Article 122(2) of the Treaty of Lisbon).³ In particular, agreement was reached, first, to expand the EU's existing medium-term financial assistance facility, designed to alleviate balances of pay-

² On May 2, 2010, euro area members and the IMF agreed on a three-year financial support program for Greece with a total of EUR 110 billion.

³ In addition to existing EU facilities for non-euro area EU countries as well as unconventional measures, such as ECB liquidity assistance. The EU also provides macrofinancial assistance (MFA) to non-EU countries (such as Georgia or Ukraine), which is, typically, conditional and complements assistance by the IMF.

ments problems,⁴ by creating an additional euro-area fund worth up to EUR 60 billion (to be borrowed by the European Commission in the capital market) and, second, to set up a special purpose vehicle (named the European Financial Stability Facility) to raise up to EUR 440 billion in support of euro area Member States (which will at the same time provide the necessary guarantees) over three years. In total, the stabilization package for the euro area is worth EUR 750 billion (of which EUR 250 billion would be contributed by the IMF).

Germany was hit worse than other EU countries by the crisis, given its high dependency on exports and its comparatively strong specialization on capital goods. Following the setback in exports, German businesses have considerably scaled back investment. Even so, the performance of the German labor market has been comparatively good. As in Austria, production disruptions were offset with a subsidized reduction of working hours. While having virtually stagnated in the first quarter of 2010 (0.2% quarter-on-quarter growth), growth should be fairly robust in the second quarter. Growth is being driven not only by exports, but also by domestic demand.

The *French* economy suffered a smaller setback than the euro area Member States on average, given the traditionally high relevance of domestic demand and the lower importance of the export-oriented capital goods industry. At the same time, public finances have deteriorated sharply in France due to the impact of the automatic stabilizers and a spending package, adopted in 2009, which became effective in 2010. Since France will have to consolidate its

budget in the coming years, the French economy may be in for a rather protracted recovery.

The *Italian* economy went through a recession from the fourth quarter of 2007 until the fourth quarter of 2009. The economic crisis compounded pre-crisis losses in export competitiveness. The decline in private consumption was comparatively limited, and consumption expenditure should remain the key driver of growth also in 2010. Italy's budget deficit climbed to 5.3% of GDP in 2009. In the most recent update of its stability program, the Italian government therefore announced that it would cut public spending by EUR 24 billion by 2012.

The countries in *Central, Eastern and Southeastern Europe (CESEE)*, which are of prime importance for Austria, were hit by the crisis through a number of channels – first by the collapse of export demand; second by the sharp drop in direct investment; third by temporary reversals of capital inflows and the ensuing sharp depreciation of some currencies as well as the substantial repercussions that currency depreciation had especially for individual and corporate debtors given their high exposure to foreign currency loans; and fourth by the substantial problems of some countries to refinance themselves in international capital markets. This created the need in several countries to seek international help from the IMF or combined EU/IMF assistance. The economic performance of the CESEE area has been very heterogeneous. While the Baltic states as well as Hungary, Romania and, above all, Ukraine suffered huge setbacks, Poland stands out as the only country in the EU to have recorded positive growth in 2009.

⁴ A facility is an arrangement that allows stakeholders to borrow money (or to deposit balances) subject to the agreed conditions for a short period of time.

Overall, the countries that joined the EU in 2004 or 2007 are expected to see their economies recovery comparatively fast.

4 Austria: Recovery Is Driven Above All by Exports

The global economic crisis hit the Austrian *export industry* as early as in the second quarter of 2008, when quarter-on-quarter growth started to contract. Domestic exporters, especially those in the manufacturing industry, experienced the biggest slump in export demand in the fourth quarter of 2008 and especially in the first quarter of 2009. In 2009 as a whole exports contracted by 15.0%. In line with the recovery of the world economy, Austrian export activity regained momentum in the second half of 2009, returning to positive growth on a quarterly basis.

While GDP flash estimates show another decline in Austrian exports for the first quarter of 2010, the latest leading indicators, however, (including the OeNB's export indicator⁵) would imply either a slight upward revision of export growth in the first quarter or a comparatively robust export activity in the second quarter of 2010.

Among other things, the sharp setback in exports reflects the consequences of the global crisis on the development of demand in Austrian export markets, which slumped by 11.7% in 2009 after having weakened already in 2008. The situation of domestic exporters was exacerbated by the deterioration of price competitiveness, which is attributable both to the appreciation of the euro and to a significant rise in unit labor costs in 2009. The loss in price competitiveness

Table 3

Growth and Price Developments in Austria's Foreign Trade

| | 2009 | 2010 | 2011 | 2012 |
|--|--------------------------------------|------|------|------|
| | <i>Annual change in %</i> | | | |
| Exports | | | | |
| Competitor prices in Austria's export markets | -3.6 | +3.9 | +2.0 | +1.4 |
| Export deflator | -1.6 | +1.4 | +1.9 | +1.9 |
| Changes in price competitiveness | -2.0 | +2.5 | +0.2 | -0.5 |
| Import demand in Austria's export markets (real) | -11.7 | +7.4 | +4.7 | +6.0 |
| Austrian exports of goods and services (real) | -15.0 | +4.6 | +5.4 | +6.1 |
| Market share | -3.3 | -2.8 | +0.7 | +0.1 |
| Imports | | | | |
| International competitor prices in the Austrian market | -3.4 | +3.1 | +1.8 | +1.3 |
| Import deflator | -1.9 | +1.0 | +1.7 | +1.9 |
| Austrian imports of goods and services (real) | -13.1 | +1.3 | +4.3 | +5.2 |
| Terms of trade | +0.2 | +0.4 | +0.2 | +0.0 |
| | <i>Percentage points of real GDP</i> | | | |
| Contribution of net exports to GDP growth | -2.0 | +1.8 | +0.9 | +0.9 |

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

⁵ The results of the OeNB's export indicator of May 2010 point to a rise of nominal goods exports of 6.5% in March and of 3.2% in April 2010 (seasonally and working day-adjusted, quarter on quarter). Estimates of goods exports produced with the export indicator are based on truck mileage data compiled by the Austrian highway authority and road toll operator, ASFINAG. Indicator results and (German) information on the underlying methodology can be downloaded from the OeNB's website (www.oenb.at/de/geldp_volksw/prognosen/export-indikator/oenb-exportindikator.jsp).

Table 4

Austria's Current Account

| | 2009 | 2010 | 2011 | 2012 |
|-------------------------------------|------------------|------|------|------|
| | % of nominal GDP | | | |
| Balance of trade | 3.4 | 4.1 | 4.2 | 4.4 |
| Balance on goods | -0.8 | -0.4 | -0.4 | -0.3 |
| Balance on services | 4.2 | 4.5 | 4.6 | 4.8 |
| Euro area | 0.0 | 0.1 | 0.3 | 0.5 |
| Non-euro area countries | 3.4 | 4.0 | 3.9 | 3.9 |
| Balance on income | -0.5 | -0.4 | -0.4 | -0.5 |
| Balance on current transfers | -0.6 | -0.6 | -0.5 | -0.6 |
| Current account | 2.3 | 3.1 | 3.3 | 3.4 |

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

has caused domestic exporters to lose market shares. For 2010 we expect demand to rebound strongly in Austrian export markets and price competitiveness to improve, not least on account of stagnating unit labor costs (-0.1%). Both factors will contribute to the recovery of exports.

Annual export growth is projected to be weak compared with previous recovery episodes, but positive in 2010 at 4.6%. Thereafter, export growth should accelerate to 5.4% in 2011 and to 6.1% in 2012. In other words, the recovery of the Austrian economy is essentially being driven by external factors.

The Austrian *current account* continued to be in surplus in 2009 (2.3% of nominal GDP), but the surplus has been declining since 2008, after having increased persistently for a number of years up to 2007. Whereas goods exports declined significantly, the contraction in goods imports was cushioned by sustained stable consumption expenditure. Services exports held up much better during the crisis than goods exports, and above all the tourist industry has

been instrumental in stabilizing the economy. Overnight stays in Austria, while declining by 1.9% in 2009, did not contract as much as overall economic activity, and the decline in overnight stays by foreigners (-3.2%) was mitigated to some extent by an offsetting rise in overnight stays by residents (1.7%). Moreover, the base year 2008 had been one of the most successful years in the history of tourism in Austria. In the last winter season 2009/2010 (November to April) overnight stays edged down by another 0.4% compared with the corresponding season of the previous period.⁶

Until the end of the forecast horizon, the goods balance is expected to improve gradually and to become broadly balanced again. In particular, the improvement in the goods balance vis-à-vis the euro area will reflect the expected accelerated recovery of Austria's major trading partners. On balance, the economic recovery will cause the current account surplus to keep growing moderately, namely to 3.1% in 2010, to 3.3% in 2011 and to 3.4% in 2012.

⁶ Even so, the Austrian tourist industry achieved the third-best result on record in 2009.

5 Domestic Demand Is Recovering Slowly

5.1 Investment in Plant and Equipment Continues to Decline in 2010

In the secondary sector (NACE sections C to F) real output contracted by 14.0% in 2009 in seasonally adjusted terms. In other words, *manufacturing*, more than any other branch of the industry, suffered by far the most from the crisis when export demand slumped. The crisis of the secondary sector was, moreover, exacerbated by tightened financing conditions and by the general

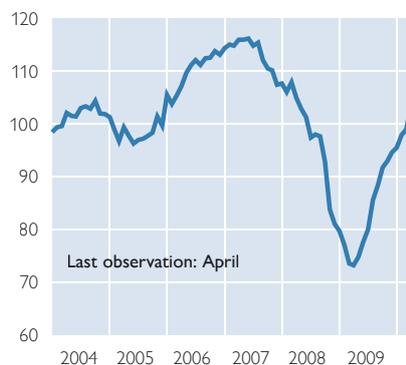
climate of uncertainty under which businesses had to plan for the future. Output growth did not start to recover somewhat until the second half of 2009. A combination of the above factors drove down investment in plant and equipment by as much as 8.5% and gross fixed capital formation as a whole by 7.5% in 2009.

The successive lowering of ECB key interest rates since the fall of 2008 has gradually eased financing conditions. Interest rate pass-through to businesses, while occurring with a short lag, was virtually complete. Moreover,

Chart 2

Soft Indicators for the Austrian Economy

Economic Sentiment Indicator (ESI)



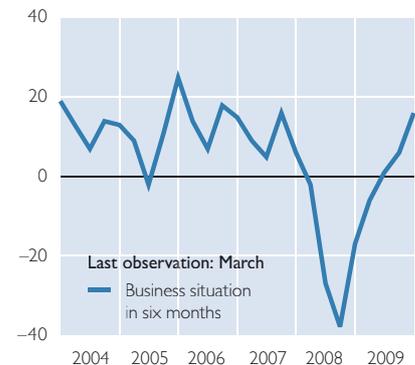
Source: European Commission.

Bank Austria PMI



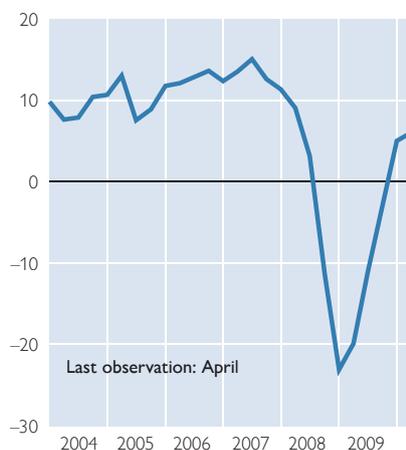
Source: Bank Austria.

FAI Economic Indicator



Source: Federation of Austrian Industry (FAI).

ESI: Export Expectations



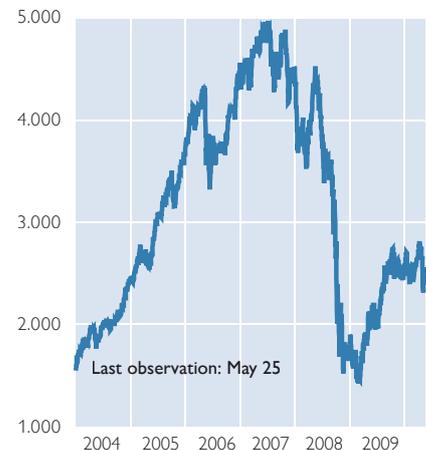
Source: European Commission.

Bank Austria PMI: New Orders



Source: Bank Austria.

ATX



Source: Wiener Börse AG.

Table 5

Investment Activity in Austria

| | 2009 | 2010 | 2011 | 2012 |
|--|------|------|------|------|
| <i>Annual change in %</i> | | | | |
| Total gross fixed capital formation (real) | -7.5 | -4.5 | +1.5 | +2.9 |
| of which: Investment in plant and equipment (real) | -8.5 | -6.1 | +2.0 | +3.2 |
| Residential construction investment (real) | -6.2 | -3.9 | +0.1 | +1.8 |
| Nonresidential construction investment and other investment | -1.8 | -3.4 | +1.7 | +3.1 |
| Government investment (real) | -1.5 | +0.5 | -1.5 | -1.5 |
| Private investment (real) | -7.8 | -4.8 | +1.7 | +3.2 |
| <i>Contribution to total gross fixed capital formation growth in percentage points</i> | | | | |
| Investment in plant and equipment (real) | -3.3 | -2.3 | +0.7 | +1.2 |
| Residential construction investment (real) | -1.3 | -0.8 | +0.0 | +0.4 |
| Nonresidential construction investment and other investment | -0.7 | -1.5 | +0.7 | +1.4 |
| Government investment (real) | -0.1 | +0.0 | -0.1 | -0.1 |
| Private investment (real) | -7.4 | -4.6 | +1.6 | +3.0 |
| <i>Contribution to real GDP growth in percentage points</i> | | | | |
| Inventory changes (real) | -0.6 | +0.0 | -0.1 | +0.1 |

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

orders have picked up lately, and typical leading indicators (see chart 2) have recently edged higher. Capacity utilization, which had dropped significantly during the crisis, rebounded in early 2010 and is again close to long-time averages. This notwithstanding, existing excess capacities continue to hamper investment activity. Hence, *gross fixed capital formation* will continue to contract in the first half of 2010. This trend will not reverse until the second half of the year, so that annual growth is expected to remain negative in 2010 as a whole (-4.5%). The outlook for the next two years is positive, yet at 1.5% (2011) and 2.9% (2012) growth of business investment is expected to fall significantly short of historical averages. Over the entire forecast horizon, the *investment-to-GDP ratio* should come to approximately 19½% (2008: 21.7%).

The more immediate future is likely to see above all replacement investment rather than the development of new

production capacities. Thus *investment in plant and equipment*, which will continue to contract in 2010 (-6.1%), is projected to grow rather slowly in 2011 (2.0%) and 2012 (3.2%). The contraction in *housing investment* has been relatively moderate so far. Yet a drop in planning permissions granted implies that the revival will remain very subdued in this area, too, in 2011 (0.1%) and 2012 (1.8%), following an anticipated contraction by 3.9% in 2010. *Civil engineering*, while benefiting from the government's economic support measures, will account for the second-largest slump among all investment categories in 2010 and is expected to revive but slowly in 2011 and 2012. *Public investment*, finally, will grow at a rate of 0.5% in 2010 and thus continue to fuel economic activity this year; yet thereafter the government's restrictive spending policies underlying the projections for 2011 and 2012 will cause public investment growth to contract by 1.5%.

5.2 Consumption as a Stabilizing Factor

Private consumption has been the single most important factor in stabilizing the economy throughout the crisis. Consumer spending continued to grow by as much as 0.8% in 2009, benefiting from the wage settlements negotiated in 2008, measures implemented by the government to raise disposable income, the low inflation rate and the as yet low level of unemployment.

In 2010, however, the rise of inflation to 1.7% is going to dampen the expansion of real disposable income. Moreover, the benign impact of the income tax reform is tapering off. Given the significant drop in wage settlements in 2009, the rise in compensation per employee is going to be markedly lower in 2010 (1.3%) than in 2009 (2.4%). At the same time, the gradual economic revival is going to fuel growth of operating surpluses and self-employment income (1.6%) and is

expected to stabilize household income in combination with net public transfers. In addition, employment should grow at least marginally (0.2%).

Given that the national accounts data for the first quarter of 2010, the latest data of Statistics Austria on retail trade excluding car sales⁷ (real growth of 3.0%) and leading indicators continue to signal robust consumption, we project consumption to continue to grow at a fairly robust rate in 2010 (1.1%). In 2011 and 2012 compensation per employee is expected to be somewhat higher again, reflecting comparatively higher wage settlements (1.9% and 2.0%, respectively) and a 0.6% increase in overall employment in both years. At the same time, self-employment income, operating surpluses and property income are going to grow at a comparatively robust pace. With government needing to retrench, net transfers are going to dampen the development of household income. Real

Table 6

Determinants of Nominal Household Income in Austria

| | 2009 | 2010 | 2011 | 2012 |
|--|-------|-------|------|------|
| <i>Annual change in %</i> | | | | |
| Employees | -0.8 | +0.2 | +0.6 | +0.7 |
| Wages per employee | +2.4 | +1.3 | +1.9 | +2.1 |
| Compensation of employees | +1.5 | +1.4 | +2.5 | +2.8 |
| Property income | -30.0 | -11.3 | +5.4 | +8.0 |
| Mixed income and operating surplus, net | -1.7 | +1.6 | +2.9 | +4.6 |
| <i>Contribution to disposable household income growth in percentage points</i> | | | | |
| Compensation of employees | +1.3 | +1.2 | +2.1 | +2.3 |
| Property income | -4.2 | -1.1 | +0.5 | +0.7 |
| Mixed income and operating surplus, net | -0.3 | +0.3 | +0.6 | +0.9 |
| Net transfers minus direct taxes ¹ | +3.4 | +1.4 | -0.5 | -0.6 |
| Disposable household income (nominal) | +0.1 | +1.8 | +2.6 | +3.3 |

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

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

⁷ New car sales registrations increased by 18.3% in the first quarter of 2010 but dropped by 11.4% in April 2010 (based on annual growth rates). This unusually high volatility can be attributed to the launch of a car scrapping incentive in April 2009, which prompted interested buyers to postpone their purchases. In April 2009 new car registrations had increased by 12.8%.

Table 7

Private Consumption in Austria

| | 2009 | 2010 | 2011 | 2012 |
|---|------|------|------|------|
| <i>Annual change in %</i> | | | | |
| Disposable household income (nominal) | +0.1 | +1.8 | +2.6 | +3.3 |
| Private consumption expenditure (PCE) deflator | +1.2 | +1.7 | +1.8 | +1.8 |
| Disposable household income (real) | -1.1 | +0.1 | +0.8 | +1.5 |
| Private consumption (real) | +0.8 | +1.1 | +0.9 | +1.0 |
| <i>% of nominal disposable household income</i> | | | | |
| Saving ratio | 11.0 | 10.1 | 10.0 | 10.2 |

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

disposable household income will, however, continue to grow despite the anticipated restrictive fiscal stance, namely by 0.8% in 2011 and by 1.5% in 2012. The saving ratio is going to drop to 10.1% in 2010 – following a drop to 11.0% in 2009⁸ – but remain broadly unchanged thereafter.

5.3 Outlook for the Labor Market Remains Weak

During the crisis Austria's *unemployment rate* (Eurostat definition) rose from 3.8% in 2008 to 4.8% in 2009, and yet Austria has been among the euro area countries with the lowest increase in

unemployment during the crisis so far. In the first quarter of 2010, Austria had the second-lowest unemployment rate in the euro area. At the same time, the number of unemployed started to go down in March 2010 (249,679 jobless persons), and the number of vacancies started to increase again somewhat. The number of hours worked also started to pick up somewhat in the first quarter of 2010.

Given the size of the economic contraction, the comparatively small increase in unemployment by international and historical standards alike, and the relatively fast return to positive

Table 8

Labor Market Developments in Austria

| | 2009 | 2010 | 2011 | 2012 |
|--|-------|------|------|------|
| <i>Annual change in %</i> | | | | |
| Total employment | -1.1 | +0.2 | +0.6 | +0.6 |
| of which: Payroll employment | -0.8 | +0.2 | +0.6 | +0.7 |
| Self-employment | -1.2 | +0.1 | +0.2 | +0.4 |
| Public sector employment | +0.2 | +0.0 | -0.1 | -0.1 |
| Registered unemployment | +20.8 | +3.6 | +3.1 | +1.4 |
| Labor supply | +0.1 | +0.4 | +0.7 | +0.7 |
| <i>% of labor supply</i> | | | | |
| Unemployment rate (Eurostat definition) | 4.8 | 5.0 | 5.1 | 5.1 |

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

⁸ The saving ratio had peaked in 2008 at a rate of 12%, surpassing the previous record high of 1996. The rates projected for the forecast horizon, while reflecting an ongoing decline, continue to exceed the pre-crisis levels around the turn of the millennium (1999: 9.7%).

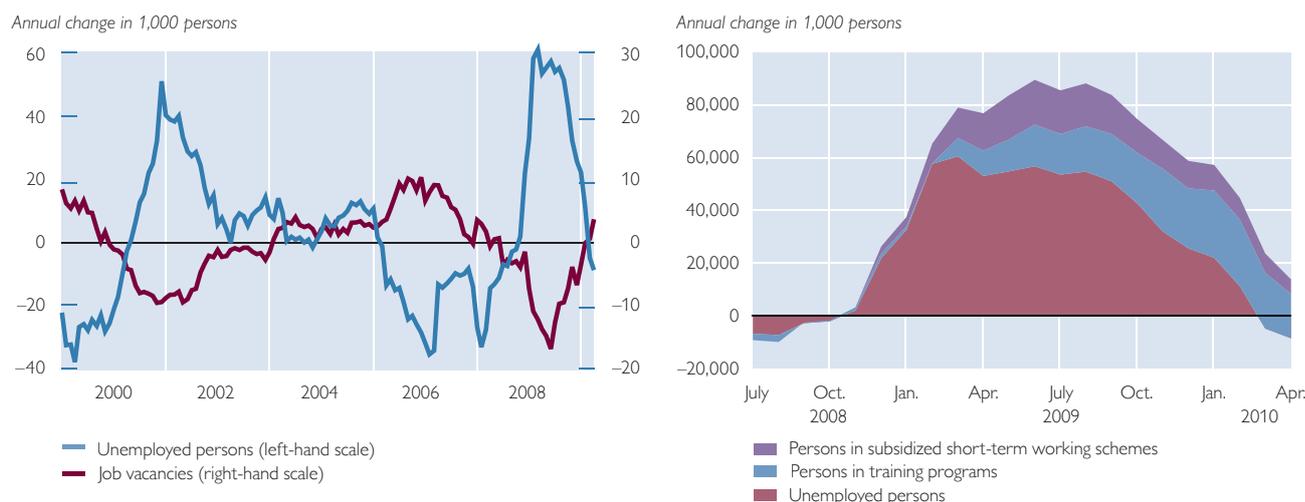
employment growth come as a surprise. Compared with the crisis of 2001, the number of unemployed rose more sharply, but it has also gone down more sharply (see chart 3, left-hand panel),⁹ and broadly the same holds true for the development of vacant positions. At the same time, the number of participants in training programs has risen to record highs and firms have made heavy use of state-subsidized short-term working schemes, as is evident from chart 3 (right-hand panel). While the number of persons in training programs rose rapidly at the outset of the crisis and continued to edge up thereafter, the number of persons registered for subsidized short-term working rose markedly in early 2009 but has been on a clear downtrend since the summer of 2009.

The number of employees signed up for subsidized short-term working

schemes need not be tantamount to the number of employees actually working short term. Registration for short-term working was just a precautionary measure in many cases. In 2009, about 60% of workers signed up for subsidized short-term working schemes actually worked short term in the end (Federal Ministry of Labor, Social Affairs and Consumer Protection). In this context, working hours were on average cut by 26% according to ministry statistics. In other words, the stabilizing effect of subsidized short-term working schemes on labor market conditions provides only part of the explanation for the comparatively moderate rise in unemployment.¹⁰ Companies evidently made an effort not to lay off employees if possible and reduced the number of hours worked above all by encouraging staff to reduce overtime and use vacation leave credits as well as by using averaging

Chart 3

Developments in the Austrian Labor Market



Source: Austrian Public Employment Service, Eurostat, Statistics Austria.

⁹ In the crisis of 2001, GDP growth bottomed out at 0.8%; in the current crisis it dropped to -3.4%.

¹⁰ However, the national accounts data for 2009 reflect just a 1.2% drop in the number of hours worked even though new micro census data show a decline by 4.1% for 2009. The national accounts data are probably going to be revised accordingly. In other words, the comparatively small increase in unemployment is attributable to a disproportionately large drop in hours worked.

arrangements. In this context companies benefited from labor market policy measures, such as the gradual extension of subsidized short-time working.

The growth of labor supply decelerated visibly in 2009, thus being highly procyclical, as in the past. Over the forecast horizon, labor supply will edge up again in line with the economic recovery. In addition, the influx of workers from abroad will rebound more strongly in mid-2011 once all workers resident in the countries that joined the EU in 2004 gain full access to the labor market. In 2010 and 2011 demographic developments and the early retirement scheme for workers with long employment histories, which is effective until 2013, are going to dampen labor supply growth somewhat. On balance, labor supply will, how-

ever, rise over the forecast horizon, albeit not as fast as before the crisis.

Economic growth will be too low throughout the entire forecast horizon to facilitate a reduction of the *unemployment rate* from the demand side. The weak growth in employment and in labor supply indicates that labor market conditions will remain weak over the entire forecast horizon. The unemployment rate is therefore projected to rise to 5.0% in 2010 and to 5.1% in 2011, and to remain unchanged in 2012. Based on the national accounts definition, around 286,000 workers will be unemployed in 2010, and close to 300,000 persons in both 2011 and 2012. The wage share is expected to drop to pre-crisis levels over the forecast horizon, after having risen disproportionately strongly in 2009.

Box 1

Growth Scenario Assuming Compliance with the Austrian Stability Program

In line with the conventions for Eurosystem projections, the baseline scenario underlying the projections reflects only fiscal policy measures that have already been enacted, or that have been specified in sufficiently great detail and parliamentary adoption of which is only a matter of time (the economic outlook of the European Commission is based on a similar no-policy-change assumption). The Austrian government has yet to specify most of the fiscal consolidation measures it needs to undertake in order to comply with the objectives of the stability program. The purpose of this box is to analyze the growth effects that should materialize if the Austrian government indeed follows the fiscal consolidation path to which it committed itself in the stability program.

The free operation of automatic stabilizers following economic contraction and the implementation of comprehensive discretionary fiscal stimulus measures have caused public finances to deteriorate dramatically since 2008 in Austria. The poor state of public finances requires comprehensive fiscal consolidation measures, not least because demographic aging is going to increase the burden on public finances even further.

It can be assumed that the Austrian economy will not be able to ever recoup a substantial part of the output losses incurred in 2009 (Gaggl and Janger, 2009). Yet the permanent loss in output implies a permanent loss in tax revenues (Grossmann et al., 2009), which must be offset either by cutting spending and/or by raising taxes. Furthermore, the better part of the fiscal stimulus measures adopted in 2008 and 2009 was of a permanent nature, which means that these measures will have to be financed ex post and thus add to the need for fiscal consolidation.

In line with the requirements of the excessive deficit procedure, the Austrian government announced measures to reduce its general government deficit ratio to below 3% of GDP by 2013 in the latest update of the stability program (budget balance for 2010: -4.7%, 2011: -4.0%, 2012: -3.3%). However, the government did not specify the fiscal adjustment measures with which it means to implement the announced fiscal path.

Given the no-policy-change assumption, the forecast at hand reflects neither additional spending cuts nor tax increases nor the introduction of new taxes. The only fiscal consolidation measures that we included, based on the new fiscal framework for the period from 2011 to 2014, are an exceptionally low growth of public sector wages and intermediate consumption as well as a slight decline in public sector employment, because those measures do not require any additional acts of legislation (unlike potential cuts of social transfers, such as family allowances).¹

Hence, the OeNB's projections of the general government deficit for 2011 and 2012 are more pessimistic than the fiscal objectives indicated in the stability program. In order to quantify the growth effects of the fiscal adjustment required to achieve the objectives targeted in the stability program, the OeNB calculated a separate scenario² based on the assumption that the government undertakes additional fiscal consolidation measures (line D in table below) beyond the measures (line B) included already in the baseline scenario (line C), with the help of which it is possible to reach the deficit objectives of the stability program (line E). This scenario is based on the assumption that the additional consolidation measures consist of the following mix: 50% higher indirect taxes, 20% higher direct taxes (payable by households), 20% lower transfers, 10% lower real public consumption. As line D shows, the OeNB expects the additional fiscal adjustment measures that would be necessary to reach the stability program targets to reduce economic growth by 0.2 percentage points in 2011 and by 0.4 percentage points in 2012.

Estimated Effects of Fiscal Consolidation

| | | Maastricht balance | | | GDP growth | | |
|----------------------|--|--------------------|-------------|-------------|---|-------------|-------------|
| | | 2010 | 2011 | 2012 | 2010 | 2011 | 2012 |
| | | % of nominal GDP | | | Annual change in % (percentage points) | | |
| A | Results in the absence of fiscal consolidation | x | -4.4 | -4.2 | x | +2.0 | +2.3 |
| B | Effects of fiscal consolidation in baseline projections | x | +0.2 | +0.3 | x | -0.2 | -0.2 |
| C = A + B | OeNB baseline projections | -4.5 | -4.2 | -3.9 | +1.6 | +1.8 | +2.1 |
| D | Effects of additional fiscal consolidation compatible with Austria's stability program | x | +0.2 | +0.6 | x | -0.2 | -0.4 |
| E = A + B + D | Scenario based on a deficit path compatible with the stability program | x | -4.0 | -3.3 | x | +1.7 | +1.7 |

Source: OeNB.

Additional minor negative growth effects might result from parallel fiscal consolidation in other EU Member States.

The negative growth effects of compliance with stability program commitments beyond the baseline scenario may be overstated insofar as, against the backdrop of high market uncertainty about the sustainability of public debt levels in the euro area, noncompliance with the stability programs may cause risk premia on European government bonds to rise again to such levels that would cause the growth rates underlying the baseline scenario to become unrealistic.

¹ Other spending cuts have been included in the OeNB's forecast, but they are not considered to be fiscal consolidation measures per se, as they are primarily the result of more favorable macroeconomic conditions. This is the case in particular for lower interest rate payments.

² The table shows the ex post effects of measures on the general government's fiscal balance. Through the operation of the automatic stabilizers, the negative growth effects of the fiscal consolidation measures reduce tax revenues and, thus, also the impact of measures on the fiscal balance. In the case of cuts in wages for civil servants and in pensions, it is important to remember that they are subject to social security contributions and wage taxes, which means that a given spending cut would not cause the fiscal balance to improve by the corresponding amount, even in the absence of real economy effects.

6 Inflation Is Rising, but Will Remain in Line with the Definition of Price Stability

Inflation as measured by the HICP climbed to 1.8% in March and April 2010, i.e. to significantly higher levels than in the previous months, on account of substantial energy price hikes. HICP inflation is expected to remain broadly unchanged until the end of 2010. Thus,

the annual inflation rate for 2010 should come to 1.7%, following an exceptionally low rate of 0.4% in 2009. Following unchanged inflation in 2011, a marginal increase to 1.8% is forecast for 2012 given a slight increase in prices for durable consumer goods.

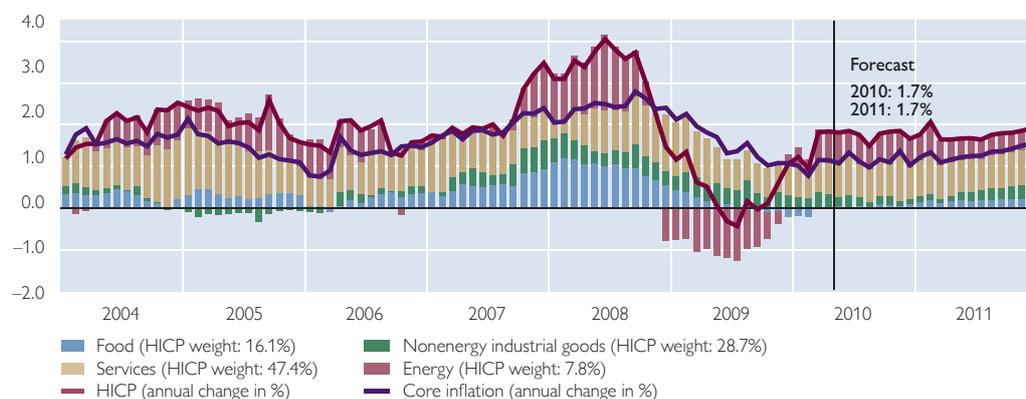
As the decline in employment has been very moderate in relation to the extent of the economic setback, *unit*

Chart 4

HICP Inflation and Contributions from Subcomponents

Contribution to growth in percentage points

Last observation: April 2010



Source: OeNB, Statistics Austria.

Table 9

Selected Price and Cost Indicators for Austria

| | 2009 | 2010 | 2011 | 2012 |
|--|--------------------|------|------|------|
| | Annual change in % | | | |
| Harmonised Index of Consumer Prices (HICP) | +0.4 | +1.7 | +1.7 | +1.8 |
| HICP energy | -10.4 | +8.0 | +5.1 | +3.8 |
| HICP excluding energy | +1.5 | +1.1 | +1.4 | +1.6 |
| Private consumption expenditure (PCE) deflator | +1.2 | +1.7 | +1.8 | +1.8 |
| Investment deflator | +1.7 | +1.7 | +1.8 | +1.9 |
| Import deflator | -1.9 | +1.0 | +1.7 | +1.9 |
| Export deflator | -1.6 | +1.4 | +1.9 | +1.9 |
| Terms of trade | +0.2 | +0.4 | +0.2 | +0.0 |
| GDP at factor cost deflator | +1.7 | +1.6 | +1.7 | +1.8 |
| Unit labor costs | +4.8 | -0.1 | +0.6 | +0.7 |
| Compensation per employee | +2.4 | +1.3 | +1.9 | +2.1 |
| Labor productivity | -2.3 | +1.4 | +1.3 | +1.4 |
| Collectively agreed wage settlements | +3.4 | +1.6 | +1.9 | +2.0 |
| Profit margins ¹ | -3.0 | +1.7 | +1.1 | +1.1 |

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

¹ GDP deflator divided by unit labor costs.

labor costs have risen sharply in 2009 (4.8%). Since firms were not able to pass on the higher costs to their clients, they suffered a 3.0% decline in profit margins. At the same time, the increase in compensation per employee (2.4% in 2009) remained markedly below wage settlements (3.4%). This negative wage drift results from a number of factors: On the one hand, employees worked less overtime, and companies paid fewer bonuses and other incentive compensation. On the other hand, job losses were recorded above all in the manufacturing industry, which pays above-average wages. The wage settlements negotiated in 2010 (1.6%) stood under the influence of the crisis year 2009. Looking ahead, the OeNB expects wage settlements to increase by 1.9% in 2011 and by 2.0% in 2012, and it forecasts a slight increase in wage drift, rising profit margins and rising productivity, but still slightly below the inflation rates. Given sustained high unemployment levels and the still strongly negative output gap, there is little sign of inflation pressures building up during the forecast horizon.

7 Balance of Risks for Growth Is on the Downside

The risks surrounding the above *growth projections* are predominantly tilted toward the downside. While we cannot rule out the possibility that the global pessimistic economic outlook that prevailed in early 2010 is going to broadly dissipate, the balance of risks is clearly on the downside in the medium term. Above all the world-wide strong need to consolidate public finances and swift exits from fiscal and monetary stimulus programs might dampen economic growth. For a summary of growth effects anticipated for Austria, see box 1. Other downside risks include possible renewed tensions in financial markets.

At the same time, a further depreciation of the euro would be beneficial for the European export industry. Last but not least, a further rises in commodity prices constitute a risk for the business cycle.

Conversely, the main upside risk for *inflation* stems from a renewed surge in commodity prices. In addition, measures to consolidate the budget through revenue increases by raising fees and taxes would also stoke inflation. At the same time, a further depreciation of the euro and stronger medium-term output growth would fuel inflation. Given the ongoing rise in unemployment, at least temporary excess capacities as well as the negative output gap until the end of the forecast horizon, we cannot rule out lower wage and price inflation, either. Thus, the inflation risks seem to be balanced.

8 Forecast Revisions Driven by Export Demand

The underlying assumptions on global growth have been revised upward since the OeNB's December 2009 economic outlook. For 2010, we raised our growth expectations for import demand in Austria's export markets by another 4.0 percentage points. Oil prices have gone down somewhat, and the euro has depreciated somewhat against the U.S. dollar and it has weakened slightly on the basis of nominal effective exchange rates. The lower interest rate level has fed through to somewhat lower long-term and short-term interest rates throughout the forecast horizon.

The effects of these new external assumptions were simulated using the OeNB's macroeconomic model. The brighter external conditions – above all upward revisions of demand growth in Austria's export markets – were found to enhance GDP growth by 0.3 percentage points in 2010, and by 0.6 percentage

Table 10

Change in the External Economic Conditions since the OeNB December 2009 Outlook

| | June 2010 | | | December 2009 | | Difference | |
|---|---------------------------|------|------|---------------|------|------------|-------|
| | 2010 | 2011 | 2012 | 2010 | 2011 | 2010 | 2011 |
| | <i>Annual change in %</i> | | | | | | |
| Growth of Austria's export markets | +7.4 | +4.7 | +6.0 | +3.4 | +3.8 | +4.0 | +0.9 |
| Competitor prices in Austria's export markets | +3.9 | +2.0 | +1.4 | -0.1 | +1.1 | +4.0 | +0.9 |
| Competitor prices in Austria's import markets | +3.1 | +1.8 | +1.3 | +0.1 | +1.1 | +3.0 | +0.7 |
| | <i>USD</i> | | | | | | |
| Oil price per barrel (Brent) | 79.5 | 83.7 | 86.3 | 81.4 | 85.9 | -1.9 | -2.2 |
| | <i>Annual change in %</i> | | | | | | |
| Nominal effective exchange rate (exports) | +2.3 | +0.5 | +0.0 | -0.4 | +0.0 | +2.7 | +0.5 |
| Nominal effective exchange rate (imports) | +1.4 | +0.2 | +0.0 | -0.1 | +0.0 | +1.5 | +0.2 |
| | <i>%</i> | | | | | | |
| Three-month interest rate | 0.8 | 1.1 | 1.7 | 1.2 | 2.4 | -0.4 | -1.3 |
| Long-term interest rate | 3.4 | 3.8 | 4.2 | 3.9 | 4.4 | -0.5 | -0.6 |
| | <i>Annual change in %</i> | | | | | | |
| U.S. GDP (real) | +3.1 | +2.2 | +2.8 | +1.9 | +2.3 | +1.2 | -0.1 |
| | <i>USD/EUR</i> | | | | | | |
| USD/EUR exchange rate | 1.29 | 1.26 | 1.26 | 1.49 | 1.49 | -0.20 | -0.23 |

Source: Eurosystem.

points in 2011. In addition, the low level of interest rates is also beneficial for growth.

Table 11 lists in detail the reasons for revising the outlook. Apart from the impact of changed external assumptions, they are attributable to the impact

of new data and a residual ("Other"). The influence of new data includes the effects of the revisions of both the historical data already available at the time the latest projections were made (i.e. data up to the third quarter of 2009) and the forecasting errors of the previ-

Table 11

Breakdown of Forecast Revisions

| | GDP | | HICP | |
|---|---------------------------|------|------|------|
| | 2010 | 2011 | 2010 | 2011 |
| | <i>Annual change in %</i> | | | |
| June 2010 outlook | +1.6 | +1.8 | +1.7 | +1.7 |
| December 2009 outlook | +1.2 | +1.6 | +1.5 | +1.6 |
| Difference | +0.4 | +0.2 | +0.2 | +0.1 |
| | <i>Percentage points</i> | | | |
| Due to: | | | | |
| External assumptions | +0.3 | +0.6 | +0.1 | +0.1 |
| New data | -0.3 | +0.0 | +0.1 | +0.0 |
| of which: Revision of historical data until Q3 09 | -0.1 | +0.0 | x | x |
| Projection errors for Q4 09 and Q1 10 | -0.1 | +0.0 | +0.1 | x |
| Other ¹ | +0.3 | -0.4 | +0.0 | +0.0 |

Source: OeNB June 2010 and December 2009 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.

ous projections for the periods now published for the first time (i.e. data for the third quarter of 2009 and for the first quarter of 2010). The item “Other” includes changes in expert assessments regarding the development of domestic variables such as government consumption or wage settlements and any changes to the forecast models. This exercise shows that data revisions as well as forecasting errors had a negative impact of 0.1 percentage points, respec-

tively, on the forecast for 2010. For 2011, these historical data revisions are of no relevance. The remainder of the difference (2010: +0.3 percentage points, 2011: –0.4 percentage points) reflects a correction of the generally too negative assessment of economic developments in the OeNB’s December 2009 outlook and a correction of wage settlements. The upward revision of the inflation forecast basically reflects the assumption of higher energy prices.

Box 2

OeNB-BOFIT Outlook for CESEE Countries¹

Domestic Demand Remains Weak in Most of CESEE, Gradual Recovery Mainly Driven by Net Exports

2009 brought a severe recession to the CESEE-8² region, with GDP contracting by 3.5% on average (compared with –4% in the euro area). Without Poland’s positive growth rate of 1.7%, CESEE-8 growth would have been considerably worse, as Romania shrank by 7.1%, Hungary by 6.3%, Bulgaria by 5% and the Czech Republic by 4.2%, and GDP in the Baltic states dropped by between 14% (Estonia) and 18% (Latvia).

According to the OeNB projections, 2010 will bring a moderate expansion of output for the CESEE-8 on average (1.3%), with highly diverse developments at the country level. Poland will once again outperform the region. In the Czech Republic and Romania, growth will amount to around 1%, while it is set to stagnate in Bulgaria and Hungary. In contrast to this year’s highly heterogeneous developments, 2011 will bring a more balanced recovery for the CESEE-8 of 3.0%. The region’s growth performance will nonetheless remain below pre-crisis levels in the near and medium term.

CESEE-8 GDP Outcomes 2009 and Projections for 2010 and 2011

| | Eurostat | | OeNB | |
|----------------|--------------------|------|------|------|
| | 2009 | 2010 | 2010 | 2011 |
| | Annual growth in % | | | |
| CESEE-8 | –3.5 | 1.3 | 1.3 | 3.0 |
| Bulgaria | –5.0 | 0.3 | 0.3 | 2.9 |
| Czech Republic | –4.2 | 1.3 | 1.3 | 2.6 |
| Hungary | –6.3 | –0.2 | –0.2 | 2.5 |
| Poland | 1.7 | 3.0 | 3.0 | 3.4 |
| Romania | –7.1 | 0.8 | 0.8 | 3.1 |

Source: OeNB March 2010 forecast, Eurostat.

Domestic growth drivers will not play a meaningful role in 2010 except in Poland. The moderate GDP expansion of 1.3% in the CESEE-8 region as a whole will be based on positive net exports (mainly due to protracted weak import demand) and restocking.

Investment is expected to remain low given substantial capacity underutilization, weak domestic demand prospects and fiscal constraints in many countries. Growth in investment is further hampered by tight financing conditions. In particular, investment in Bulgaria is expected to shrink further, and we expect no change in the Czech Republic and Hungary and only weak growth in Romania. While still remain-

¹ Compiled by Josef Schreiner (Josef.Schreiner@oenb.at) and Julia Wörz (Julia.Woerz@oenb.at).

² Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Romania (all Central, Eastern and South-eastern European countries which have not yet adopted the euro).

ning low levels in a historical perspective, Poland will show relatively stronger investment growth partly due to large-scale public and EU cofunded projects. Private consumption will continue to fall in all countries, with the exception of Poland. The deterioration in labor markets, falling real wages in some countries and an elevated debt burden of households in several CESEE countries will all remain dampening factors for private consumption. Furthermore, as fiscal consolidation continues and thus deters a rebound in private consumption, domestic demand will continue to be weak.

Given the bleak outlook for domestic demand, we expect only moderate import growth for 2010. Based on this sluggish development in imports, net exports will remain the only growth driver in 2010 (just as in 2009). Poland is the only country in the region which – in light of its more favorable import growth prospects – continues to exhibit a negative contribution of net exports.

The contribution of domestic demand to GDP growth is expected to turn positive in 2011. Moreover, improving external demand will bolster exports, which in turn will have a stimulating impact on investment. We also expect private consumption to rise, yet from low levels. Both factors will contribute to higher import dynamics, with imports growing even more strongly than exports. Hence, the growth contribution of net exports should decline to around zero in the region. The individual countries, however, will not be equally affected by this development: While external demand will continue to deliver a slightly positive growth impulse in the Czech Republic and Hungary, it will dampen dynamics somewhat in the rest of the region. Private consumption will therefore return as the main driver of a still relatively moderate overall growth performance in 2011.

These forecasts are subject to considerable risks, related strongly to the developments in Western Europe. External demand and external financing conditions could be affected negatively if the gradual recovery of the world economy and the euro area assumed in our baseline fails to materialize (risk of a double dip). On the other hand, a stronger recovery than the expected moderate rebound in Western Europe would imply an upward risk to our projections. Uncertainty also prevails with respect to changes in investor confidence (i.e. the development of global risk aversion, in particular vis-à-vis emerging economies). We assume that no further deterioration will take place in 2010 and that confidence will improve somewhat toward 2011. Investor risk perceptions could also remain below their pre-crisis levels, with negative implications for the long-term catching-up process. Moreover, we expect that negative impacts from fiscal consolidation measures on domestic demand will mainly materialize in 2010. In particular our projections for 2011 are hence subject to downward risks arising from weaker-than-expected private consumption as a result of a prolonged real economy impact of the crisis. Overall, risks are more balanced than they were at the time of the last projection exercise in September 2009.

BOFIT-OeNB Forecast for Russia³: Bouncing Back from Deep Contraction

In 2010, the assumed calming of the international economic situation and developments in raw material prices will brighten the outlook for income and demand on the part of consumers and companies. Annual growth figures will also get a boost from last year's extremely low basis level. Russian households are on average not heavily in debt, which bodes well for a quick and robust recovery of consumption over the next two years. With the gradual normalization of financial markets and the recovery of banking activity, companies are expected to modestly raise the level of capital formation. Stock adjustments should largely have run their course, so that the inventory effect on aggregate output is likely to turn positive in the course of 2010. Russia's export growth (in real terms) is bound to turn positive again this year, but after that, capacity constraints of energy extraction and insufficient new investment are likely to consid-

³ The projections for Russia are prepared by the Bank of Finland Institute for Economies in Transition (BOFIT) in cooperation with the OeNB on a semiannual basis.

Russia GDP Outcome 2009 and Projections for 2010 and 2011

| | Rosstat | BOFIT-OeNB | |
|--------|--------------------|------------|------|
| | 2009 | 2010 | 2011 |
| | Annual growth in % | | |
| Russia | -7.9 | 5.5 | 5.0 |

Source: BOFIT-OeNB March 2010 forecast, Rosstat.

erably slow down growth rates. Following their incisive slump, imports are set to turn strongly upward in 2010, largely driven by consumer demand. Import demand has gained strength from a modest appreciation of the ruble, whose real exchange rate has firmed to roughly where it was before the devaluation in late 2008/early 2009. Imports are thus projected to grow considerably faster than exports, which will put the growth contribution of foreign trade back in negative territory in 2011 and will contribute to trimming overall GDP expansion.

The expected improvement of world trade will lead to higher consumption of raw materials and energy and thus to increasing demand for and rising prices of oil and other Russian staples. However, weaker-than-expected price developments in raw materials would be immediately reflected in Russia's consumption demand and economic growth. Another risk factor relates to the fragility of international financial markets: A renewed financial disturbance and new sizeable capital outflows could swiftly affect Russian corporations' financing possibilities and markedly delay start-ups of investment projects. In a similar manner, larger-than-expected state borrowing could upset the balance and push companies out of range for bank loans.

OeNB Projections for Croatia: Economic Stagnation in 2010, Growth Impetus in 2011 Arising from Prospective EU Entry

In 2010, Croatia's economy is about to stagnate, which implies a still rather bleak economic outlook. In light of still low consumer and business confidence, continued tight credit conditions, limited fiscal leeway and deteriorating labor market conditions, private consumption and investment activity are expected to remain relatively depressed. Yet, the ongoing tendency to restock might cause domestic demand to contract less strongly than in 2009. Imports are expected to continue decreasing more strongly than exports based on sluggish domestic demand. Hence, we expect net exports to again contribute positively to economic growth in 2010.

For 2011, we expect the economy to grow by 1.8% and to return to the growth pattern observed before the crisis, with a positive contribution of domestic demand and a negative contribution of net exports. Similar to previous experience with accession countries, we expect investment activity to pick up on the back of prospective EU entry (in addition to a positive impetus from renewed lending activity). Under the assumption of a successful closure of negotiations in 2010, EU accession in 2012 could be within reach, which, due to some frontloading of imports, could result in an increasingly negative contribution of net exports.

Croatia GDP Outcome 2009 and Projections for 2010 and 2011

| | Eurostat | OeNB | |
|---------|--------------------|------|------|
| | 2009 | 2010 | 2011 |
| | Annual growth in % | | |
| Croatia | -5.8 | -0.1 | 1.8 |

Source: OeNB March 2010 forecast, Eurostat.

References

- Gaggl, P. and J. Janger. 2009.** Will the Great Recession Lead to a Lasting Impact on Potential Output in Austria? In: Monetary Policy & the Economy Q3/09. OeNB. 26–52.
- Grossmann, B., J. Janger and L. Reiss. 2009.** Fiscal and Structural Policy Challenges Created by the Economic Crisis of 2008–2009. In: Monetary Policy & the Economy Q4/09. OeNB. 33–60.

Annex: Detailed Result Tables

Table 12

Demand Components (Real Prices)

Chained volume data (reference year = 2000)

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|--|----------------|----------------|----------------|----------------|--------------------|-------------|-------------|-------------|
| | EUR million | | | | Annual change in % | | | |
| Private consumption | 139,039 | 140,525 | 141,829 | 143,268 | +0.8 | +1.1 | +0.9 | +1.0 |
| Government consumption | 49,106 | 49,451 | 49,753 | 50,044 | +1.0 | +0.7 | +0.6 | +0.6 |
| Gross fixed capital formation | 51,978 | 49,624 | 50,375 | 51,851 | -7.5 | -4.5 | +1.5 | +2.9 |
| of which: Investment in plant and equipment | 19,639 | 18,438 | 18,803 | 19,411 | -8.5 | -6.1 | +2.0 | +3.2 |
| Residential construction investment | 11,067 | 10,636 | 10,642 | 10,833 | -6.2 | -3.9 | +0.1 | +1.8 |
| Investment in other construction | 22,097 | 21,340 | 21,708 | 22,391 | -1.8 | -3.4 | +1.7 | +3.1 |
| Changes in inventories (including statistical discrepancy) | 3,238 | 3,363 | 3,522 | 3,595 | x | x | x | x |
| Domestic demand | 243,362 | 242,962 | 245,479 | 248,759 | -1.5 | -0.2 | +1.0 | +1.3 |
| Exports of goods and services | 130,614 | 136,593 | 143,946 | 152,738 | -15.0 | +4.6 | +5.4 | +6.1 |
| Imports of goods and services | 117,889 | 119,370 | 124,449 | 130,966 | -13.1 | +1.3 | +4.3 | +5.2 |
| Net exports | 12,725 | 17,222 | 19,497 | 21,772 | x | x | x | x |
| Gross domestic product | 256,087 | 260,184 | 264,976 | 270,530 | -3.4 | +1.6 | +1.8 | +2.1 |

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

Table 13

Demand Components (Current Prices)

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|--|----------------|----------------|----------------|----------------|--------------------|-------------|-------------|-------------|
| | EUR million | | | | Annual change in % | | | |
| Private consumption | 151,329 | 155,571 | 159,830 | 164,400 | +2.0 | +2.8 | +2.7 | +2.9 |
| Government consumption | 54,713 | 55,714 | 56,871 | 58,073 | +5.3 | +1.8 | +2.1 | +2.1 |
| Gross fixed capital formation | 57,438 | 55,791 | 57,681 | 60,528 | -5.9 | -2.9 | +3.4 | +4.9 |
| Changes in inventories (including statistical discrepancy) | 3,209 | 3,311 | 3,332 | 3,510 | x | x | x | x |
| Domestic demand | 266,690 | 270,386 | 277,713 | 286,511 | +0.2 | +1.4 | +2.7 | +3.2 |
| Exports of goods and services | 137,486 | 145,849 | 156,584 | 169,272 | -16.4 | +6.1 | +7.4 | +8.1 |
| Imports of goods and services | 126,823 | 129,748 | 137,554 | 147,492 | -14.8 | +2.3 | +6.0 | +7.2 |
| Net exports | 10,662 | 16,101 | 19,030 | 21,780 | x | x | x | x |
| Gross domestic product | 277,352 | 286,488 | 296,744 | 308,291 | -1.6 | +3.3 | +3.6 | +3.9 |

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

Table 14

Deflators of Demand Components

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|--|--------------|--------------|--------------|--------------|--------------------|-------------|-------------|-------------|
| | 2000 = 100 | | | | Annual change in % | | | |
| Private consumption | 108.8 | 110.7 | 112.7 | 114.7 | +1.2 | +1.7 | +1.8 | +1.8 |
| Government consumption | 111.4 | 112.7 | 114.3 | 116.0 | +4.2 | +1.1 | +1.5 | +1.5 |
| Gross fixed capital formation | 110.5 | 112.4 | 114.5 | 116.7 | +1.7 | +1.7 | +1.8 | +1.9 |
| Domestic demand (excluding changes in inventories) | 109.7 | 111.5 | 113.4 | 115.4 | +1.9 | +1.6 | +1.7 | +1.8 |
| Exports of goods and services | 105.3 | 106.8 | 108.8 | 110.8 | -1.6 | +1.4 | +1.9 | +1.9 |
| Imports of goods and services | 107.6 | 108.7 | 110.5 | 112.6 | -1.9 | +1.0 | +1.7 | +1.9 |
| Terms of trade | 97.8 | 98.2 | 98.4 | 98.4 | +0.2 | +0.4 | +0.2 | +0.0 |
| Gross domestic product | 108.3 | 110.1 | 112.0 | 114.0 | +1.8 | +1.7 | +1.7 | +1.8 |

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

Table 15

Labor Market

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|---|---------------------------------|---------|---------|---------|--------------------|------|------|------|
| | Thousands | | | | Annual change in % | | | |
| Total employment | 4,211.6 | 4,219.9 | 4,243.7 | 4,271.1 | -1.1 | +0.2 | +0.6 | +0.6 |
| of which: Private sector employment | 3,679.0 | 3,687.6 | 3,712.1 | 3,740.2 | -1.3 | +0.2 | +0.7 | +0.8 |
| Payroll employment (national accounts definition) | 3,540.9 | 3,546.2 | 3,566.6 | 3,591.5 | -0.8 | +0.1 | +0.6 | +0.7 |
| | % of labor supply | | | | | | | |
| Unemployment rate (Eurostat definition) | 4.8 | 5.0 | 5.1 | 5.1 | x | x | x | x |
| | EUR per real output unit x 100 | | | | | | | |
| Unit labor costs (whole economy) ¹ | 65.3 | 65.2 | 65.7 | 66.1 | +4.8 | -0.1 | +0.6 | +0.7 |
| | EUR thousand per employee | | | | | | | |
| Labor productivity (whole economy) ² | 60.8 | 61.7 | 62.4 | 63.3 | -2.3 | +1.4 | +1.3 | +1.4 |
| | EUR thousand | | | | | | | |
| Real compensation per employee ³ | 36.5 | 36.3 | 36.4 | 36.5 | +1.2 | -0.4 | +0.1 | +0.3 |
| | At current prices, EUR thousand | | | | | | | |
| Gross compensation per employee | 39.7 | 40.2 | 41.0 | 41.9 | +2.4 | +1.3 | +1.9 | +2.1 |
| | At current prices, EUR million | | | | | | | |
| Total gross compensation of employees | 140,631 | 142,649 | 146,234 | 150,368 | +1.5 | +1.4 | +2.5 | +2.8 |

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

¹ Gross wages divided by real GDP.

² Real GDP divided by total employment.

³ Gross wages per employee divided by the private consumption expenditure (PCE) deflator.

Table 16

Current Account

| | 2009 | 2010 | 2011 | 2012 | 2009 | 2010 | 2011 | 2012 |
|-----------------------------|--------------------|----------|----------|----------|-------------------------|------|------|------|
| | <i>EUR million</i> | | | | <i>% of nominal GDP</i> | | | |
| Balance of trade | 9,488.0 | 11,660.5 | 12,494.8 | 13,671.6 | 3.4 | 4.1 | 4.2 | 4.4 |
| Balance on goods | -2,149.0 | -1,133.1 | -1,112.9 | -1,023.2 | -0.8 | -0.4 | -0.4 | -0.3 |
| Balance on services | 11,637.0 | 12,793.6 | 13,607.7 | 14,694.8 | 4.2 | 4.5 | 4.6 | 4.8 |
| Euro area | 62.0 | 207.3 | 918.2 | 1,504.2 | 0.0 | 0.1 | 0.3 | 0.5 |
| Non-euro area countries | 9,426.0 | 11,453.2 | 11,576.6 | 12,167.4 | 3.4 | 4.0 | 3.9 | 3.9 |
| Balance on income | -1,403.0 | -1,104.3 | -1,108.0 | -1,395.2 | -0.5 | -0.4 | -0.4 | -0.5 |
| Balance on transfers | -1,761.0 | -1,771.2 | -1,464.8 | -1,719.9 | -0.6 | -0.6 | -0.5 | -0.6 |
| Current account | 6,324.0 | 8,785.0 | 9,922.0 | 10,556.5 | 2.3 | 3.1 | 3.3 | 3.4 |

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

Table 17

Quarterly Outlook Results

| | 2010 | 2011 | 2012 | 2010 | | | | 2011 | | | | 2012 | | | |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Prices, wages and costs | | | | | | | | | | | | | | | |
| <i>Annual change in %</i> | | | | | | | | | | | | | | | |
| HICP | +1.7 | +1.7 | +1.8 | +1.3 | +1.9 | +1.6 | +1.8 | +1.8 | +1.7 | +1.6 | +1.7 | +1.8 | +1.8 | +1.8 | +1.8 |
| HICP (excluding energy) | +1.1 | +1.4 | +1.6 | +0.9 | +1.2 | +1.1 | +1.3 | +1.3 | +1.4 | +1.4 | +1.5 | +1.6 | +1.6 | +1.6 | +1.6 |
| Private consumption expenditure (PCE) deflator | +1.7 | +1.8 | +1.8 | +1.7 | +1.8 | +1.7 | +1.7 | +1.7 | +1.8 | +1.8 | +1.9 | +1.8 | +1.8 | +1.8 | +1.8 |
| Gross fixed capital formation deflator | +1.7 | +1.8 | +1.9 | +1.8 | +1.9 | +1.7 | +1.5 | +1.5 | +1.7 | +2.0 | +2.2 | +2.1 | +2.0 | +1.9 | +1.8 |
| GDP deflator | +1.7 | +1.7 | +1.8 | +1.7 | +1.7 | +1.6 | +1.6 | +1.6 | +1.7 | +1.7 | +1.8 | +1.7 | +1.7 | +1.8 | +1.8 |
| Unit labor costs | -0.1 | +0.6 | +0.7 | +0.7 | -0.7 | -0.3 | -0.1 | -0.1 | +0.8 | +1.0 | +0.9 | +0.7 | +0.7 | +0.7 | +0.6 |
| Nominal wages per employee | +1.3 | +1.9 | +2.1 | +1.3 | +1.1 | +1.2 | +1.5 | +1.9 | +1.9 | +2.0 | +1.9 | +1.9 | +2.0 | +2.2 | +2.3 |
| Productivity | +1.4 | +1.3 | +1.4 | +0.7 | +1.8 | +1.4 | +1.7 | +2.0 | +1.1 | +1.0 | +1.0 | +1.2 | +1.4 | +1.5 | +1.7 |
| Real wages per employee | -0.4 | +0.1 | +0.3 | -0.3 | -0.7 | -0.6 | -0.1 | +0.2 | +0.1 | +0.1 | +0.0 | +0.1 | +0.2 | +0.4 | +0.5 |
| Import deflator | +1.0 | +1.7 | +1.9 | +1.0 | +0.9 | +1.2 | +1.1 | +1.3 | +1.6 | +1.8 | +1.9 | +1.9 | +1.9 | +1.9 | +1.9 |
| Export deflator | +1.4 | +1.9 | +1.9 | +0.2 | +1.5 | +2.1 | +2.0 | +1.9 | +1.9 | +1.8 | +1.9 | +1.9 | +1.9 | +1.9 | +1.9 |
| Terms of trade | +0.4 | +0.2 | +0.0 | -0.8 | +0.6 | +0.9 | +0.9 | +0.6 | +0.2 | +0.0 | -0.1 | +0.0 | +0.0 | +0.0 | +0.0 |
| Economic activity | | | | | | | | | | | | | | | |
| <i>Annual and/or quarterly changes in % (real)</i> | | | | | | | | | | | | | | | |
| GDP | +1.6 | +1.8 | +2.1 | +0.0 | +1.1 | +0.4 | +0.4 | +0.4 | +0.4 | +0.5 | +0.5 | +0.5 | +0.5 | +0.5 | +0.6 |
| Private consumption | +1.1 | +0.9 | +1.0 | +0.3 | +0.2 | +0.3 | +0.2 | +0.3 | +0.2 | +0.2 | +0.2 | +0.2 | +0.3 | +0.3 | +0.4 |
| Government consumption | +0.7 | +0.6 | +0.6 | +1.0 | -1.0 | -0.9 | -0.4 | +0.4 | +0.9 | +0.9 | +0.3 | +0.0 | -0.2 | -0.3 | -0.3 |
| Gross fixed capital formation | -4.5 | +1.5 | +2.9 | -1.9 | -0.7 | +0.0 | +0.4 | +0.5 | +0.6 | +0.6 | +0.6 | +0.7 | +0.8 | +1.0 | +1.1 |
| of which: Investment in plant and equipment | -6.1 | +2.0 | +3.2 | -3.0 | -0.6 | +0.2 | +0.5 | +0.7 | +0.6 | +0.6 | +0.6 | +0.7 | +0.9 | +1.1 | +1.3 |
| Residential construction investment ¹ | -3.9 | +0.1 | +1.8 | -1.2 | -1.2 | -0.9 | -0.1 | +0.3 | +0.4 | +0.5 | +0.5 | +0.4 | +0.4 | +0.4 | +0.5 |
| Exports | +4.6 | +5.4 | +6.1 | -0.2 | +3.5 | +1.7 | +1.3 | +0.9 | +1.0 | +1.2 | +1.4 | +1.6 | +1.5 | +1.6 | +1.7 |
| Imports | +1.3 | +4.3 | +5.2 | -0.2 | +1.6 | +1.2 | +0.9 | +0.9 | +1.0 | +1.1 | +1.2 | +1.3 | +1.3 | +1.5 | +1.5 |
| <i>Contribution to real GDP growth in percentage points</i> | | | | | | | | | | | | | | | |
| Domestic demand | -0.2 | +0.9 | +1.2 | +0.0 | -0.2 | +0.0 | +0.1 | +0.3 | +0.4 | +0.4 | +0.3 | +0.3 | +0.3 | +0.3 | +0.4 |
| Net exports | +1.8 | +0.9 | +0.9 | +0.0 | +1.1 | +0.4 | +0.3 | +0.1 | +0.1 | +0.1 | +0.2 | +0.3 | +0.2 | +0.2 | +0.2 |
| Changes in inventories | +0.0 | +0.1 | +0.0 | +0.0 | +0.3 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 | +0.0 |
| Labor market | | | | | | | | | | | | | | | |
| <i>% of labor supply</i> | | | | | | | | | | | | | | | |
| Unemployment rate (Eurostat definition) | 5.0 | 5.1 | 5.1 | 4.9 | 5.0 | 5.0 | 5.0 | 5.0 | 5.1 | 5.0 | 5.1 | 5.1 | 5.1 | 5.1 | 5.0 |
| <i>Annual and/or quarterly changes in %</i> | | | | | | | | | | | | | | | |
| Total employment | +0.2 | +0.6 | +0.6 | +0.1 | +0.0 | +0.0 | +0.1 | +0.2 | +0.2 | +0.2 | +0.2 | +0.1 | +0.1 | +0.1 | +0.1 |
| of which: Private sector employment | +0.2 | +0.7 | +0.8 | +0.2 | +0.0 | +0.0 | +0.1 | +0.2 | +0.2 | +0.3 | +0.2 | +0.2 | +0.2 | +0.2 | +0.1 |
| Payroll employment | +0.1 | +0.6 | +0.7 | +0.2 | +0.0 | +0.0 | +0.0 | +0.2 | +0.3 | +0.3 | +0.2 | +0.1 | +0.1 | +0.1 | +0.1 |
| Additional variables | | | | | | | | | | | | | | | |
| <i>Annual and/or quarterly changes in % (real)</i> | | | | | | | | | | | | | | | |
| Real disposable household income | +0.1 | +0.8 | +1.5 | +0.4 | -0.2 | -0.2 | -0.1 | +0.5 | +0.4 | +0.4 | +0.3 | +0.3 | +0.4 | +0.4 | +0.4 |
| <i>% of nominal disposable household income (saving ratio) and % of real GDP (output gap)</i> | | | | | | | | | | | | | | | |
| Household saving ratio | 10.1 | 10.0 | 10.2 | 10.7 | 10.3 | 9.9 | 9.5 | 9.7 | 9.9 | 10.1 | 10.1 | 10.2 | 10.2 | 10.3 | 10.3 |
| Output gap | -2.0 | -1.7 | -1.3 | -2.5 | -1.7 | -1.8 | -1.8 | -1.9 | -1.8 | -1.6 | -1.5 | -1.4 | -1.4 | -1.3 | -1.3 |

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

¹ Excluding other investment in construction and other investment.

Table 18

Comparison of Current Economic Forecasts for Austria

| Indicator | OeNB | | | WIFO | | IAS | | OECD | | IMF | | European Commission | |
|---|--------------|--------------|------|------------|------|------------|------|----------|------|------------|------|---------------------|------|
| | June 2010 | | | March 2010 | | March 2010 | | May 2010 | | April 2010 | | May 2010 | |
| | 2010 | 2011 | 2012 | 2010 | 2011 | 2010 | 2011 | 2010 | 2011 | 2010 | 2011 | 2010 | 2011 |
| <i>Annual change in %</i> | | | | | | | | | | | | | |
| Key results | | | | | | | | | | | | | |
| GDP (real) | +1.6 | +1.8 | +2.1 | +1.3 | +1.4 | +1.3 | +1.7 | +1.4 | +2.3 | +1.3 | +1.7 | +1.3 | +1.6 |
| Private consumption (real) | +1.1 | +0.9 | +1.0 | +0.7 | +0.7 | +0.7 | +1.1 | +1.1 | +1.6 | x | x | +0.8 | +0.6 |
| Government consumption (real) | +0.7 | +0.6 | +0.6 | +1.0 | -0.3 | +0.8 | +0.3 | +1.3 | +0.5 | x | x | +1.2 | +1.0 |
| Gross fixed capital formation (real) ¹ | -4.5 | +1.5 | +2.9 | -1.9 | +1.9 | +0.7 | +1.7 | -3.6 | +2.8 | x | x | -1.4 | +1.7 |
| Exports (real) | +4.6 | +5.4 | +6.1 | +5.0 | +6.2 | +5.3 | +5.4 | +4.0 | +7.7 | x | x | +4.2 | +4.9 |
| Imports (real) | +1.3 | +4.3 | +5.2 | +2.4 | +4.8 | +4.6 | +4.6 | +1.5 | +6.8 | x | x | +2.5 | +3.8 |
| GDP per employee | +1.4 | +1.3 | +1.4 | +1.2 | +1.0 | +1.6 | +1.1 | x | x | x | x | +1.5 | +1.4 |
| GDP deflator | +1.7 | +1.7 | +1.8 | +0.7 | +1.3 | +1.1 | +1.3 | +1.2 | +1.0 | x | x | +0.6 | +1.7 |
| CPI | x | x | x | +1.4 | +1.8 | +1.3 | +1.6 | x | x | +1.3 | +1.5 | x | x |
| HICP | +1.7 | +1.7 | +1.8 | +1.4 | +1.8 | x | x | +1.4 | +1.0 | x | x | +1.3 | +1.5 |
| Unit labor costs | -0.1 | +0.6 | +0.7 | +0.0 | +0.8 | x | x | x | x | x | x | +0.1 | +0.7 |
| Payroll employment | +0.2 | +0.6 | +0.6 | -0.2 | +0.1 | -0.3 | +0.6 | x | x | x | x | -0.1 | +0.2 |
| <i>% of labor supply</i> | | | | | | | | | | | | | |
| Unemployment rate ² | 5.0 | 5.1 | 5.1 | 5.2 | 5.4 | 5.5 | 5.5 | 4.9 | 5.0 | 5.4 | 5.5 | 5.1 | 5.4 |
| <i>% of nominal GDP</i> | | | | | | | | | | | | | |
| Current account | 3.1 | 3.3 | 3.4 | 2.5 | 2.9 | x | x | 3.0 | 3.4 | 1.8 | 1.7 | 3.1 | 4.1 |
| Government surplus/deficit | -4.5 | -4.2 | -3.9 | -4.7 | -4.0 | -4.7 | -4.0 | -4.7 | -4.6 | -4.8 | -4.5 | -4.7 | -4.6 |
| External assumptions | | | | | | | | | | | | | |
| Oil price in USD/barrel (Brent) | 79.5 | 83.7 | 86.3 | 80.0 | 82.0 | 85.0 | 90.0 | 80.0 | 80.0 | 80.0 | 83.0 | 84.5 | 89.2 |
| Short-term interest rate in % | 0.8 | 1.1 | 1.7 | 0.9 | 1.1 | 1.0 | 1.8 | 0.7 | 1.9 | 0.9 | 1.6 | 0.9 | 1.6 |
| USD/EUR exchange rate | 1.29 | 1.26 | 1.26 | 1.35 | 1.35 | 1.35 | 1.35 | 1.28 | 1.28 | 1.36 | 1.35 | 1.36 | 1.35 |
| <i>Annual change in %</i> | | | | | | | | | | | | | |
| Euro area GDP (real) | +0.7 to +1.3 | +0.2 to +2.2 | x | +1.0 | +1.2 | +1.0 | +1.5 | +1.2 | +1.8 | +1.0 | +1.5 | +0.9 | +1.5 |
| U.S. GDP (real) | +3.1 | +2.2 | +2.8 | +2.5 | +2.2 | +2.8 | +2.4 | +3.2 | +3.2 | +3.1 | +2.6 | +2.8 | +2.5 |
| World GDP (real) | +4.0 | +3.6 | +4.2 | +3.3 | +3.5 | x | x | +4.6 | +4.5 | +4.2 | +4.3 | +4.0 | +4.0 |
| World trade | +9.1 | +5.9 | +7.0 | +10.0 | +8.0 | +9.0 | +7.0 | +10.6 | +8.4 | +7.0 | +6.1 | +8.9 | +6.3 |

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

¹ For IAS: Gross investment.² Eurostat definition.

Real Estate Inheritance in Austria

As real estate inheritances are an important component of Austrian households' assets, they are relevant for monetary policymaking and for the maintenance of financial stability. 20% of Austrian households have inherited real estate wealth, with some 2% of all households accounting for around 40% of the overall volume of real estate inheritances in Austria. In aggregate, real estate inheritances constitute up to 23% of households' total real estate wealth. Households which have inherited differ from those which have not in so far as the former have a higher level of education, earn higher incomes and possess greater real estate wealth. The largest inheritance ratio is in the age group of 50- to 70-year-olds. Households with greater real estate wealth and higher income inherit more often, and they receive larger inheritances. Yet the relative share of inherited real estate properties in total real estate wealth is larger among households with smaller real estate wealth. Less well-off households may come into comparatively considerable real estate wealth through an inheritance. Real estate inheritances are of particular importance for farmers. The majority of real estate owners plan to bequeath their real estate. This intention is rather independent from wealth and income levels.

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JEL classification: D31, D63

Keywords: wealth, distribution, inheritances

This paper is based on the OeNB's Household Survey on Housing Wealth (HSHW) of 2008,² which also included a number of questions on bequests and inheritances. Any isolated assessment of the inheritance process would not do justice to the multidimensional subject of private capital transfers. The concept of inheritances should be considered together with gifts and investments in children's education. Empirical studies show a clearly positive connection between inheritances and gifts. Within families, money transfers mainly flow from parents to their children, following a cascade model. Gifts reach beneficiaries at an earlier stage of their life cycle than inheritances do.³ Inheritances can either be used for consumption or for private provisions (for old age or health, or against other risks) as well as for building up wealth.

Since inheritances account for a large part of Austrian households' as-

sets (section 4), they are a relevant factor for monetary policymaking and for maintaining financial stability. Accounting for about two-thirds of all assets held by households, real estate is the single most important portfolio item in terms of volume in Austria (Fessler et al., 2009a). It serves as collateral for loans and, given its dominant role in the composition of households' assets, it is of particular relevance for the resilience of households to financial risks (Albacete and Wagner, 2009; Albacete and Fessler, 2010). Furthermore, the effects of monetary policy are determined by several transmission mechanisms, including the cost of capital, expected future changes in real estate prices, real estate supply and demand, the credit channel and the balance sheet effect on consumption as well as on demand for real estate itself (Fessler et al., 2009a). The prospect of inheriting real estate can also have an

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² For more detailed information on the 2008 Household Survey on Housing Wealth, see Wagner and Zottel (2009) and Fessler et al. (2009).

³ In Germany, almost as much as two-thirds of inheritances are received after the age of 40 (Szydlík, 2006).

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impact on saving and consumption. Households expecting to come into an inheritance may be more likely to take on higher debts in order to optimize their lifetime consumption. Likewise, they will be able to make greater transfers to their children, and to do so at an early stage, if they have reason to expect asset transfers from their parents to complement their old age income. Hence, the inheritance process has a bearing on the conduct and the financial wealth of individuals of several generations.

Given the relevance of household wealth and of inheritances for monetary policy and financial stability, the Eurosystem Household Finance and Consumption Survey (HFCS), which will be conducted in Austria in 2010, will contain a separate inheritance chapter. While the HSHW was limited to real estate inheritance, the scope of the HFCS will also include other forms of inheritance. Therefore, the HSHW may be seen as a pilot project for the euro area harmonized HFCS.

So far, international comparisons have been hard to draw, given the differences in respondents targeted (individuals, households), in the reference period (inheritances occurred during the past five years, ten years or ever) as well as in the capital transfers reviewed.⁴ The harmonized HFCS data for the euro area are to shed light on these cross-country differences. Moreover, data quality will only be assessable in longitudinal analyses once the results of several waves of surveys are available.

So far, little is known about inheritances in Austria. Data derived from a 2004 OeNB survey on financial assets of Austrian households show that one-third of households have received an inheritance whose size varies among these households according to social categories (Schürz, 2007). The consolidated real estate wealth of Austrian households amounts to some EUR 880 billion. This large figure implies a considerable potential for gifts and bequests.

The economic literature deals with three main questions arising in connection with bequests: How large are the assets bequeathed, and what types of assets are bequeathed? What are the motives for bequeathing? Which socio-economic characteristics distinguish heirs from nonheirs? The economic literature offers partly contradictory reasons for making bequests.⁵ Sociology, by contrast, focuses on issues such as intergenerational solidarity within families and the conditions set out by institutional frameworks. In his sociological work on “legitimate domination,” Weber (1922, 1985) already stressed the close links between inheritance, law, economy and political authority. The connection between inheritances and death raises the former above the *sphere of the profane* (Beckert, 2004) and therefore renders this subject so complicated. This study delves into three questions:

- (a) What are the motives for bequeathing real estate?
- (b) Who inherits real estate in Austria, and which socioeconomic charac-

⁴ The Socio-Economic Panel (SOEP) asks respondents: “Have you ever inherited real estate or have you ever received a large gift? We refer to transfers of real estate wealth and estates in land, equity, securities, other assets or large amounts of cash.” The responses cite the value at the time of the inheritance, which means that the prices need to be adjusted. The annex contains the HSHW’s questions on real estate inheritances.

⁵ For an introduction, see Kessler and Masson (1989); Pestieau (2003); for an overview of motives for bequests, see Arrondel and Masson (2002).

teristics distinguish heirs from nonheirs?

- (c) How large and how important are real estate inheritances in Austria?

A period of more than six decades of political stability and economic wealth has enabled Austrian households to accumulate significant assets. Since World War II, this accumulation process has not suffered any major shocks such as wars or currency reforms. The fallout of the financial crisis may well harbor potential for a temporary setback, especially for the value of risky investments. The long-term significance of inheritances, however, has increased and is likely to rise even further.

With life expectancy increasing, most households receive bequests at a later stage in life. The inheritance ratio (households with inheritances over total sample) of the HSHW rises until the age cluster of 60- to 69-year-olds.

Together with retirement provisions, provisions against income risk and emergencies, capital transfers (inheritances and gifts) have an important role to play in building up wealth. On the other hand, accumulated wealth forms the basis for gifts and inheritances. Thus, there is a reciprocal relationship between accumulated wealth and capital transfers (e.g. Kessler and Masson, 1989; Gale and Scholz, 1994; Szydlík, 2004; DIW, 2005). The well-educated and earners of high incomes accumulate greater wealth, which translates into more sizeable inheritances for their descendants.

As a result of demographic aging, the volume of inheritances will probably concentrate on a diminishing num-

ber of heirs.⁶ However, empirical evidence of capital transfers have so far remained contradictory, and it is hard to draw international comparisons (Fessler et al., 2008). The Eurosystem's HFCS, which is currently being conducted in most countries of the euro area, will enable substantial progress in this area.⁷

Inter vivos transfers and inheritances are sensitive areas in household surveys. Respondents are particularly likely to refuse to answer questions on where their wealth originated. Moreover, real estate has a special status in inherited wealth. Real estate is not as readily marketable as cash gifts, and often it is the explicit wish of the testator or donor that the estate remain unsold.

Section 1 deals with the motives for bequeathing. Section 2 illustrates conceptual problems of research into the significance of inheritances, while section 3 presents empirical results based on the HSHW 2008. Section 4 assesses the significance of inheritances for wealth accumulation, section 5 concludes.

1 Why Do People Make Bequests?

Economists have an interest in bequest motives because these motives have an impact on capital formation. Accordingly, the intent to leave assets to an heir is likely to lead to an increase in the saving ratio. Furthermore, it is assumed that members of a cohort intending to leave assets to beneficiaries will save more than a younger cohort of heirs who, in anticipation of their inheritance, feel a lesser urge to do so.

⁶ For a historical overview on inheritances, see Bradford DeLong (2003).

⁷ See www.ecb.int/home/html/researcher_hfcn.en.html

For the sake of simplicity, the economic literature distinguishes three key reasons for making bequests: Accidental bequests, altruistic bequests (motive) as well as strategic bequests (motive).⁸

(a) *Accidental bequests*

The intention to leave wealth has no role to play in the original life cycle hypothesis (Modigliani and Brumberg, 1954). People save for old age and to provide for unexpected financial shortfalls, and not with the intention to inherit; thus, if someone inherits their wealth, this happens accidentally. Involuntary bequeathers' propensity to save remains unaffected. Empirical indicators imply that the life cycle hypothesis presents the process of saving in a too simplistic way. Low-income earners are unable to build up any or any significant amount of wealth during their lifetime. There are also many elderly people who do not consume their assets during retirement.

(b) *Altruistic bequests*

People who follow an altruistic bequest motive consider their descendants' benefit in their utility function. In deciding on whether to save or to consume, parents take their childrens' interests into account and try to anticipate their future income. At the beginning, they invest in the education of their children until the return on this human capital transfer decreases. Later, they make gifts and thereafter bequests (Masson and Pestieau, 1997, p. 62f). It therefore appears that parents endeavor to level

out income differentials between the generations of their family. Transfers based on altruistic motives should level out income differentials among children and neutralize public redistribution (Arrondel et al., 1997). Altruistic bequests offer dynastic protection to family wealth down the generational line.

(c) *Strategic bequests*

In the strategic bequest model, testators seek to influence the behavior of potential future heirs. For instance, they promise to testate in the heirs' favor in exchange for old-age care. This implies that there is a positive connection between transferable wealth and descendants' care for the testator (Bernheim et al., 1985, p. 1045f). Empirical evidence of this assumed motivation has yet to be found.⁹

1.1 Bequest Motives

The motives underlying planned bequests, as explored in household surveys, are stylized ones. Inheritance law based on mandatory shares creates a legal framework which obscures possible motives.

In their three-generation study, Arrondel and Masson (2001) describe even more intricate interrelationships, and they significantly expand the conventional two-generation model. The perception that several generations determine intergenerational transfer behavior goes back to Mauss (1950): The author suggests that an inheritance is not a unilateral or reciprocal transfer of wealth, but rather a process of mutual

⁸ The literature also identifies further bequest motives, such as the paternalist motive, which is akin to the altruistic motive. Unlike the former, the latter does not take into account the childrens' preferences but is based on parents' views on what is good for their offspring. Affluent testators might also have a capitalistic motive. In such a case, the aim of accumulating wealth would be the bequest in itself rather than the well-being of family members.

⁹ SOEP data show that persons who took care of their parents or maintained close contact with them would not receive larger inheritances, quite the opposite. Empirical evidence suggests that a principle of equal distribution is applied in inheritance matters; i.e. all children are treated equally.

appreciation. Bequeathing creates a social bond between a testator and a beneficiary. This is why the inheritance process does not stop when the agreed service (e.g. care and attention) is rendered, but continues thereafter – thus, social relations develop over several generations.

The microdata on real estate wealth derived from the HSHW allow for a limited investigation into the different bequest motives. The survey asks about attitudes, values and expectations. However, basically none of the motives provides a coherent explanation for bequests. One will always find a number of partly competing motives in real-life social settings. It would be too schematic to categorize human behavior only within the dichotomy of altruism and strategy. Economic literature also neglects emotional ties, which are of great importance in family settings, particularly so when it comes to inheritances (Lettke, 2003; Stutz et al., 2006).

Real estate ownership is the starting point of possible asset transfers. The question “*Are you planning to bequeath any real estate to anyone?*” was only put to owners of real estate, and yet there is a social differentiation to be found in the results. Workers are hardly concerned with the matter of bequests, maybe on account of their low income. It also comes as no surprise that elderly people were found to deal with the subject of bequests more often than the average. The older people become, the more pressing the question of asset transfers grows. The positive link between the question on bequest plans and the one on inheritances received

reveals the continuity of the inheritance process across generations.¹⁰

Altruistic motives – “*affection for future heirs*” – account for 49% of bequest plans, while strategic motives – “*bequests lead to a better relationship with children*” – account for only 17%. Most of the answers, however, go beyond these two motives. 54% of respondents bequeath “*because it is customary to do so in their families.*”¹¹ This is particularly true for farmers (86%). The importance of conventions increases sharply among the age group 30 to 39 and is highest among the oldest respondents. Quite the opposite is true for the altruistic motive, which is more common among younger people.

2 Conceptual Difficulties in Researching the Significance of Inheritances

This study is based on empirical data collected during the OeNB Household Survey on Housing Wealth 2008 (HSHW 2008),¹² which was conducted as a pilot project for the planned comprehensive Eurosystem household survey. The respondents were the owners or tenants¹³ of the respective households’ real estate at the time of the interview. The survey focused on the ownership of the occupied housing and on other real estate items belonging to any of the household members as well as on the related liabilities incurred by the household. Furthermore, detailed socioeconomic characteristics and data concerning intergenerational transfers in connection with real estate wealth were compiled. The questions relating to the value of inheritances in the

¹⁰ This is in line with the results found by Cox and Stark (2005).

¹¹ Multiple answers were permitted.

¹² The HSHW 2008 fieldwork was conducted by the Institute for Empirical Social Studies (IFES).

¹³ The person identified as the tenant in the applicable rental agreement.

HSHW that were analyzed for this study can be found in the annex. For more detailed information on the 2008 Household Survey on Housing Wealth, see Wagner and Zottel (2009) and Fessler et al. (2009a).

A number of difficulties arising in the data collection process have to be taken into account when interpreting the results. Questions on the total amount of gifts and inheritances often lead to misunderstandings. Thus, respondents often have trouble remembering the value of bequests made long ago or the year of receipt, or it is not clear whether the value stated in the answer is adjusted or not. Furthermore, not all respondents may make a neat distinction between inheritances and gifts.

The issue of inheritances touches upon several taboos. The increase in wealth generally goes hand in hand with bereavement, conferring an ambivalent note on inheritances. The “item nonresponse” problem is of particular importance in such sensitive questions, meaning that respondents do not know the answer or deliberately refuse to give it. If this error were randomly distributed, the item nonresponse problem would be less important. However, it is specially the better-off households – where inheritances and bequests are of crucial significance – that are always generally underrepresented in surveys and that are more likely to withhold responses (Fessler et al., 2009b, 2009c). Therefore, we can assume that the inheri-

tances captured in household surveys only mark the lower bound of the actual volume of bequests. In actual fact, inheritances are likely to be of a much greater importance.¹⁴

Given the insufficient data base, it is not possible to establish if the inherited real estate was sold or rented out and whether the proceeds were used for consumption or rather saved. In any event, wealth increases from real estate bequests will certainly have a smaller impact on consumption than cash inheritances.

The answers regarding the absolute amounts of inheritances must be interpreted with caution.¹⁵ Given that fluctuations in real estate values differ from those in financial assets, it is of limited use to apply general price adjustment methods. Moreover, changes in real estate prices follow different regional patterns and can vary quite a lot even within a closely delimited geographical area.

The representative OeNB Household Survey on Housing Wealth 2008 explored real estate inheritances received by households. The survey did not set a lower limit for inheritance coverage, since a number of estates are very small,¹⁶ nor did it make distinctions between inheritances within the same household.

There were no nonresponses for the HSHW question on whether there had been any inheritances in a household. In this case, possible data problems could only arise from concealment or poor recollection. All households of

¹⁴ Therefore, it remains open to debate whether bequests in well-to-do households follow other motives than in low-income households with a low level of wealth.

¹⁵ The SOEP requests information on the nominal value of inheritances in the year of transfer. The current value depends on value increases (e.g. in the case of real estate and shares) as well as on inflation. The international literature’ assumptions on return are arbitrary. It often assumes a standard real remuneration rate which does not reflect the development of asset prices.

¹⁶ The German SOEP 2001 had a lower limit of EUR 2,500. Academic researchers criticized this threshold because it precluded a considerable number of inheritances from the survey.

Table 1

Response Behavior Regarding Inheritance Values

| Values of first to ninth real estate inheritance | Observations | | Missing values | | Multiple imputed |
|--|--------------|-------|----------------|-------------------|------------------|
| | Number | % | Number | % of observations | |
| 1. | 418 | 20.09 | 161 | 38.52 | Yes |
| 2. | 60 | 2.88 | 25 | 41.67 | Yes |
| 3. | 17 | 0.82 | 9 | 52.94 | Yes |
| 4. | 5 | 0.24 | 4 | 80.00 | No |
| 5. | 4 | 0.19 | 4 | 100.00 | No |
| 6. | 4 | 0.19 | 4 | 100.00 | No |
| 7. | 1 | 0.05 | 1 | 100.00 | No |
| 8. | 1 | 0.05 | 1 | 100.00 | No |
| 9. | 1 | 0.05 | 1 | 100.00 | No |

Source: HSHW 2008.

heirs (19.9%) were asked how many real estate inheritances they had received until the time of the survey. 86.7% of respondents said that they had received only one real estate inheritance.

A further 9.2% had received two estates and some 2.8% of the surveyed households of heirs had received three. The remaining 1.4% indicated that they had received more than three inheritances; the highest number was nine inheritances. This question, too, was answered by all households. For each of the inheritances mentioned, the survey included questions on the year of transfer and the (estimated) value at the time of receipt. Respondents supplied full details on the timing but, as expected, would not always indicate the values of bequests.

Table 1 shows the nonresponses for the first to the ninth real estate inheritances of households. For the first real estate inheritance, the nonresponse rate was 38.5%, for the second 41.7% and for the third 52.9%. Only five households indicated that they had received more than three real estate in-

heritances. The missing data for the first, second and third real estate inheritances were imputed through multiple imputations using a regression-based chained equation method (Albacete, 2010).¹⁷ The values for the fourth to the ninth real estate inheritances were not imputed (15 values from four households) since a methodically meaningful imputation for these variables was not possible, given the limited number of realized observations and the total lack thereof from the fifth inheritance onward. This procedure leads to an undervaluation of the mean value, of the volume and of the unequal distribution of the inheritances received.

The percentage of households that refuse to make statements on the value of their real estate inheritances rises markedly in line with the size of their real estate wealth. While 30% of respondents from the lowest real estate wealth decile of owner households refused to answer, this figure rises to around 60% for the highest decile. This demonstrates a well-known problem with household surveys: Nonresponses on questions related to wealth are far

¹⁷ Imputations serve to partially correct the item nonresponse problem.

more common among households with greater real estate wealth than among those with a lower level of assets.¹⁸

Even though households with sizeable wealth display a higher nonresponse rate, the multiple imputation method leads to a slight reduction of the mean of inheritance values. The incidence of missing values was on average higher for inheritances received longer ago, which might be a sign of memory gaps (recall bias).

3 Empirical Evidence for Austria

A number of studies (e.g. Kohli et al., 2006; Szydlík, 2001; Szydlík and Schupp, 2004) have consistently found a significantly higher incidence of inheriting (and/or inheritance probability in binary choice models) as well as larger inheritances among beneficiaries with higher levels of income and education. The datasets of the Luxembourg Wealth Study (LWS), which have been harmonized ex post, make it possible to compare the income and wealth situation of those who have inherited with those who have not. When comparing the financial wealth and income medians of these two subsets, we find those who have inherited to be significantly better off in terms of wealth, income and educational attainment (Fessler et al., 2008).

3.1 Who Inherits?

The HSHW data on inheritances received show the socioeconomic characteristics of households which have made inheritances to differ significantly from those who have not. Note that the following information on employment, educational attainment and age does

not refer to households in general but specifically to the owners (or tenants) of a household's primary residence. We find the number of heirs to be disproportionately low among blue-collar workers, low-income earners, households with low levels of net wealth as well as tenants of rental and co-op apartments. In contrast, the number of heirs is specially high among civil servants, freelance professionals and above all farmers, high-income earners, house owners and households with a particularly high level of real estate wealth (table 2).

With regard to educational attainment, the findings are mixed. While younger people tend to be better educated, given the spread of education that started in the 1960s, chances of having inherited at least once are higher the older a person is. Hence, educational effects and age effects develop in inverse order. This effect may mask the positive relationship we expect to exist between the level of educational attainment and housing bequests in a descriptive analysis.¹⁹ The relationship between the housing situation or real estate wealth of households and their inheritance patterns must be interpreted with caution, as housing bequests have a direct impact on the size of households' real estate wealth, and in some instances probably also on their housing situation. When we control for age in a logit estimate with a dependent variable (*real estate wealth inherited yes/no*), we find real estate wealth, income and profession to have a positive and significant influence (even after adjustment for inherited estates). Because of endogeneity problems, it is not possible

¹⁸ Approximately half of the German households which stated that they had inherited but which did not specify the amounts belong to the wealthiest 20%. More than half of the households which in 1988 confirmed that they had received an inheritance said in 2001 that they had never inherited anything. Only about 26% of respondents answered in a consistent way, which again points to a general overestimation of inheritances in household surveys.

¹⁹ Educational attainment is, as a rule, positively correlated with the wealth of parents.

Table 2

Share of Inheriting Households by Socioeconomic Characteristics

| Socioeconomic characteristics | Households which have inherited property | |
|---|---|------|
| | % | |
| Occupation (profession/trade) of tenant/owner | Freelance professional | 32.7 |
| | Entrepreneur | 25.7 |
| | White-collar worker | 16.8 |
| | Civil servant | 32.1 |
| | Farmer | 58.0 |
| | Blue-collar worker | 14.1 |
| | Other (contractor, free agent) | 12.6 |
| | Retired | 21.9 |
| | Not gainfully employed (parental leave, unemployed, on home duties, etc.) | 14.5 |
| Net household income | Up to EUR 795 | 13.9 |
| | EUR 796 to 1,432 | 17.0 |
| | EUR 1,433 to 2,388 | 17.8 |
| | EUR 2,389 to 3,185 | 21.5 |
| | EUR 3,186 or more | 27.1 |
| Gross housing wealth | No wealth | 5.3 |
| | Wealth \leq median | 24.8 |
| | Wealth $>$ median | 25.5 |
| | Wealth $>$ two times the median | 29.5 |
| | Wealth $>$ five times the median | 46.1 |
| Housing situation | One-family/two-family home | 29.6 |
| | Condominium | 16.3 |
| | Co-op apartment | 8.7 |
| | Rental apartment | 12.1 |
| | Public housing apartment | 21.1 |
| | Other (employer-provided housing, life tenants, beneficiaries of usufructs or other) | 15.8 |
| Highest level of education of tenant/owner | Compulsory education | 19.7 |
| | Apprenticeship, vocational school, intermediate or higher technical/vocational school | 20.3 |
| | High school | 17.4 |
| | College, university, academy | 21.5 |
| Age of tenant/owner | 18 to 29 years | 5.3 |
| | 30 to 39 years | 15.9 |
| | 40 to 49 years | 22.5 |
| | 50 to 59 years | 26.8 |
| | 60 to 69 years | 26.1 |
| | 70 years or older | 19.9 |
| Total | | 19.9 |

Source: HSHW 2008.

to integrate the housing conditions into the equation, and educational attainment has a positive, but insignificant effect despite its positive relationship with the inheritance probability. Educational attainment appears to be a weak indicator of real estate inheritance in Austria.

3.2 How Large Are the Inheritances?

In Austria, approximately 20% of all households have inherited real estate. In the HSHW, households which had inherited real estate were asked to indicate when this had been the case and how much the property or properties had been worth at the time. As individual households may have inherited more

than once, and as different households will have inherited at different points in time, the values of their inheritances need to be adjusted to make them comparable over time. The usual approach is to calculate present values. As these value adjustments imply a transformation of the values indicated in the survey, it would appear to make sense to calculate different variants. Adjusting the values of assets is particularly difficult in the case of inherited properties, as price developments will differ strongly from building to building, depending on location, building fabric, refurbishing or extension work, and numerous other factors.

The common approach in the literature is to assume underlying values to have changed at a real interest rate of between approximately 2% to 3% p. a. (Wolff, 2002; Cannari and D'Alessio, 2008) or to use real estate price indices (Kohli et al., 2006), which tend to reflect even higher increases in value. It is also common to use reported and adjusted values side by side (Cannari and D'Alessio, 2008).

The method of assuming inherited real estate to have gained in value over time is controversial for a number of reasons. On the one hand, it is not clear whether increases in value should be considered to be part and parcel of the inheritance. On the other hand, it is hard to say what part of an inheritance is used for consumption and what part is used to increase real estate wealth. Obviously, the respective shares differ significantly among different types of households. These controversies notwithstanding, in the literature, the adjustment interest rate is generally applied to the total inheritance value.

In the case at hand, assuming the value of inherited real estate properties in Austria to have grown at a real inter-

est rate of between 2% and 3% p. a. might cause the significance of real estate bequests to be overestimated. Using the real estate price index published by the Federal Economic Chamber of Austria instead is not an option, either, as there are no sufficiently comparable time series for the period leading up to 2000. For those reasons and to make the influence of the assumed value adjustments as transparent as possible, our approach was to proceed with caution and to calculate three variants in parallel:

(a) Simple value:

The values of inherited estates are shown as indicated by respondents. Rather than assuming the assets to have increased in value, we assume them to have lost in value in real terms (compared with the consumer price index (CPI)).

(b) Present value I:

We apply a nominal interest rate of 2% p. a. to the values of inherited estates, which is tantamount to a loss in value in real terms (compared with the CPI).

(c) Present value II:

We assume the values of inherited estates to have increased in line with the CPI. In other words, we assume the underlying real value with regard to households' purchasing power (as measured by the CPI) to have been preserved.

The present values relate to the year in which the HSHW was conducted, namely 2008. When we refer to the value of inherited real estate properties below, we mean the combined (simple) value of all properties as indicated by a given household, or the aggregate present values of all inherited properties, as adjusted.

Table 3

Inheritance Values as Established with Three Different Calculation Methods

| | Simple value | Present value I | Present value II |
|------------------------------|--------------|-----------------|------------------|
| Share of heirs in % | 19.9 | 19.9 | 19.9 |
| All households | | | |
| Average in EUR | 27,935 | 43,542 | 58,424 |
| Median in EUR | 0 | 0 | 0 |
| Gini index | 0.92 | 0.92 | 0.93 |
| Inheriting households | | | |
| Average in EUR | 140,559 | 219,088 | 293,968 |
| Median in EUR | 79,999 | 112,616 | 122,967 |
| Gini index | 0.58 | 0.60 | 0.64 |

Source: HSHW 2008.

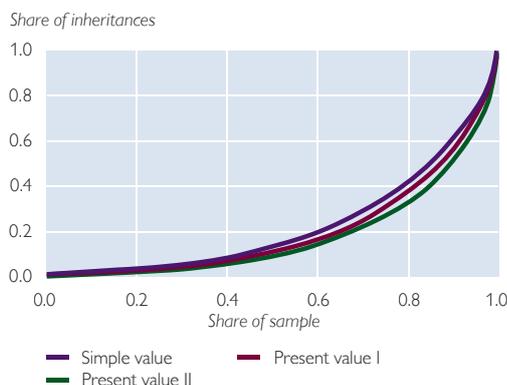
Using all three calculation methods, we thus find Austrian households (including any households which have not inherited anything) to have, on average, inherited real estate properties worth EUR 27,900 or EUR 43,500 or EUR 58,400. In other words, the average real estate value doubles when adjusted for the CPI. When we limit the calculation to those households which have inherited real estate, the average value of inherited real estate properties comes to EUR 140,600 or EUR 219,100 or EUR 294,000 EUR, respectively.

Both Gini coefficients (table 3) and Lorenz curves (chart 1) reflecting the inheritance values of households which have inherited real estate show that calculations based on present values lead to a higher degree of concentration of inheritance values. Value adjustments based on a real interest rate of between 2% and 3% p. a., as is common in the literature, would have led to an even higher degree of concentration.

Calculating deciles over the value of inheritances for households which have inherited allows us to show how inheritance wealth is distributed among households. As is evident from table 4, approximately 10% of all households which have inherited real estate – which is approximately 2% of all households – have received roughly 40% of the aggregate inheritances (simple value). This is approximately as much as the combined inheritance size of the lower 80% of the households which have inherited real estate. Based on present values, this figure increases to almost 50% of all inheritances (present value II). This means that the upper 10% of inheriting households have inherited as much as all other inheriting households taken together. Surprisingly, the financial value of the inherited real estate – which would generally

Chart 1

Lorenz Curve of Inheritance Values Based on Three Different Definitions



Source: HSHW 2008.

Table 4

Inheritance Decile Averages and Shares in Aggregate Inheritances

| | Simple value | | Present value I | | Present value II | |
|-----------|--------------|-----------------|-----------------|-----------------|------------------|-----------------|
| | Average | Share of decile | Average | Share of decile | Average | Share of decile |
| | EUR | % | EUR | % | EUR | % |
| Decile 1 | 6,401 | 0.5 | 9,422 | 0.4 | 11,156 | 0.4 |
| Decile 2 | 16,376 | 1.1 | 24,290 | 1.1 | 27,202 | 0.9 |
| Decile 3 | 27,238 | 1.9 | 43,136 | 2.0 | 50,051 | 1.7 |
| Decile 4 | 44,596 | 3.2 | 65,584 | 3.0 | 78,310 | 2.7 |
| Decile 5 | 67,659 | 4.9 | 97,662 | 4.5 | 109,585 | 3.7 |
| Decile 6 | 96,205 | 6.8 | 133,566 | 6.0 | 151,938 | 5.1 |
| Decile 7 | 136,493 | 11.0 | 190,357 | 8.7 | 221,763 | 7.5 |
| Decile 8 | 183,410 | 11.1 | 272,072 | 12.4 | 330,603 | 11.4 |
| Decile 9 | 259,721 | 19.8 | 396,871 | 18.6 | 500,799 | 16.8 |
| Decile 10 | 602,882 | 39.7 | 975,346 | 43.3 | 1,467,450 | 49.8 |

Source: HSHW 2008.

be expected to exceed the value of financial assets – is comparatively small in most cases. As a case in point, the average (simple) value is below EUR 200,000 even in the eighth decile of inheriting households, and the average CPI-adjusted value is below EUR 260,000 – which is the average sales price for primary residences – even in the seventh decile (Fessler et al., 2009a). While the decile averages change considerably depending on the method of calculation (simple value, present value I, present value II), the decile shares are robust with regard to the chosen method. The number of small real estate inheritances is very large, that of large real estate inheritances is very small. This finding is in line with international evidence produced by virtually all inheritance analyses (e.g. Wolff, 2002; Kohli et al., 2006; Cannari and D'Alessio, 2008).

3.3 Who Inherits How Much?

Apart from the question of which households – as differentiated by certain socioeconomic characteristics – have inherited more often than others, the question arises as to how much in-

dividual households inherit and how large the differences are.

The size of inheritances depends, above all, on the socioeconomic characteristics of people's parents and grandparents. The socioeconomic characteristics themselves are correlated across generations. For instance, respondents with a higher level of educational attainment tend to have had better-educated, wealthier parents with higher incomes, reflecting a high degree of intergenerational transmission of social status, income, wealth, consumption and educational attainment. Mulligan (1999) provides an overview of numerous studies that have confirmed these relationships.

Households participating in the HSHW (i.e. the owners or tenants of a household's primary residence) were asked to indicate what level of educational attainment they had achieved. Educational attainment is an excellent indicator of parent households' social characteristics, as it is very stable throughout the life cycle and highly correlated with income, wealth and social status (OECD, 2008, p. 216).

Table 5

Rank Correlation between Educational Attainment and Inheritance Values of Inheriting Households

| Owner/tenant | Simple value | Present value I | Present value II |
|-----------------------------|-----------------|-----------------|------------------|
| | Kendall's Tau-b | | |
| Educational level | 0.090*** | 0.031* | -0.026 |
| Educational level of father | 0.153*** | 0.106*** | 0.062*** |
| Educational level of mother | 0.101*** | 0.043** | -0.004 |

Source: HSHW 2008.

Note: *, **, ***: Significant at the 10%, 5% and 1% level of significance.

While respondents' parents constitute only one potential source of inheritances,²⁰ there is a significantly positive correlation between the size of the inheritances made by households and their level of educational attainment as well as that of their parents (table 5). In the case of simple values and present values I, the level of educational attainment of participating households and of their mother as well as father are correlated significantly with the size of the inheritances. When it comes to present values II, a significant positive correlation remains only for the fathers. This relationship may be explained by the opposing effects of age. The older the respondents are, the higher the probability is that a member of the household has made an inheritance, and the lower the probability is (on account of the process of education expansion) that they will have a higher level of educational attainment. The rise in women's general level of educational attainment occurred with a lag compared with men. When inheritances are adjusted for the CPI (present values II), this effect increases because inheritances made a longer time ago rise in value

and the assets tend to have been bequeathed by people with a lower degree of educational attainment.

Approximately 90% of households which had inherited real estate owned property at the time of the survey. This group accounted for some 97% of the aggregate inheritances. If we divide the inheriting households into five groups of equal size according to their real estate wealth (quintiles), we find the shares of inheriting households to be higher – and the size of the inheritances to be significantly higher – in the upper quintiles²¹ (table 6), for two reasons: First, the inheritance becomes part of these households' real estate wealth and second, wealthier households make significantly larger inheritances. Moreover, between the fourth and the fifth quintile, the share of inheriting households increases by roughly 42%, and the share of aggregate inheritances more than doubles.

The different calculation methods (simple value, present value I, present value II) have a significant impact on the quintile averages (table 6). At the same time, the quintile shares in inheritances remain relatively constant. This

²⁰ What is not evident from the survey, however, is information on households' potential partners or on their grandparents, etc.

²¹ The share of households who have inherited exceeds the average in all quintiles. This is so because, in the case at hand, we have looked only at households who own real estate (which is roughly 90% of all households who have inherited), and those households have inherited significantly more often than the average household.

Table 6

Quintile Averages and Shares in Aggregate Inheritances by Real Estate Wealth Quintiles¹

| | Simple value | | Present value I | | Present value II | | |
|------------|--------------|-------------------|-----------------|-------------------|------------------|-------------------|------|
| | Average | Share of quintile | Average | Share of quintile | Average | Share of quintile | |
| | % | EUR | % | EUR | % | EUR | |
| Quintile 1 | 26.0 | 73,663 | 8.6 | 103,355 | 7.8 | 127,755 | 7.8 |
| Quintile 2 | 24.7 | 127,854 | 14.2 | 193,045 | 13.9 | 245,315 | 13.9 |
| Quintile 3 | 24.3 | 146,366 | 16.1 | 231,840 | 16.4 | 324,423 | 16.4 |
| Quintile 4 | 31.0 | 142,346 | 20.2 | 228,473 | 20.9 | 308,027 | 20.9 |
| Quintile 5 | 44.0 | 210,570 | 40.9 | 326,285 | 41.0 | 417,253 | 41.0 |

Source: HSHW 2008.

¹ Only households which have inherited and own real estate were taken into account. Quintiles cover only real estate owners.

can be explained with the fact that the points in time at which households inherited real estate are distributed randomly over quintiles and households, so that the calculation of present values has a limited influence on the relative quintile shares of aggregate inheritances. While the lowest real estate quintile (owners of real estate only)

accounts for less than 9% of aggregate inheritances, the highest quintile is accountable for as much as 41%.

The higher the real estate wealth of households, the lower is the relative share of inherited property in their total real estate wealth (table 7). Both the median and the average share of inherited housing in overall real estate

Table 7

Share of Real Estate Inheritances in Real Estate Wealth of Inheriting Households¹

| | | Quintile 1 | Quintile 2 | Quintile 3 | Quintile 4 | Quintile 5 |
|------------------|--|------------|------------|------------|------------|------------|
| | | % | | | | |
| Simple value | Median share of inheritances in wealth ² | 74.4 | 82.1 | 44.4 | 27.0 | 9.6 |
| | Average share of inheritances in real estate wealth ² | 141.5 | 84.9 | 66.0 | 44.5 | 24.5 |
| | Share of inheritances in real estate wealth ³ | 111.1 | 84.1 | 66.1 | 44.8 | 13.9 |
| Present value I | Median share of inheritances in wealth ² | 100.4 | 97.1 | 67.3 | 39.0 | 14.5 |
| | Average share of inheritances in real estate wealth ² | 213.6 | 128.9 | 106.2 | 71.5 | 38.1 |
| | Share of inheritances in real estate wealth ³ | 155.8 | 127.1 | 104.4 | 71.8 | 21.5 |
| Present value II | Median share of inheritances in wealth ² | 102.8 | 99.7 | 74.8 | 44.4 | 17.2 |
| | Average share of inheritances in real estate wealth ² | 279.6 | 165.5 | 151.3 | 96.4 | 48.8 |
| | Share of inheritances in real estate wealth ³ | 192.8 | 161.1 | 146.9 | 97.1 | 27.4 |

Source: HSHW 2008.

¹ Only households which have inherited and own real estate.

² Calculated at the individual household level.

³ Calculated at the quintile level.

Table 8

Annual Real Estate Inheritances

| | Inheritances made in the past ten years | | | Inheritances made in the past five years | | |
|---|---|-----------------|------------------|--|-----------------|------------------|
| | Simple value | Present value I | Present value II | Simple value | Present value I | Present value II |
| Share of inheriting households in % | | 5.9 | | | 2.8 | |
| EUR average | 137,796 | 153,189 | 154,577 | 141,117 | 148,469 | 150,072 |
| Share of inheritances p.a. in real estate wealth in % | 0.33 | 0.36 | 0.36 | 0.32 | 0.34 | 0.34 |
| Share of inheritances p.a. in GDP in % | 1.06 | 1.18 | 1.19 | 1.04 | 1.09 | 1.11 |

Source: HSHW 2008.

wealth decreases steadily from the first to the fifth real estate wealth quintile (with quintiles, again, calculated only for owners). The same holds true for the share of inheritances in the real estate wealth of inheriting households clustered in the same quintile.

Tables 6 and 7 show that, while rising in absolute terms in line with the size of real estate wealth, real estate inheritances decline relative to overall real estate wealth. In other words, inheritances clustered in the lower real estate wealth quintiles are more significant with regard to their relative share in total real estate wealth than inheritances clustered in the higher real estate wealth quintiles. While the average real estate inheritance is roughly three times as high in the highest quintile as in the lowest quintile, the average share of the inheritance in real estate wealth is six times as high in the lowest quintile as in the highest quintile. Hence numerous studies conclude that bequests offset inequality somewhat.²² Yet this perspective neglects differences in the use of inheritances (consumption or

saving). Neither the Austrian HSHW data nor the German SOEP (Socio-Economic Panel) data provide any evidence about the direct use of inheritances. Still, Kohli et al. (2006) conclude on the basis of SOEP longitudinal data generated in two waves that inheritances tended to increase the wealth previously accumulated by households.

3.4 Volume of Real Estate Inheritances

Depending on the calculation method, real estate inheritances of households account for a share of 11% (simple value), 17% (present value I) or 23% (present value II) of their overall real estate wealth. Note that those figures do not reflect any real increases in value.

In order to get an idea of how much real estate is inherited per year, we calculated the respective average values for two periods: for the ten years from 1998 to 2007, and for the five years from 2003 to 2007. We found 5.9% (2.8%) of households to have inherited real estate in those ten (five) years. This

²² The Gini coefficient drops when, say, in a group of two persons, person A, who already has EUR 10, inherits another EUR 5 and person B, who already has EUR 1,000, inherits another EUR 499. While the difference between the wealth of A and B thus increases in absolute terms, the respective bequest accounts for a larger share of A's wealth than of B's wealth.

Table 9

Share of Inheritances in Total Household Wealth – Selection of Relevant Literature

| Authors | Share of inheritances/gifts in total wealth | Comments |
|-------------------------------|---|---|
| Kotlikoff and Summers (1981) | 80% | United States, capitalized inheritances, spending for durable consumer goods, financial support by parents for adult children |
| Modigliani (1988) | 20% | United States, inheritances only, no college expenses (therefore figures only half as high as in Kotlikoff and Summers); not remunerated (lops another half of the figures of Kotlikoff and Summers) |
| Davies and St.-Hilaire (1987) | 35% present value, 53% capitalized | Canada, inheritances not remunerated |
| Kessler and Masson (1989) | 46% inheritances | France |
| Gale and Scholz (1994) | 20% gifts, 30% inheritances, 12% college expenses | United States, data based on US-SCF 1983, 1986; deliberate transfers by parents to adult children in other households, only inter-household transfers above USD 3,000 (including payment of college expenses) |
| Wolff (2002) | One-third each inheritances, gifts, saving | United States |
| Brown and Weisbrenner (2002) | 20% to 25% | United States, data based on US-SCF 1998; inheritances and gifts; high degree of concentration |
| Klevmarken (2004) | 19% capitalized, 10.5% present value | Sweden, inheritances and gifts; capitalized at a real interest rate of 3%; HUS 1998 |
| Kohli et al. (2006) | 27% | Germany, increase in housing value and prices of 2002 |
| Cannari and D'Alessio (2008) | 56% capitalized, 34% present value | Italy, capitalized at a real interest rate of 3% |

boils down to approximately 0.6% of households inheriting some real estate on average during that period. For Germany, SOEP data show that some 1.5% of households made inheritances (real estate, financial assets, companies) each year, with the aggregate annual volume of inheritances corresponding to approximately 1.4% of GDP.²³ The corresponding figure for real estate inheritances in Austria is above 1% of GDP. This appears to be plausible; after all, real estate inheritances account for the lion's share of inheritances. Moreover, real estate wealth represents approxi-

mately two-thirds of the overall wealth of households in Austria. As some 40% to 50% of inheritances are clustered in the highest real estate inheritance decile (table 4), approximately 0.06% of households inherit property worth some 0.5% of GDP each year.

4 Share of Inheritances in Wealth in an International Comparison

The HSHW 2008 does not allow for analyses of the share of inheritances in the total wealth of households, as it was limited to real estate wealth and inheritances. Data integrating both financial

²³ In Switzerland, the aggregate volume of estates amounts to as much as 6.8% of GDP (Stutz et al., 2006, p. VIII).

assets and real estate wealth/inheritances are scheduled to be available for Austria by the end of 2011 upon completion of the first wave of the Eurosystem Household Finance and Consumption Survey (HFCS).

However, the share of inheritances in overall wealth has been discussed broadly in the literature (Davies and Shorrocks, 1999). SHARE (Survey of Health, Ageing and Retirement for Europe) data have also confirmed for EU countries that intergenerational transfers are a major source of household wealth. Across all SHARE countries, about 30% of all households reported to have received large gifts or inheritances larger than EUR 5,000 at least once. The top 5% of inheriting households have received about two-thirds of all inheritances (Börsch-Supan et al., 2005).

Davies and Shorrocks (1999) expect inheritances to account for 35% to 45% of household wealth; yet surveying the literature shows a high degree of dispersion (table 9).

The differences can be attributed to the following factors:

- In the absence of a uniform definition of wealth, individual surveys and register data reflect different delimitations of wealth in different studies.
- More than one model of valuation was used (different papers use different interest rates).
- Different papers use different concepts of the intergenerational transfer of wealth (inheritances, gifts, spending on education, etc.).
- Different survey dates reflect different stock prices, and the differences may be substantial.

The range of results shows that it is of paramount importance to make the underlying methodological approaches transparent, as all methods come with

specific problems. This is the case in particular for the calculation of present values, as the present values may differ for different types of wealth. When inheritances include financial assets and real estate, it would be necessary to establish or assume separate price paths for stocks, trade investments, mutual fund shares, passbook savings, cash, real estate, life insurance plans, etc. Assuming an average real interest rate is problematic as a rule, as this interest rate may be adequate for some periods but not for others. Average interest rates applied to all inheritances cause inheritances to be weighted differently at different times.

5 Summary and Conclusions

Bequests of real estate account for a considerable share of household wealth, which is why real estate inheritances may have far-reaching implications for monetary policymaking and for the maintenance of financial stability. Real estate is used to collateralize loans and is of particular relevance for the resilience of households to financial risks. Prospects of inheriting housing or plans to bequeath housing can, moreover, have an impact on saving and consumption.

Given the relevance of household wealth and of inheritances for monetary policy and financial stability, the Eurosystem HFCS, which will be conducted in 2010 in Austria, will contain a separate inheritance chapter. The HSHW is a pilot project for the HFCS, which will provide harmonized data for the euro area. While the HSHW was limited to real estate wealth and inheritances, the HFCS will cover total wealth and the different types of wealth transfers.

Based on the OeNB Household Survey on Housing Wealth 2008, we found the Gini coefficient for inherited

housing to range from 0.92 to 0.93²⁴ depending on the calculation method. Approximately 20% of Austrian households reported that they had inherited real estate, with the inheritance share being highest (about 27%) for the age group of the 50- to 70-year-olds. Real estate wealth was higher among inheriting households than among nonheirs. The number of Austrian households

which have inherited huge real estate properties is very small. The relative share of inherited real estate properties in total real estate wealth is larger among households with smaller real estate wealth; in other words, real estate inheritances tend to have an equalizing effect on the prevailing distribution of wealth. The results for Austria are in line with international findings.

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²⁴ To put these figures into perspective: A Gini coefficient of 0.92 might imply, for instance, that as many as 99 persons out of 100 inherited a single euro each, whereas 1 person inherited as much as EUR 1,400.

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Annex

HSHW Questions Relating to Inheritance Issues

1. Have you (= your household or any member of your household) ever inherited real estate?
2. How many real estate items did you inherit?
3. In what year was that (approximately)?
4. What was the approximate value of this real estate item (please indicate separately for each real estate item inherited)?

Stock Market Volatility and the Business Cycle

Burkhard Raunig,
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In this paper we provide a review of the literature on the link between stock market volatility and aggregate demand. In particular, we focus on the implications of the so-called uncertainty hypothesis according to which it is primarily the uncertainty associated with stock market fluctuations that influences aggregate demand. Empirical studies find that stock market volatility indeed feeds back into the real economy.

JEL classification: E44, E20, E30

Keywords: uncertainty hypothesis, conditional volatility, business cycle

Although conventional wisdom holds that the stock market plays an important role for macroeconomic developments and the business cycle, the precise linkages between the stock market and macroeconomic aggregates are not well understood. Several transmission channels have been proposed in the literature: For instance, stock market fluctuations influence the wealth of stock holders and therefore influence consumption spending (e.g. Poterba, 2000). In addition, stock price fluctuations may also influence investment spending via their impact on financing conditions.

Moreover, it is not clear how important the effects of financial market fluctuations are for real economic activity in a quantitative sense. For example, although it is generally claimed that the Great Crash in 1929 was the starting point of the Great Depression, several economists argue that these two events were only loosely related at best. Temin (1976), for instance, finds that direct wealth effects were fairly small due to the small fraction of consumers that actually invested in the stock market (see also Romer, 1990).

More generally, the main problem of theories that seek to establish a causal link between stock market fluctuations and real economic activity is that potential effects appear to be too small, quantitatively, to have a large impact on

macroeconomic variables. In this sense, the stock market appears to be a side-show from a business cycle point of view. This point of view is also consistent with Barro and Ursua (2009), who show that although stock market crashes have predictive power for business cycle downturns, only 30% of stock market crashes are associated with depressions, while severe depressions are almost always associated with stock market crashes. Put differently, stock market crashes occur with substantially higher frequency than depressions. If crashes are related to economic downturns in a causal way, one would expect to see that a larger fraction of crashes are associated with periods of economic slowdowns.

Romer (1990) proposes an additional channel through which stock market fluctuations, albeit not necessarily stock market crashes themselves, impact upon aggregate demand. In her theory, the so-called uncertainty hypothesis, volatility of the stock market leads to uncertainty about future economic conditions and may thereby result in lower consumption and investment spending. According to this view, stock market volatility can lead to substantial effects on, say, consumption spending even if the fraction of asset-holding households is small, as long as non-asset-holding households also view the stock market

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as a predictor of future economic activity. Thus, stock market uncertainty can have large effects despite the fact that households' direct stock market participation is rather limited. Similarly, if stock market volatility can be viewed as an indication of how uncertain firms regard future developments, it can have a large effect on investment even if only a small fraction of firms in an economy are subject to financing conditions determined by stock price movements.

In this paper, we provide empirical evidence on the relationship between stock market volatility and the business cycle and review the existing literature.

The remainder of this paper is structured as follows: Section 1 describes methods used to measure conditional stock market volatility and provides some indication of how volatility and the business cycle are related. Section 2 summarizes the empirical literature, and section 3 concludes the paper.

1 Stock Market Volatility, Crashes and Recessions

1.1 Volatility, Stylized Facts and Measurement

Share prices can fluctuate for numerous reasons. For example, share prices may respond to new firm-specific information, change due to the changing risk aversion of investors or react to changes in expectations about the future course of the economy. Volatility reflects the magnitude of such price fluctuations. If volatility is high, the chance that we see large positive or negative price changes is high, too. By contrast, low volatility implies that deviations from expected price changes are small on average. Volatility is therefore widely used as a measure of risk in financial markets.

Chart 1 shows the daily returns (i.e. the logarithmic daily price changes) on the S&P 500 index over the period

from 1960 to the end of 2008. As can be seen, the magnitude of the returns varies considerably. Turbulent periods of highly fluctuating returns tend to follow periods in which return fluctuations are rather modest. This phenomenon, called "volatility clustering" in the literature, suggests that volatility varies over time. Another phenomenon, which is more specific to stock returns, is volatility asymmetry. Volatility tends to increase more strongly after negative returns than after equally large positive returns (French et al., 1987).

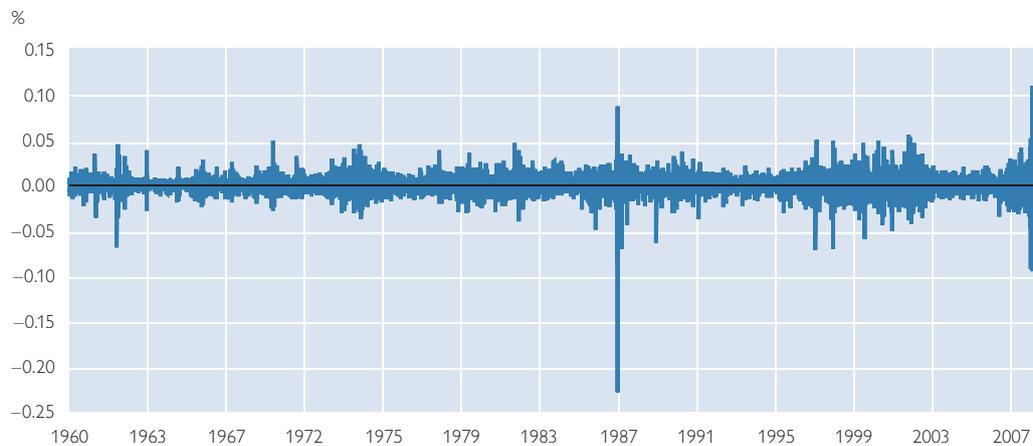
Unfortunately, volatility cannot be observed directly and must therefore be estimated. Moreover, the presence of volatility clustering and asymmetry calls for models that are able to adequately capture the dynamics of volatility. Four different approaches are popular for modeling and forecasting volatility. These include historical volatility, autoregressive conditional heteroskedasticity (ARCH)-type models, stochastic volatility models and option implied volatility. There exists an extensive literature on the specification, estimation and performance of the aforementioned models. Li et al. (2002), Poon and Granger (2003), and Andersen et al. (2006) provide recent surveys of this literature.

In this paper, we only describe three alternative models that we use here to illustrate the evolution of stock market volatility over time. Ultimately, we are interested in the relationship between stock market volatility and the business cycle. The macroeconomic data used in our calculations are available on a quarterly frequency; therefore we focus on quarterly stock market volatility.

A simple model from the class of historical volatility models is the standard deviation s_t of financial returns based on a rolling time window with fixed window length. Using daily log

Chart 1

S&P 500 Daily Stock Market Returns



Source: OeNB.

returns r_i the estimator of volatility is given by

$$s_t = Q \sqrt{\frac{1}{N-1} \sum_{i=1}^N (r_i - \bar{r})^2} \quad (1)$$

where \bar{r} denotes the average daily return over a quarter, N is the number of trading days within a quarter and $Q = \sqrt{365/4}$ is a scaling factor that converts daily volatility into quarterly volatility. Due to the rolling window, this estimator captures volatility clustering, albeit in a rather simple manner. However, the estimator does not account for volatility asymmetry because the estimator does not discriminate between positive and negative returns.

A more sophisticated model that accounts for volatility clustering as well as for volatility asymmetry is the asymmetric GARCH (generalized ARCH) model proposed in Glosten, Jagannathan and Runkle (GJR) (1993). In the GJR model, stock market volatility may respond differently to positive and negative shocks. We obtain these shocks implicitly by filtering monthly returns r_{mt} with a first order autoregressive process

$$r_{mt} = \alpha_0 + \alpha_1 r_{m,t-1} + \sqrt{h_t} \varepsilon_t \quad (2)$$

where the shocks ε_t are assumed to be independently and identically distributed with zero mean and unit variance. The conditional variance h_t of the returns is given by

$$h_t = \beta_0 + \beta_1 \varepsilon_{t-1}^2 + \beta_2 \Pi_{t-1}^- \varepsilon_{t-1}^2 + \beta_3 h_{t-1} \quad (3)$$

In (3) the variable Π_{t-1}^- equals 1 if $\varepsilon_{t-1} < 0$ and 0 otherwise. If $\beta_2 > 0$ then negative shocks have a larger impact on volatility than positive shocks. We estimate equations (2) and (3) jointly with maximum likelihood methods using monthly stock index return data. To obtain a measure of quarterly volatility, we take the square root of the sum of the estimated monthly conditional variances over a given quarter.

The models introduced so far use historical data of financial returns to estimate volatility. Alternatively, volatility can also be backed out from quoted prices of traded financial derivatives if volatility is required as an input parameter to price these instruments. Volatility obtained in this way is called implied volatility. It is often argued that implied volatility is superior to time

series-based volatility because implied volatility reflects the current view in the market about future volatility. The most popular index of U.S. implied stock market volatility is the VIX provided by the Chicago Board Option Exchange (CBOE). The VIX is based on implied volatility backed out from prices of S&P 500 index options. We use this index of implied S&P 500 volatility as our third measure of U.S. stock market volatility.

1.2 Volatility, Crashes and Recessions

Stock market crashes are periods where the prices of many stocks traded in the market suddenly drop dramatically. These extreme price declines often occur at the end of a speculative bubble and may be caused by sharp revisions of market participants’ expectations, by overreaction to new information, herd behavior or panic. The economic uncertainty associated with financial crashes is typically reflected in high levels of stock market volatility.

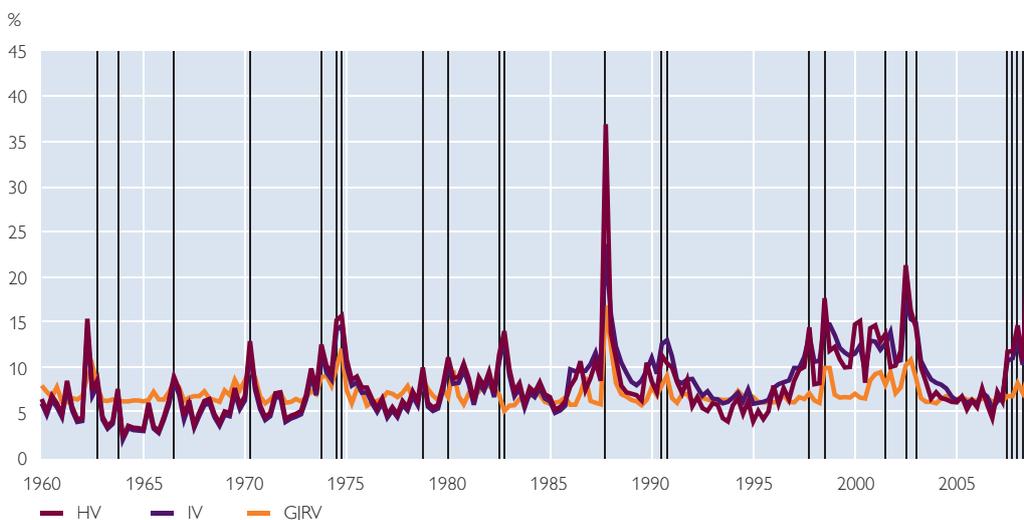
Chart 2 shows the evolution of quarterly U.S. stock market volatility over the period from 1960 to the end of 2008 together with a dummy variable that takes on the value of 1 during quarters belonging to crash periods and 0 otherwise. Our classification into crash periods follows Bloom (2009). Volatility is measured by historical volatility (HV) based on (1), GARCH-type volatility (GJRV) based on (2) and (3), and implied volatility (IV) based on the VIX index.

Our data cover 196 quarters, from which 171 are classified as normal periods and 25 are classified as crash periods. In chart 2 it is easy to see that volatility skyrockets during crash periods no matter how volatility is measured. The crashes of 1987 and 2008 stand out as episodes where volatility was extraordinarily high.

Table 1 contains summary statistics for our volatility measures. As can be anticipated from chart 2, the level of volatility is considerably higher during crash periods than in noncrash periods.

Chart 2

Quarterly U.S. Stock Market Volatility and Stock Market Crashes



Source: OeNB.

Note: Vertical lines denote crash quarters.

Table 1

U.S. Quarterly Stock Market Volatility during Crashes and Normal Times

| No crash | HV | GJRV | IV |
|------------------------|------|------|------|
| Mean | 7.3 | 7.0 | 7.5 |
| Median | 6.8 | 6.6 | 6.9 |
| Maximum | 16.3 | 12.4 | 15.9 |
| Minimum | 2.2 | 5.8 | 2.1 |
| Number of observations | 171 | 171 | 171 |
| Crash | HV | GJRV | IV |
| Mean | 15.2 | 9.0 | 13.2 |
| Median | 12.9 | 8.4 | 12.6 |
| Maximum | 40.5 | 16.9 | 29.3 |
| Minimum | 7.6 | 5.2 | 7.1 |
| Number of observations | 25 | 25 | 25 |

Source: OeNB.

Moreover, all three volatility measures take on their highest value in a crash period.

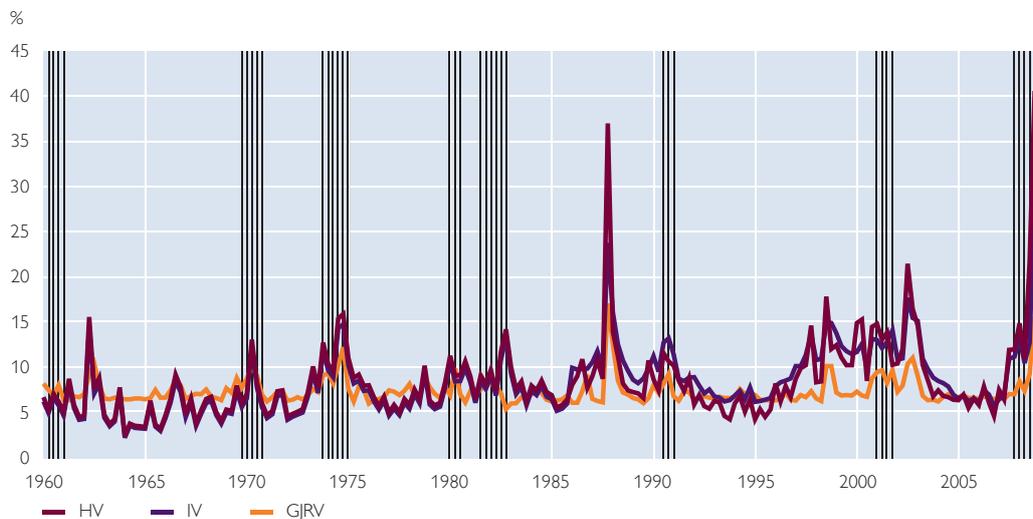
Stock market crashes often precede recessions. Barro and Ursua (2009) investigate the long term economic history for 30 countries and conclude that stock market crashes have indeed some

predictive power for recessions. However, not every crash results in a recession. For example, the spectacular “Black Monday” of October 19, 1987, when the S&P 500 index dropped by more than 20% within a day and stock markets crashed around the world, was not followed by a severe recession. However, stock market volatility tends to be higher during a recession (e.g. Schwert, 1989). This can be seen in chart 3, where our measures of U.S. stock market volatility are plotted together with a dummy variable that takes on the value of 1 when a quarter belongs to a recession period as classified by the U.S. National Bureau of Economic Research (NBER) and 0 otherwise.

Table 2 shows summary statistics for our volatility measures over economic expansions and recessions of the U.S. economy over the period from 1960 to 2008. Over this sample period 160 quarters are classified as expansionary and 36 quarters are classified as contractions. Again, stock market volatility is larger on average during recessions.

Chart 3

Quarterly U.S. Stock Market Volatility and Recessions



Source: OeNB.

Note: Vertical lines denote recession quarters.

Table 2

U.S. Quarterly Stock Market Volatility in Periods of Expansion and Recession

| No recession | HV | GJRV | IV |
|------------------------|------|------|------|
| Mean | 7.6 | 7.0 | 7.7 |
| Median | 6.8 | 6.6 | 7.0 |
| Maximum | 36.9 | 16.9 | 23.6 |
| Minimum | 2.2 | 5.8 | 2.1 |
| Number of observations | 160 | 160 | 160 |
| Recession | HV | GJRV | IV |
| Mean | 11.3 | 8.3 | 10.4 |
| Median | 10.4 | 8.0 | 10.3 |
| Maximum | 40.5 | 15.5 | 29.3 |
| Minimum | 4.9 | 5.2 | 4.5 |
| Number of observations | 36 | 36 | 36 |

Source: OeNB.

1.3 Volatility and Output

The empirical observation that stock market volatility tends to be higher during recessions points toward a negative relationship between stock market volatility and output. Chart 4 shows a scatter plot of U.S. quarterly percent-

age growth of real GDP against implied U.S. stock market volatility together with a fitted regression line.

The negative relationship between volatility and output growth is clearly visible. Scatter plots using historical volatility or GJR-based volatility instead of implied volatility show a similar negative relationship.

2 Stock Market Volatility and the Business Cycle; Empirical Evidence

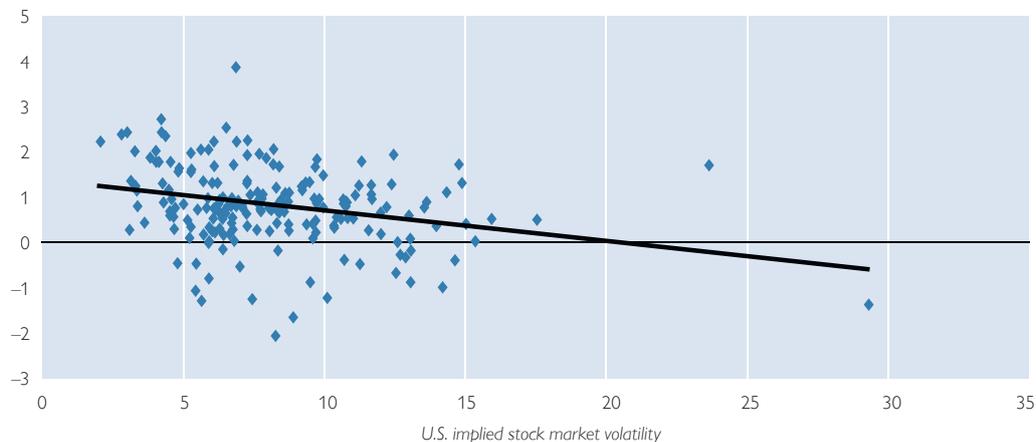
Although the empirical evidence presented in the previous section indicates a close relationship between stock market volatility and economic fluctuations, the evidence is only suggestive. However, several papers document similar linkages using more detailed empirical approaches. We now turn to this literature in greater detail.

The empirical study of Romer (1990) deals primarily with the onset of the Great Depression. However, Romer also presents estimates of the relationship between stock market volatility and consumption in the U.S.A.

Chart 4

U.S. Stock Market Volatility and GDP Growth

U.S. quarterly percentage growth of real GDP



Source: OeNB.

for the post-war period.² Using annual U.S. data ranging from 1949 to 1986, she concludes that a doubling of stock market volatility reduces durable consumer goods output by about 6%, whereas the effect on nondurables is essentially 0. This ordering of the magnitudes of the effects is consistent with the idea that stock market volatility is closely related to uncertainty about future real economic activity. This is because nonreversibility gives rise to a lock-in effect that is particularly pronounced during periods of high uncertainty. Consider for instance a consumer deciding to buy a durable consumption good. Given the durable nature of the good and the uncertainty about future income, it may turn out that the good is either too modest or too luxurious with respect to future income. However, if the consumer waits until uncertainty is resolved, it may be easier to choose an appropriate good. Thus, by postponing the purchase of the good, the lock-in effect can be avoided and the benefit of doing so increases with the level of uncertainty. It follows that decisions that are irreversible to a larger extent are postponed, resulting in particularly pronounced reactions of durable consumption expenditures and investment expenditures to increasing stock market volatility.

Since investment decisions are presumably the least reversible, one would expect that stock market volatility has the largest effect on investment spending, followed by durable consumption and nondurable consumption. Note that if households substitute away from durable consumption goods into nondurable consumption goods because of higher uncertainty, then nondurable

consumption may even rise during periods of high stock market volatility.

Raunig and Scharler (2010) evaluate the uncertainty hypothesis by estimating the influence of stock market volatility on durable consumption growth, nondurable consumption growth and investment growth. Their analysis is based on quarterly time series data for the U.S.A.

Based on a number of different estimates of time-varying stock market volatility, Raunig and Scharler (2010) find that stock market volatility exerts an economically and statistically significant effect on aggregate demand. Moreover, they find that the adverse effect of stock market volatility on aggregate demand depends on the extent to which decisions are reversible. Based on their richest specification (table 3), they find that an increase in volatility by one standard deviation reduces the quarterly growth of durable consumption by around -0.70 percentage points, whereas the effect on the growth of nondurable consumption is only -0.14 percentage points. Investment growth responds with a lag of one quarter and declines by 1.12 percentage points.

Table 3

Effect of an Increase in Stock Market Volatility by one Standard Deviation on U.S. Consumption and Investment Growth

| | Volatility | Lagged volatility |
|----------------------------------|------------|-------------------|
| Growth of durable consumption | -0.70 | x |
| Growth of nondurable consumption | -0.14 | x |
| Investment growth | x | -1.12 |

Source: OeNB.

² See Romer (1990), Table III.

Hence, the decline in the growth of durable consumption and investment is larger during periods of increased volatility than the decline in the growth of nondurable consumption, which is again fully consistent with the predictions of the uncertainty hypothesis.

In addition to being statistically significant, the estimated effects are also substantial in an economic sense. Stock market returns, in contrast to volatility, have a quantitatively smaller and often statistically insignificant influence on consumption and investment. This result is consistent with Lettau and Ludvigson (2004), who also find that returns exert only a limited influence on consumption. The reason is that although permanent shocks to stock prices have a strong effect on consumption, most fluctuations in prices are transitory and exert only small effects on consumption.

Alexopoulos and Cohen (2009) identify uncertainty shocks using vector autoregressive methods. To measure uncertainty, they use stock market volatility measures, as in Raunig and Scharler (2010) and Choudhry (2003), and also an index based on the number of New York Times' articles on economic uncertainty. They find that uncertainty shocks play an important role for the business cycle. In particular, uncertainty measured by the New York Times' index accounts for up to 25% of the short-run variation in employment and output.

Choudhry (2003) analyzes the influence of stock market volatility on GDP and the components of GDP using an error-correction framework. Under the assumption that volatility follows a nonstationary stochastic process, he estimates the short-run and long-run dynamics of GDP components using an error-correction framework. His results confirm that stock market volatility has

adverse effects on consumption and investment.

A different, but closely related, issue is analyzed in Jansen and Nahuis (2003). They analyze how stock market fluctuations influence consumer sentiment in a sample of eleven countries. They find that in the vast majority of countries under consideration, consumer sentiment and stock returns are positively related. They also find that causality runs from stock returns to consumer sentiment rather than vice versa. Moreover, they conclude that the correlation between stock returns and consumer sentiment mirrors expectations about future economic conditions. Therefore, the evidence presented in their paper also provides some backing for the uncertainty hypothesis, in the sense that stock market fluctuations give rise to uncertainty about future economic conditions.

Note that although the uncertainty hypothesis suggests that causality runs from stock market volatility to the business cycle, this need not necessarily be the case. Although the early literature on the determinants of stock market volatility (e.g. Schwert, 1989) finds only weak linkages between stock market volatility and macroeconomic variables, recent empirical research (e.g. Engle et al., 2008; Diebold and Yilmaz, 2010) establishes important linkages between macroeconomic fundamentals and stock market volatility. In particular, Arnold and Vrugt (2008) find a strong link between macroeconomic uncertainty and stock market volatility using survey data from the Survey of Professional Forecasters maintained by the Federal Reserve Bank of Philadelphia. The authors find that rising uncertainty about future macroeconomic developments increases stock market volatility. Thus, taken together with the evidence presented above, it appears

that causality between macroeconomic outcomes and stock market volatility is bidirectional.

3 Concluding Remarks

In this paper, we review the theoretical and empirical literature dealing with the link between the stock market and real economic activity. Our particular focus is on the so-called uncertainty hypothesis according to which it is not stock market fluctuations per se which influence aggregate demand, but the volatility associated with such fluctuations.

The main idea is that increased volatility results in higher uncertainty about future economic conditions. Increased uncertainty, in turn, leads to lower consumption and investment spending, and this shortfall in aggregate demand causes an economic slowdown. Empirical evidence suggests that this indirect channel through which stock market developments feed back into the real economy is quantitatively important.

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Modeling and Predicting the EUR/USD Exchange Rate: The Role of Nonlinear Adjustments to Purchasing Power Parity

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Reliable medium-term forecasts are essential for forward-looking monetary policy decision-making. Traditionally, predictions of the exchange rate tend to be linked to the equilibrium concept implied by the purchasing power parity (PPP) theory. In particular, the traditional benchmark for exchange rate models is based on a linear adjustment of the exchange rate to the level implied by PPP. In the presence of aggregation effects, transaction costs or uncertainty, however, economic theory predicts that the dynamics of the nominal exchange rate around the equilibrium value implied by PPP are nonlinear. This paper presents some of the shortcomings of the traditional linear exchange rate models and assesses whether alternative nonlinear formulations outperform them for forecasting purposes. We find that the theory of nonlinear adjustment to PPP is supported by the data in a threshold cointegration framework for the monthly EUR/USD exchange rate between 1990 and 2010. Furthermore, sizeable gains in terms of medium-term forecast accuracy can be obtained using nonlinear specifications.

JEL classification: E31, F31, F37

Keywords: exchange rates, purchasing power parity, nonlinearity, threshold models

Interest rate policy has a lagged, medium-term impact on inflation, which implies that monetary policy decisions must be forward looking, i.e. based on assessments of future price developments. The Eurosystem's monetary policy strategy, in particular, has a medium-term perspective: Due to the time lag of the monetary policy transmission mechanism, the ECB's interest rate decisions are based on regular economic and monetary analyses, which serve to identify risks to price stability in the short to medium term and in the medium to long term, respectively. Since exchange rates have a direct impact on price developments through their effect on import prices, they are crucial to the Eurosystem's economic assessments and projections. However, exchange rates are among the macroeconomic variables that are most difficult to forecast. Since model-based forecasts are often unsatisfactory, the Eurosystem's published economic projections are based on the technical

assumption that bilateral exchange rates remain unchanged over the projection horizon.

This paper presents some of the shortcomings of the traditional benchmark for medium-term exchange rate forecasts, namely the linear adjustment of the nominal exchange rate to the level implied by purchasing power parity (PPP), and assesses whether an alternative nonlinear formulation outperforms the traditional model in terms of forecasting accuracy.

PPP is an economic concept which postulates that international goods arbitrage will, in the long run, equate price levels across countries. If the national price level in country A is lower than in country B, international goods arbitrage will cause the currency of country A to appreciate with respect to the currency of country B, such that the price levels are equalized if expressed in one currency, and no arbitrage opportunities remain. It follows that the exchange rate – the relative

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price of two currencies – must equal the relative price levels of the respective countries. Letting S_t denote the spot exchange rate in price notation (the price of the foreign currency in terms of domestic currency) and letting P_t and P_t^* denote the domestic and foreign price levels, respectively, PPP requires that $S_t = P_t/P_t^*$ or, letting lowercase letters denote natural logarithms

$$s_t = p_t - p_t^* \quad (1)$$

From the definition of the real exchange rate as the nominal exchange rate adjusted for relative price levels, $q_t = s_t - (p_t - p_t^*)$, it follows that PPP holds as long as the real exchange rate is constant. Empirically, if PPP is a relevant equilibrium concept, the real exchange rate would be expected to fluctuate closely around its constant mean, keeping the nominal exchange rate and the relative price levels together in the long run. Hence, in this setting real exchange rate fluctuations are assumed to be caused mainly by transitory shocks.

Although a growing body of literature finds some evidence for mean reversion in real exchange rates, the estimated degree of persistence remains extremely high, with half-lives of shocks ranging between three and five years (Rogoff, 1996). These long half-lives are not justifiable through price rigidities. “The purchasing power parity puzzle then is this,” writes Rogoff, “How can one reconcile the enormous short-term volatility of real exchange rates with the extremely slow rate at which shocks appear to damp out?” (Rogoff, 1996, p. 647).

Taylor (2001) shows that two pitfalls – namely sampling (temporal aggregation) and model specification (linear specification) – could cause an overestimation of half-lives and thus explain much of the persistence of real exchange rates. The idea that real exchange rates might exhibit nonlinear mean reversion dates back to 1916, when Heckscher proposed that trading costs could create a “band of inaction” in which no international goods arbitrage occurs, even though purchasing power differs between two countries. Only when arbitrage opportunities outweigh trading costs, international goods arbitrage takes place and mean reversion occurs.² Other approaches (O’Connell and Wei, 1997) consider variable costs of trade in addition to fixed costs. While there is mean reversion outside some band of inaction, real exchange rates will rarely cross their mean because of proportional trading costs. An alternative explanation for nonlinear adjustment was developed by Kilian and Taylor (2001), who focus on the determination of exchange rates on financial markets rather than on goods markets. In their model, on the one hand traders take the advice of economic fundamentalists, who differ in their opinions about exchange rate misalignments with respect to the equilibrium exchange rate, and on the other hand of technical analysts, who focus on trend projection in order to obtain exchange rate forecasts. The more uncertain economic fundamentalists are about the equilibrium exchange rate, the more weight is given to the forecast by technical analysts, which implies that the exchange rate persistently deviates from its equi-

² *The transaction costs argument holds, in a purer form, for exchange rate determination during the gold standard. Since deviations of nominal exchange rates from the gold parity opened arbitrage opportunities, exchange rate fluctuations were restricted through the cost of shipping gold from one country to another, including freight, insurance and opportunity costs as well as a risk premium (Mooslechner, 2008).*

librium value. As the deviations become greater, however, the degree of agreement between economic fundamentalists on the misalignment increases, and more weight is given to their increasingly conclusive consensus forecasts, so that mean reversion sets in.

Based on this theoretical discussion, in this contribution we formulate an empirical model for the EUR/USD exchange rate which allows for nonlinear reversion toward the PPP equilibrium. Focusing on the original “band of inaction” theory, the real exchange rate will be modeled as a nonstationary process within certain thresholds and as mean reverting outside the band defined by those thresholds. We analyze whether the “band of inaction” theory can explain the persistence of the EUR/USD real exchange rate (i.e. whether there is a threshold effect within the adjustment of the nominal exchange rate to the PPP equilibrium) and whether the underestimation of the speed of adjustment can be traced to the above rigidities (i.e. whether the speed of mean reversion of real exchange rates found outside the thresholds is significantly higher than the speed determined over the whole sample). We also investigate whether modeling the nonlinear adjustment with the aid of threshold specifications improves the out-of-sample predictive ability for the nominal exchange rate.

This paper is structured as follows: Section 1 provides an overview of the EUR/USD exchange rate developments between 1990 and 2009 and relates major deviations from the PPP equilibrium to the evolution of the monetary policy framework in the euro area. Section 2 presents the framework for empirical analysis, i.e. the cointegrated

vector autoregressive (VAR) model, the estimation of the band of inaction and the resulting model with nonlinear adjustment. Next, section 3 compares the out-of-sample forecasting properties of the linear and the nonlinear model. Finally, section 4 summarizes the main findings and provides an outlook for further research.

1 Twenty Years of PPP and the EUR/USD Exchange Rate

Since the beginning of the process toward the Economic Monetary Union (EMU) in 1990, the dynamics of the exchange rates between the legacy currencies of the euro and the U.S. dollar can be understood more properly by making reference to the evolution of the institutional framework of European monetary integration. The first decade – from the liberalization of capital transactions in the European Economic Community in 1990 to the introduction of the common currency in 1999 – was marked by persistent deviations of the synthetic EUR/USD exchange rate³ from the PPP equilibrium. While the price differential remained relatively constant during the decade, the nominal exchange rate experienced extended periods of sustained appreciation and depreciation. The EUR/USD exchange rate and the price differential are plotted in charts 1 and 2, respectively.

In particular, the exchange rate dynamics in the early 1990s were closely related to the European Exchange Rate Mechanism (ERM), with pairwise fluctuation bands of $\pm 2.25\%$. When the Deutsche Bundesbank strongly increased its interest rates in the beginning of the 1990s to counteract inflationary

³ The calculation of the synthetic EUR/USD exchange rate is based on a weighted average of the bilateral exchange rate of the former national currencies against the U.S. dollar and was sourced from Thomson Reuters.

pressures (which stemmed at least partly from German reunification), this caused an appreciation vis-à-vis the U.S. dollar not only of the Deutsche mark but also of the remaining ERM currencies. Markets considered some European currencies overvalued and high interest rates were perceived as unsustainable for countries with weaker economic fundamentals (e.g. United Kingdom and France). Eventually, speculation against some currency pegs led to the ERM crisis between 1992 and 1993, in which the pound sterling had to leave the ERM and the fluctuation margins for the remaining currencies had to be widened to $\pm 15\%$. This crisis caused a sharp depreciation of the synthetic EUR/USD exchange rate from 1992 to 1993, even though the PPP level remained roughly unchanged for this period.

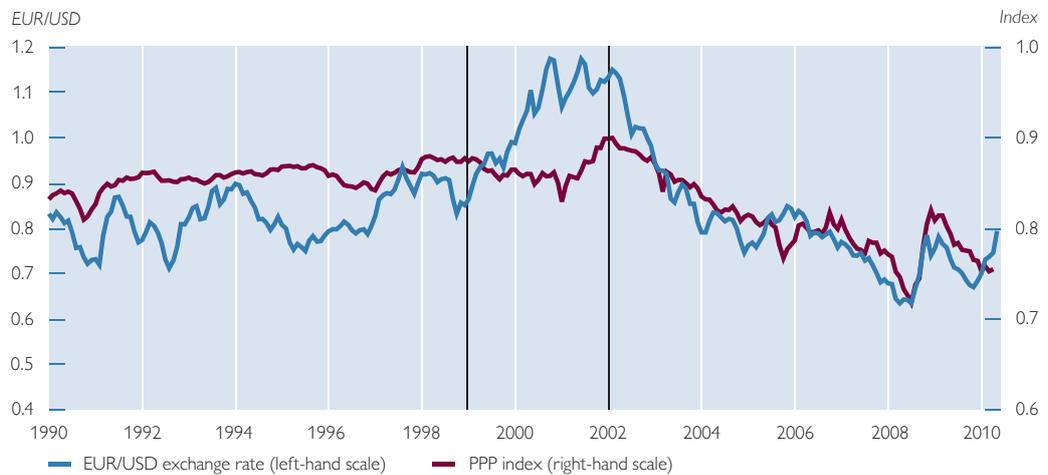
In order to promote economic convergence between the future euro area economies, the Treaty on European Union of 1992 – which established the completion of EMU by 1999 as a formal objective – stated a number of economic criteria concerning inflation, long-term interest rates, exchange rates and public finances. At the same time, the Clinton administration proclaimed a “strong dollar” policy in the United States. The political will to guard the value of the U.S. dollar resulted in the coordinated intervention of the Federal Reserve System (Fed), the Bank of Japan and the Deutsche Bundesbank against the U.S. dollar depreciation in 1995. This intervention marked the beginning of a sustained nominal appreciation trend of the U.S. dollar. Since the inflation differential remained relatively constant until the introduction of the euro, the weakening of the synthetic euro against the U.S. dollar recorded from 1995 onward was not in line with PPP fundamentals.

In January 1999 the conversion rates of the legacy currencies against the euro were irrevocably fixed, the euro was introduced as the noncash single currency and the single monetary policy entered into force. The handing over of monetary policy responsibility to the ECB might have contributed to the relative decline of European producer prices between 1999 and 2001. The declining price differential between 1999 and 2001 would have suggested a strengthening of the euro with respect to the U.S. dollar for this period. Instead, the phase between the introduction of the euro in January 1999 and the cash changeover in January 2002 was characterized by a strong weakening trend (from about 0.85 EUR/USD in January 1999 to almost 1.20 EUR/USD in 2001). In autumn 2000, several concerted foreign exchange interventions were carried out by the ECB and the Fed (the only official concerted interventions involving the ECB hitherto) to counteract the euro depreciation. In 2001, the recessive period in the U.S.A. and the resulting disinflationary period contributed to bringing the nominal exchange rate closer toward the PPP equilibrium rate.

In January 2002, euro banknotes and coins became the sole legal tender in the euro area countries. Since then, producer price inflation has been substantially lower in the euro area than in the U.S.A., leading to a strong decline in the producer price differential (which had until then been relatively constant). This process was accompanied by a strengthening of the euro (from over 1.10 EUR/USD in January 2002 to around 0.60 EUR/USD in summer 2008), such that the magnitude of exchange rate misalignments with respect to the PPP equilibrium seems to have decreased since the cash turnover in 2002. Since then, the euro

Chart 1

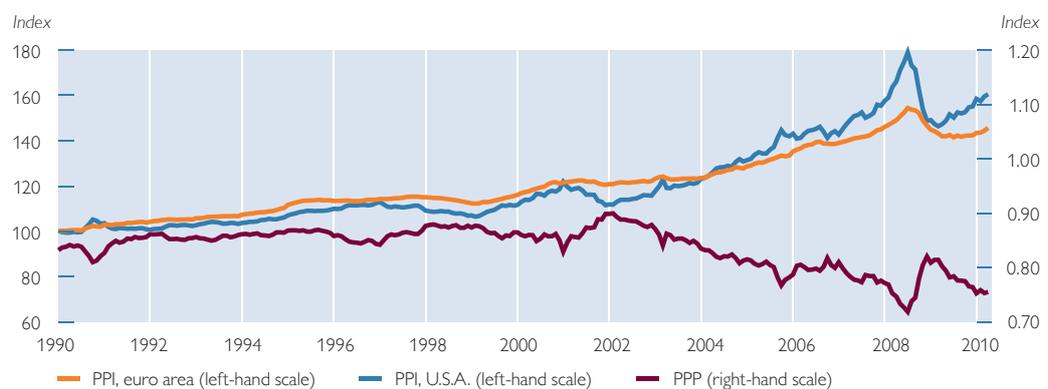
EUR/USD Exchange Rate and Purchasing Power Parity (PPP)



Source: Eurostat, Fed, OeNB.

Chart 2

Producer Price Index (PPI) and Purchasing Power Parity (PPP)



Source: Eurostat, Fed, OeNB.

has somewhat weakened, with USD 1 trading for EUR 0.70 on average in 2009.

Against the background of the substantial exchange rate fluctuations over the past twenty years, the recent EUR/USD depreciation associated with the outbreak of the Greek sovereign debt crisis in winter 2009/2010 cannot be judged a major deviation from PPP equilibrium at this point in time. At the cutoff date (June 2010), the level of the EUR/USD exchange rate lied slightly above the historical average.

2 PPP, Nonlinearities and the Exchange Rate: An Empirical Analysis

2.1 Data

For our empirical analysis, we use monthly data on exchange rates and producer prices for the euro area and the U.S.A. between January 1990 and December 2009. The EUR/USD exchange rate was specified as the nominal exchange rate in price notation, such that an increase in the exchange rate is interpreted as a nominal depre-

ciation of the euro (until December 1998: synthetic EUR/USD exchange rate). Price levels were specified as PPIs rather than CPIs. On the one hand, due to the strong weight of services in the CPI, the proportion of tradable and traded goods is higher in the former than in the latter; on the other hand, producer prices might also suffer fewer distortions through taxes than consumer prices.⁴ The producer price series were seasonally adjusted for the estimation.

Empirically, PPP theory holds when the real exchange rate $s_t - (p_t - p_t^*)$ is stationary. More generally, the PPP holds as long as s_t and $(p_t - p_t^*)$ are integrated of order one ($I(1)$) and a linear combination of s_t and $(p_t - p_t^*)$ is stationary, i.e. if s_t and $(p_t - p_t^*)$ are cointegrated. Augmented Dickey-Fuller tests on the null hypothesis of a unit root suggest that the nominal exchange rate and the price differential are both $I(1)$, such that they fulfill the prerequisites for further cointegration analysis.

2.2 Cointegration and the PPP Equilibrium

The presence of a long-run equilibrium of nonstationary time series implies that the natural modeling framework is given by vector error correction (VEC) specifications (Engle and Granger, 1987). The basic linear specification used in this study to model the relationship between exchange rate and price differential dynamics is thus given by

$$\Delta x_t = \Gamma(0) + \sum_{j=1}^k \Gamma(j) \Delta x_{t-j} + \Pi x_{t-1} + \varepsilon_t$$

$$x_t = [s_t, p_t - p_t^*]' \quad (2)$$

$$\varepsilon_t = [\varepsilon_t^1, \varepsilon_t^2]': NID(0, \Sigma)$$

where $\Gamma(0)$ is a vector of constants, the matrices $\Gamma(j)$ contain the short-run coefficients and the reduced rank matrix $\Pi = \alpha\beta'$ summarizes the long-run elasticities (β) and the adjustment parameters associated with the equilibrium condition (α). Adjustment of the nominal exchange rate toward PPP implies that the first element of α is negative. The Johansen test for cointegration is inconclusive concerning the statistical evidence for cointegration between the exchange rate variable and relative prices. In particular, the results change strongly depending on the set of deterministic elements included in the model and the lag length of the short-run adjustment part. To the extent that nonlinearities play an important role in the adjustment, the lack of evidence for cointegration in the linear setting is not surprising. We thus stick to the VEC setting despite the weak empirical support in terms of cointegration test results. The estimates of model (2) are presented in the first column of table 1.

A further simplification of (2) can be achieved if relative PPP is assumed to hold in its “pure” theoretical form, namely with the restriction that the long-run parameter vector is $\beta = (1, -1)'$. The result of the likelihood ratio test in table 1 indicates that the restrictions imposed by the pure relative PPP model cannot be rejected by the data.

The estimated adjustment coefficients for the exchange rate are negative and marginally significant in both model specifications, which indicates that there is some equilibrium correction of the nominal exchange rate toward its PPP fundamentals. However, the adjustment speed is very low, with half-lives of 3.2 years and 2.6 years for the

⁴ The monthly average nominal EUR/USD exchange rate was provided by Thomson Reuters (until December 1998: synthetic EUR/USD exchange rate). Seasonally adjusted monthly PPIs were provided by the Fed for the United States and by the OECD for the euro area in its respective composition.

unrestricted and the restricted model, respectively.⁵ This finding is consistent with the vast majority of half-life estimates in the empirical literature dealing with PPP in the framework of linear models, which tend to range between three and five years (Rogoff, 1996).

Interestingly, there is no evidence for a robust exchange rate pass-through between the euro area and the U.S.A., since the hypothesis that price levels adjust toward the exchange rate is not backed up by the data. The fact that both the euro area and the U.S.A. are large and relatively closed economies intuitively supports the lack of pass-through from exchange rates to price differentials. From a modeling point of view, the price differential is thus weakly exogenous to the exchange rate. Hence, the result concerning the weak exogeneity of relative prices may be seen as a justification to use univariate specifications to model exchange rates. However, we stick to a bivariate model for

several reasons. On the one hand, our model allows for differential short-run effects of relative price and nominal exchange rate dynamics on the current exchange rate and thus nests the case where only the real exchange rate depends on its own past. On the other hand, since we are interested in exchange rate predictions, a specification for relative price dynamics is necessary for our out-of-sample exercise.

The high persistence of deviations from the long-run relationship, which materializes itself in a low speed of adjustment – the PPP puzzle – motivates the use of nonlinear model specifications to tackle the issue of inaction bands and regime-specific speeds of adjustment to PPP.

2.3 Threshold Effects and Nonlinear Adjustments to PPP

Following the arguments of Heckscher (1916) and Taylor (2001), according to which the mean reversion of real exchange rates might depend on the

Table 1

Cointegrating Vectors, Adjustment Coefficients and Half-lives of Long-run Deviations – Linear Models

| | (1) | (2) |
|--|-------------------|---------------------------------------|
| Long-run elasticity | 2.576 (1.148) | 1.000 imposed as $\beta = (1, -1)$ |
| Exchange rate adjustment parameter (α_s) | -0.018 (0.013) | -0.021 (0.013) |
| Price differential adjustment parameter (α_{p-p}) | 0.006 (0.005) | 0.002 (0.004) |
| Half life of PPP deviation (in years) | 3.2 | 2.6 |
| LR-test for $\beta = (1, -1)$ | 1.061 | |
| p-value | 0.302 | |

Source: Author's calculations.

Note: Numbers in parenthesis are standard errors. Number of observations: 238.

⁵ Half life estimates, which correspond to the estimated time it takes for the exchange rate to correct half of the deviation to the equilibrium, are estimated as $\hat{h} = \frac{\log(2)}{-\hat{\alpha}_s}$

extent to which the nominal exchange rate deviates from the PPP equilibrium, we expect that model specifications with such a property would reduce the downward bias of the overall speed of adjustment toward the price fundamentals. Particularly, theories predicting a band of inaction in the dynamics of the nominal exchange rate around the equilibrium value implied by PPP theory would justify the use of empirical models which explicitly take into account this feature of the adjustment process. A simple approach would consist of dividing the deviations of the equilibrium level implied by PPP into regimes and allowing for potentially different adjustment processes in each one of them.

Threshold models have been used extensively to model asymmetric adjustment in macroeconomic series. General threshold autoregressive models were first introduced by Tong (1993), and the special case of threshold cointegration was formulated by Balke and Fomby (1997). In order to capture the nonlinear properties of the long-run equilibrium, we introduce the following threshold VEC (T-VEC) model

$$\begin{aligned} \Delta x_t = & \Gamma(0) + \sum_{j=1}^k \Gamma(j) \Delta x_{t-j} + \\ & + \alpha_1 \beta' x_{t-1} I(\beta' x_{t-1} < \theta_1) + \\ & + \alpha_2 \beta' x_{t-1} I(\beta' x_{t-1} > \theta_2) + \varepsilon_t \end{aligned} \quad (3)$$

where θ_1 and θ_2 , $\theta_1 < \theta_2$, are the thresholds delimiting three regimes in terms of the lagged level of the PPP deviation and $I(\cdot)$ is the indicator function, taking the value of one if its argument is true and zero otherwise. In the central regime ($\theta_1 < \beta' x_{t-1} < \theta_2$) no adjustment to the PPP equilibrium takes place, and the model representing the joint dynamics of the nominal exchange rate and relative prices is a vector autoregression in first differences. When the deviation from equilibrium surpasses the thresh-

old, the adjustment process (to the central regime) sets in, with a speed given by the size of α_1 for corrections that are triggered if the exchange rate falls below the band of inaction and α_2 for adjustments that set in if the exchange rate exceeds the band.

This specification is able to model the asymmetric dynamics implied by theoretical settings in which corrective behavior is only expected to be relevant when the deviation from equilibrium is large enough, as in PPP models assuming transaction costs and aggregation effects in the basket of goods included in the price indices.

We fix the constrained cointegration relationship supported by the linear model, so that $\beta = (1, -1)'$ is maintained for the estimation of the nonlinear specification. The thresholds can then be estimated by carrying out a grid search over all pairs of realized values of the deviation from PPP and choosing the pair that minimizes the sum of squared residuals for equation system (2). In order to avoid regimes with too few observations and to identify a relevant band of inaction, we impose that at least 10% of the observations lie in the outer regimes and 30% in the central band.

The results of the estimation of the T-VEC model are presented in table 2 and the estimated band of inaction, together with the deviations from the PPP equilibrium, is depicted in chart 3. The central regime implied by the estimates is large compared to the regimes where adjustment takes place, thus deviations from PPP equilibrium are not corrected for most of the estimation period. The estimated upper and lower regime thresholds are symmetric with respect to the PPP equilibrium (as defined by the mean of the real exchange rate over the full period under study). Furthermore, the point estimate

of the adjustment speed is higher in both regimes than in the linear alternatives presented above, although the speed of downward adjustment seems not statistically significant on a 5% level. Strong differences can be observed across adjustment regimes, with short-lived deviations in the lower regime and a single longer period of downward

adjustment spanning the period from 2000 to 2002.

We also perform a nonlinearity test in the spirit of Hansen (1996) and Hansen and Seo (2002), bootstrapping the distribution of the likelihood ratio statistic for testing the linear VEC model against the threshold alternative. The result of the test gives evidence against

Table 2

Adjustment Coefficients, Thresholds and Half-lives of Long-run Deviations – T-VEC Model

| | $\beta x_{t-1} < \theta_1$ | $\beta x_{t-1} > \theta_2$ |
|---|----------------------------|----------------------------|
| | Lower regime | Upper regime |
| Exchange rate adjustment parameter ($a_\$$) | -0.038 (0.014) | -0.054 (0.062) |
| Price differential adjustment parameter (a_{p-p^*}) | -0.002 (0.006) | 0.008 (0.020) |
| Half life of PPP deviation (in years) | 1.5 | 1.1 |
| θ_1 | | -0.129 |
| θ_2 | | 0.131 |
| LR-test for linearity | | 4.999 |
| Bootstrap p-value | | 0.050 |

Source: Authors' calculations.

Note: Numbers in parenthesis are standard errors. Number of observations: 238.

Chart 3

Real Exchange Rate and Bands of Inaction

Index (standardized around the mean)



Source: Eurostat, Fed, Thomson Reuters, authors' calculations.

the linear specification and supports the threshold adjustment model.

The half-lives of the deviations, which are now to be interpreted as the speed of adjustment to the central inaction band, are significantly reduced in comparison with the linear models and indicate that half of the gap between the realized exchange rate and the band of inaction closes in around 1 to 1½ years.

Alternative estimations of single-threshold models with different adjustment speeds for positive and negative deviations confirm that there is significant adjustment of negative deviations from the PPP fundamentals, while such correction is not statistically significant for positive deviations. Since a positive error correction term corresponds to an undervaluation of the euro relative to its PPP fundamentals, the asymmetry of the adjustment process implies that exchange rate dynamics should be more predictable in periods when the euro is overvalued (in terms of PPP equilibrium). We explicitly test for this hypothesis in our out-of-sample prediction exercise below.

3 The Role of Nonlinear Adjustment to PPP for Exchange Rate Prediction

The question arises whether the non-linearity found can be used to improve policy advice by anticipating exchange rate dynamics more efficiently than if linear models are used. For this purpose, we carry out an out-of-sample prediction exercise aimed at comparing the forecasting accuracy of the T-VEC model proposed for specifying exchange rate dynamics.

The design of the prediction exercise is as follows. Using data up to December 1999, we estimate the thresholds of the T-VEC model and the linear specification. We predict the EUR/USD

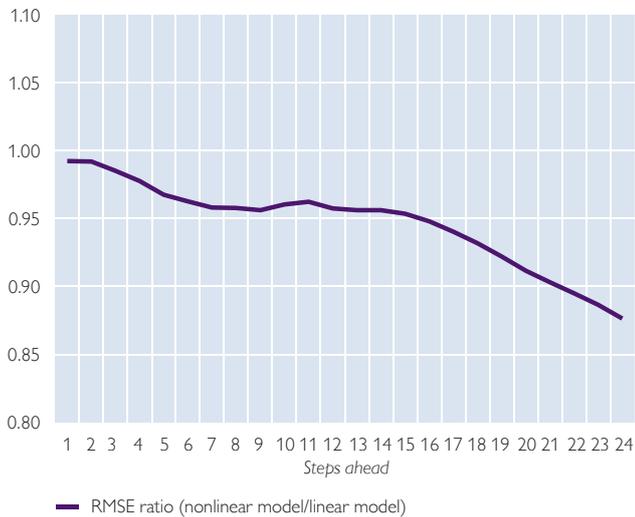
exchange rate for the period from January 2000 to December 2001 using this T-VEC model and the linear VEC alternative. For the forecast evaluation, the root mean squared prediction error (RMSE) is calculated for forecasting horizons up to two years ahead. We then add to the estimation sample the observation corresponding to January 2000 and repeat the prediction exercise. This is repeated until we reach the end of the sample, and the average RMSE for each forecasting horizon is obtained both for the linear and the nonlinear model. We also evaluate the performance of the models in terms of whether the direction of exchange rate movements corresponds to the prediction in the direction-of-change (DOC) statistic.

Chart 4 shows the RMSE-ratio, i.e. the RMSE of the T-VEC divided by the RMSE of the linear VEC. For all forecasting horizons the RMSE-ratio is smaller than one, implying that the forecasting accuracy of the T-VEC model is higher than the forecasting accuracy of the linear VEC model. Moreover, the RMSE-ratio decreases with the length of the forecasting horizon, implying that the forecasting advantage of the T-VEC model increases further for longer-term forecasts. The gains in terms of forecasting accuracy are of around 5% at the one-year horizon and 15% at the two-year horizon. We also performed Diebold-Mariano tests of significance in the difference of predictive accuracy, which gave strong evidence of statistically significant improvements in the forecasting ability of the T-VEC model after a horizon of 18 months. At prediction horizons between four and ten months ahead, the T-VEC improvement in forecast accuracy is marginally significant.

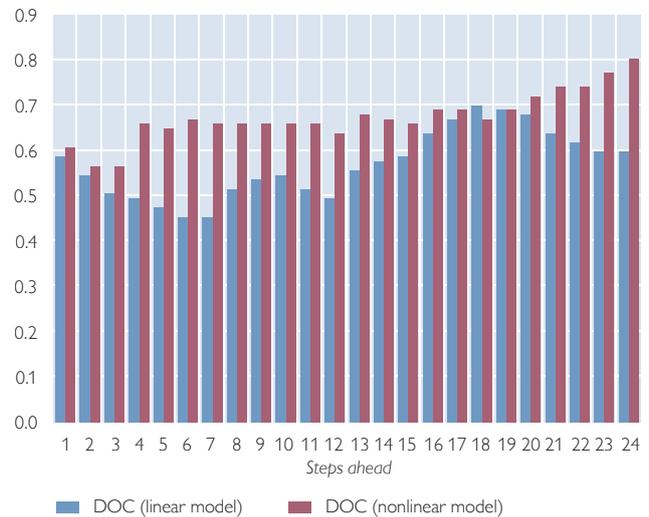
Chart 4

Out-of-Sample Predictive Performance

Root Mean Squared Error (RMSE)



Direction of Change (DOC) Statistics

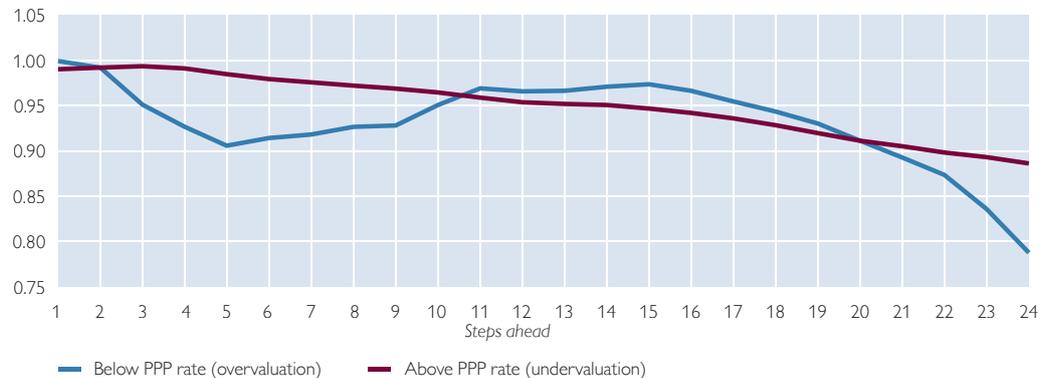


Source: Authors' calculations.

Chart 5

Out-of-Sample Predictive Performance by Subsample

Root Mean Squared Error (RMSE) Ratio, (nonlinear model to linear model)



Source: Authors' calculations.

Very sizeable improvements are found in terms of predicting the direction of change in the exchange rate. In chart 4, the DOC statistics is shown for both models over the 24 forecasting horizons. With the exception of the forecasting horizons around 1½ years, where the performance of both models is very similar, the T-VEC model clearly outperforms the linear specification, in

particular for horizons of 4 to 12 months and of more than 20 months.

In order to understand the nature of the improvement of the predictive ability of the nonlinear model, we calculate the RMSE ratio in the two subsamples defined by whether the nominal exchange rate appears overvalued or undervalued with respect to the PPP equilibrium. The results are presented

in chart 5 and indicate that there are interesting differences across subsamples. The advantage of the T-VEC model in terms of forecasting accuracy is independent of the subsample analyzed. Improvements are particularly large for the sample of observations below the PPP rate (overvaluation) for forecasts ranging from three to nine months ahead, as well as for very long-run forecasts. Since deviations in the lower regime tend to be corrected toward the band of inaction at a relatively high speed, these results indicate that the nonlinear specification is able to replicate and predict adjustment dynamics better when the euro is relatively overvalued with respect to the PPP equilibrium.

4 Conclusions and Further Paths of Research

In this study we propose a simple threshold error correction specification for the EUR/USD exchange rate aimed at modeling nonlinear adjustments to the PPP equilibrium. Our results show that the data strongly support the pres-

ence of nonlinearities related to the adjustment of the nominal exchange rate to the equilibrium level given by PPP. Furthermore, we present empirical evidence concerning the fact that sizeable out-of-sample forecast gains for exchange rate dynamics can be obtained when nonlinearities are explicitly modeled. Our results imply that monetary policy makers' potential to anticipate exchange rate movements would be improved if they based their assumptions on model specifications that take into account the dynamics of nonlinear adjustment to PPP as the long-run equilibrium.

Admittedly, the specification proposed in this study is only one of various possible ways how to specify nonlinear adjustment to the equilibrium in the framework of exchange rate models. In particular, comparing threshold adjustment models with other nonlinear models based on smooth transition specifications or nonparametric methods is a promising avenue for further research in this topic.

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Highlights

Central Banking after the Crisis: Responsibilities, Strategies, Instruments – Summary of the 38th Economics Conference

Ernest Gnan,
Sylvia Kaufmann¹

Central banks throughout the world have been playing a pivotal role in combating the economic and financial crisis over the past three years. The crisis has significantly and permanently transformed our understanding of both the importance and responsibilities of central banks and the strategies and instruments they employ. The OeNB's 38th Economics Conference of May 31 and June 1, 2010, explored "Central Banking after the Crisis: Responsibilities, Strategies, Instruments," bringing together distinguished national and international experts as well as practitioners from the world of politics, business, finance and academia to draw some policy lessons for central banks from the crisis.

Conference Teeming with Austria's Top Economic Policymakers

In his opening statement, *OeNB Governor Ewald Nowotny* stressed central banks' enormous responsibility – and challenge – in pursuing a monetary policy geared toward safeguarding both price stability and financial stability. In the new regulatory architecture currently in the making at the European and international levels, central banks are going to assume a decisive role. For central banks, their reputation and thus the foundation of their independence are at stake. Central bank independence has been instrumental for the Eurosystem's success in keeping inflation low and stable since the introduction of the euro 11 years ago. Central bank independence is likewise indispensable for preserving financial stability, especially for the financial system as a whole. Referring to the debate about Eurosystem interventions on the government bond market, Nowotny highlighted that the Eurosystem ensures that temporary volatility and waves of speculation in financial markets do not derail the fiscal consolidation efforts in the euro area. However,

it is the governments that have to ensure that their public finances become sustainable again in the long run. The clear assignment of economic policy tasks at the EU level is to be preserved: The Eurosystem's primary objective is to maintain price stability. In the current context of uncertainty, shoring up confidence in the long-run stability of the euro is the best contribution the ECB can make to stabilizing the economy and to supporting economic growth and sustainable public finances. The Eurosystem will continue to adhere to its stability-oriented policy.

Austria's *Federal Chancellor Werner Faymann* talked about the challenges emerging in the aftermath of the crisis. The crisis has shattered our faith in the infallibility of both the markets and the state; in fact, it will be necessary to strike a wise balance between market and government to master the challenges of financial market regulation, socially fair fiscal consolidation, and a new growth and employment strategy. A tighter and better regulation of financial markets is required to preserve public acceptance of the economic and financial system. Serious investors prefer regulated financial markets. More

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specifically, Faymann called for a bank tax and a financial transaction tax, the establishment of an EU rating agency, stronger financial market regulatory and supervisory authorities, tighter rules on securities trading and the prohibition of speculation, legal limits for management salaries, a stricter supervision of hedge funds, improved consumer protection with regard to financial products, and legislation on bank insolvencies. The necessary fiscal consolidation must be carried out in a socially fair manner to preserve purchasing power. Especially in the crisis, it is important to maintain the welfare state. To this end, a growth strategy needs to be put in place that focuses on research, education and training, with cutting-edge climate protection programs holding the promise of providing competitive advantages. The Chancellor explicitly discouraged wage dumping, cuts in social benefits, and tax advantages for large enterprises. Finally, he called for a coordinated European approach in the upcoming budget consolidation efforts to prevent a relapse into recession.

During the Kamingsgespräch, Austrian *Vice Chancellor and Federal Minister of Finance Josef Pröll* explained his view of current economic and fiscal policies, pointing out that the crisis had highlighted that economic policymaking suffered from a credibility problem. Sound public finances are the best protection against speculation. Moreover, a single currency requires enhanced economic policy coordination. The current problems within the EU primarily stem from unsustainable public finances, Pröll explained, adding that the lack of budgetary discipline of some EU Member States entailed negative contagion effects for other countries. He therefore called for a strengthening of the preventive arm of the Stability

and Growth Pact (multi-year budget plans, more rights and more effective control mechanisms for Eurostat) and of its corrective arm (sanctions should take effect earlier on and should indeed be implemented). Although Austria's budgetary situation is less dramatic than that of other countries, determined fiscal consolidation will be inevitable. The Federal Budgetary Framework Act has clearly mapped out the consolidation path to be followed until 2014. Furthermore, the European financial stabilization mechanism should only be used as a measure of last resort. Strict conditionality and adequate financing conditions are to ensure that beneficiaries of the mechanism return to market financing as quickly as possible. Any new financial market rules must be appropriate and reasonable such as not to generate overregulation, which in turn might cause a credit crunch. A financial transaction tax would only make sense if it was internationally coordinated – otherwise, negative implications for Austria as a financial center would be inevitable. Finally, Pröll expressed his support of an independent central bank with clearly defined tasks.

Financial Crisis Management and Central Bank Independence

Session 1 of the conference dealt with the question of whether and how the role of central banks as financial crisis managers is compatible with their independence and what kind of interaction might occur between the two spheres.

For a start, *ECB President Jean-Claude Trichet* explained that the Eurosystem had responded with three types of measures to the financial and economic crisis, namely with massive key interest rate cuts, measures of enhanced credit support and its Securities Markets Programme (SMP). This measure aims

to address the severe problems in the markets for European government bonds, which had also spilled over to other markets, and thus to improve monetary policy transmission. The SMP should not be confused with quantitative easing; the purchases are sterilized immediately by liquidity-absorbing operations so that the monetary policy stance remains unchanged. The Euro-system decided on this measure in complete independence and on the basis of its legal mandate to maintain price stability. Securities purchases under the SMP are made on the secondary market and strictly aim to correct market malfunctioning. The prohibition of direct monetary financing has thus not been violated. Moreover, the market interventions are subject to the requirement that the governments concerned strictly fulfill the budget consolidation plans agreed upon; thus, the interventions strengthen budgetary discipline. Trichet finished by calling on euro area governments to reach agreement on a quantum leap regarding the effectiveness of their peer surveillance to ensure sound public finances.

Economic historian *Michael Bordo (Rutgers University)* explored the interplay between financial and economic crises on the one hand and central bank independence on the other. Using the Bank of England and the Federal Reserve System (Fed) as examples, he showed that central banks slowly developed into lenders of last resort in the course of history, prompted by financial crises and their negative consequences. He showed that again and again, wars prompted direct monetary financing and the loss of central bank independence. Severe monetary policy errors often resulted in lesser central bank independence, and regaining full independence required long struggle. Characterized by the belief in the Phil-

lips curve, the 1960s and 1970s were a time of very low central bank independence. By contrast, the successful anti-inflationary policy of the 1980s as well as the “Great Moderation” period from the mid-1980s to mid-2010 supported central bank independence. The current economic and financial crisis constitutes a considerable threat to central bank independence because the Fed and other central banks have assumed numerous government and fiscal policy functions (credit policy, bailout of non-bank financial institutions, quantitative easing) and (have to) cooperate more closely with the government. Central banks’ balance sheets balloon with a number of significantly riskier positions which threaten their financial independence and thus put the credibility of their stability-oriented monetary policy at risk.

During the subsequent panel, chaired by *Ernest Gnan (OeNB)*, *Martin Čihák (IMF)* and *Petra Geraats (University of Cambridge)* explored whether the goals of monetary and financial stability are complementary or might sometimes be contradictory.

Petra Geraats first recalled that while a monetary policy geared toward price stability requires financial stability (i.e. a functioning transmission mechanism), price stability does not automatically ensure financial stability. Recent scientific papers even argue that the high degree of macroeconomic stability that prevailed over the last two decades may have contributed to increasing both financial agents’ risk appetite and financial imbalances. Depending on the respective economic shock, it may take more than the central bank’s traditional instrument – interest rate policies – to be able to pursue the double objective of price and financial stability; it might also take liquidity policy measures, countercyclical capital requirements or

leverage restrictions. At the same time, the separation of monetary and macroprudential policies has its limits, as both share the same tools and appear to have a common cause. By way of illustration, Geraats pointed to the largely parallel development of monetary aggregates and HICP inflation as well as of credit growth and stock prices in the euro area over the last two to three decades. Since both objectives are seen as central bank tasks and central banks are equipped with the sufficient number of tools to systematically pursue them, information synergies can be utilized to achieve both objectives at the same time.

Before the crisis, *Martin Čihák* argued, the dominant view was that when central banks have just one instrument at their disposal (key interest rates), they can pursue only one goal (price stability). Hence the focus on inflation targeting. Financial stability responsibilities were generally considered a source of conflict for monetary policy as well as a risk to central banks' credibility and independence; often, avoiding the concentration of too much power with the central bank was an issue. Only a few central banks had been given the explicit legal mandate to maintain financial stability; in most cases, however, a certain responsibility derived indirectly via other tasks. The crisis raised a number of questions about (narrow) (CPI) inflation targeting. Did this approach neglect credit and asset price developments? And did it neglect synergies with financial stability tasks and deflect due attention from systemic risks? Čihák went on to list a number of reasons why the price and financial stability mandates might be compatible after all in practice. First, credit developments are in any case relevant for monetary policy – supervisory activities also improve the

quality of the information monetary policy is based on. Second, their function as lenders of last resort and crisis managers already entails considerable reputational risks for central banks; for this very reason, they would be particularly predisposed to supervising financial stability, given their natural interest in maintaining their reputation. Third, regarding their independence, central banks have always been concerned with financial stability; a formal responsibility would facilitate clearer democratic accountability (which would, however, be limited by the fact that a quantitative definition of financial stability is hardly possible). Fourth, the disadvantage of a concentration of too much power with the central bank would be offset by the advantage of the resulting automatic coordination of monetary and financial stability policies. Over the last 15 years, almost 60 central banks worldwide began to publish financial stability reports; Čihák considered these reports basically useful, pointing out, however, that the transformation of their respective findings into concrete policy action still leaves room for improvement. Also, the reports did not always anticipate crises. Finally, Čihák presented empirical results which showed that increased central bank independence improves the quality of supervision and of financial stability reports and reduces the probability of financial crises. All told, strengthening the central banks' role in the field of financial stability would use synergies and improve supervisory quality; however, such a move would have to be supplemented by adequate measures to ensure transparency and accountability. Moreover, it will be necessary to determine who should bear the ultimate costs incurred by resolving financial crises. Last but not least, the new tasks increase the de-

mands on central bank governance and resources.

Financial Crises, Monetary Policy Strategies and Instruments

OeNB Vice Governor Wolfgang Duchatzek chaired the second session, during which *Stefan Gerlach (University of Frankfurt)* presented his views on the question of whether, and how, central banking will change after the crisis. Before the crisis, improvements in the monetary policy process, a clear focus on price stability, increased transparency and professionalized decision-making procedures and forecasting techniques created the (maybe illusory) impression that monetary policy contributed significantly to the sound macroeconomic performance during the Great Moderation period. For a long time it was overlooked, however, that more stable economic developments and declining risk premia encouraged financial agents to take on greater risks. Should monetary policy strategies and tools be adjusted against this background? Gerlach was skeptical about Blanchard's suggestion to raise the inflation target, particularly because such a move would lead to a loss of credibility. Gerlach expected decision-making on the monetary policy stance to benefit from the inclusion of financial market activities – and the respective forecasts – in the monetary policy evaluation process. However, raising interest rates in response to increasing or increasingly volatile credit and stock prices, in particular over and beyond what they imply for inflation prospects, did not appear to be a very promising measure, since the real economic costs of mitigating bubbles via interest rate policy are very high. Instead, macroprudential regulatory systems should aim at containing the build-up of financial imbalances, if they are not able to prevent them in the first

place. Regulatory elements such as procyclical capital requirements and leverage ratios should be applied to all large financial institutions whose operations are based largely on maturity transformation. The respective regulations must be transparent to promote efficiency and must be implemented in coordination with the monetary authorities (establishment of a Macroprudential Policy Committee, analogous to the Monetary Policy Committee). All in all, the environment for monetary policy action will be more difficult after the crisis. Despite the statutory independence of central banks, the implementation of monetary policy will face increased fiscal policy pressure. In view of the strong rise in government debt ratios, the debt dynamics created by interest rate increases should not be underestimated, as they will generate political pressure.

How Much Risk Can a Central Bank Assume?

In the subsequent panel, *Anne C. Sibert (Birkbeck College, University of London)* and *Wolfgang Münchau (Financial Times)* discussed the possibly higher risks non-conventional monetary policy measures might entail for the balance sheets and the profitability of central banks.

Anne C. Sibert raised the question whether the nonconventional crisis measures implemented by the ECB had been legitimate. In particular, she criticized that the ECB's communication on the purchasing procedures for mortgage-backed securities and, as recently announced, Greek government bonds was, if at all existent, intransparent. Information is also lacking on the valuation of these assets and on their expected long-term effects on the risk profile of the ECB's balance sheet. According to Sibert, a critical factor – with regard to legitimacy – is the fact

that while the ECB's mandate for maintaining price stability is clearly defined in the EU Treaty, its role in maintaining financial stability is only vaguely described. Legitimacy may be founded on the visible success of the implemented unconventional policy measures in achieving short-term financial market stabilization during the crisis (legitimacy by competence). This, however, does not make up for the legitimacy deficit that currently exists because of a lack of accountability. More transparency and a better review of the performance of the ECB's Governing Council as a whole and of its individual members might be reached by publishing the minutes and voting results of Council meetings.

The contribution by *Wolfgang Münchau* was primarily concerned with the way fiscal policymakers dealt with the Greek debt challenge and with financial markets' speculative attacks. In his view, the primary surplus required to stabilize the debt ratio is so high that a restructuring or a reduction of government debt – while having been postponed through concerted policy action – will be difficult to avoid. It is highly problematic that it is still unclear how a possible bankruptcy of the Greek government might affect the ECB's balance sheet positions of Greek government bonds. Even if sterilized purchases of these bonds are not to be interpreted as monetizing the Greek deficit, they put the ECB's credibility in question. In the field of EU fiscal policy, Münchau considered the latest fiscal measures as being in conflict with the Maastricht Treaty and possibly also with the German constitution. The no-bailout clause in the Maastricht Treaty was circumvented. If Greece were to default, the other Member States would see their government debt ratios increase even more dramatically. A re-

structuring of Greek government debt at the outset of the crisis combined with a protective shield for Spain and Portugal would have been a clear signal to financial markets, showing political commitment to reestablish long-term stability. A new Stability and Growth Pact with yet another set of nonbinding rules cannot be expected to solve the structural problems.

In a short response, *Gerlach* doubted that the ECB's legitimacy deficit was indeed very large. With respect to accountability, it would have to be evaluated who would be accountable to whom. When it comes to unconventional measures, the European Parliament might not be the appropriate – or only – body the ECB should be accountable to. According to Gerlach, more transparency with respect to ECB Governing Council meetings would reduce the willingness of Council members to discuss matters openly. At the same time, he seconded the call for ex post accountability for the development of balance sheet positions. Finally, he estimated that the financial policy problems in Europe will persist over the next three years and beyond and that the restructuring of Greek debt will become visible in writedowns from ECB balance sheet positions.

Central Banking, Financial Stability and Regulation

The second conference day focused on new financial market issues raised by the crisis. In the first session, chaired by *OeNB Executive Director Andreas Ittner*, *Giovanni Carosio (Banca d'Italia)* and *Elena Carletti (European University Institute, Florence)* discussed the challenges created by the implementation of a new European macroprudential supervision mechanism.

Giovanni Carosio dealt with the challenges central banks currently face in

supervising financial stability. The crisis clearly showed that financial stability supervision will increasingly have to shift its focus from the microprudential to the macroprudential perspective to limit systemic risk. To adequately monitor the stronger financial market interdependencies in Europe, which the crisis unmasked, a new body was established that will systematically exchange and assess information on developments relevant to supervision – the European Systemic Risk Board (ESRB). The composition of the ESRB will imply coordination between the monetary authority, which has the instruments necessary to identify and assess systemic risk, and the supervisory authority, which has the instruments necessary to implement measures. The ESRB will be accountable to the European Parliament. Its work will be based on a system of rules that determine (ex ante) how future crises are to be contained and, if they are inevitable, how they are to be resolved. Early warning signals should serve to localize and contain country-specific systemic risks. While systemic risk is defined relatively clearly, its operationalization is difficult. A number of factors, such as the procyclicality of the financial market, systemic correlation and concentration risks, characterize systemic risk; there may be new variables to be considered, such as mortgage loans, which were considered unproblematic before the crisis, but have recently caused a wave of systemic risk. Since innovation and globalization play a major role in financial market developments, it would be preferable to set up a system of rules by which supervision could flexibly adjust to financial market innovations and expansions and which also allows for resolving crises on a case-by-case basis.

Elena Carletti addressed some aspects of the crisis that have often been

neglected. According to Carletti, loose monetary policy over extended periods of time, global financial imbalances and the real estate price bubble were at the root of the financial market crisis; bad incentives in the mortgage industry were but a symptom. However, more restrictive monetary policy might not have prevented the crisis, either. Risks were detected too late because supervision had not paid enough attention to systemic risk. Moreover, the trigger of the crisis was enforced by a major rise in short-term financing and by the accounting practice of marked-to-market prices. Increasing financial stability in the future will require a systemic macroprudential approach to supervision. In the future, global imbalances (i.e. lending levels that, while considered optimal at the individual level, cause negative external effects at the global level) might be contained by an IMF reform, by reserve swaps and the acceptance of new reserve currencies. A reorientation of financial market regulation should also take into consideration the interdependencies within the banking system as well as the correlations between prices and risks. In the end, the crisis has also shown that in their capacity as lenders of last resort, central banks cannot automatically guarantee efficient liquidity distribution. In addition, the credit institutions identified as systemically important (too big to fail) by the central bank are not necessarily too big to liquidate; such liquidation might involve a change in management, the rolling over of pension obligations and orderly resolution. Finally, Carletti called for a coordination of regulatory and competition policies in the financial system. There is evidence that financial institutions' equity holdings, which are kept low by the tax disadvantages for equity financing relative to debt financing, correlate

with the respective competitive situation in the credit market. Coordinating regulatory and competition policies might also help contain the size of financial institutions.

How Should We Deal with Large Financial Institutions in a Crisis?

In the final panel chaired by *Peter Mooslechner (OeNB)*, *Urs Birchler (University of Zurich)* and *Alessandro Profumo (UniCredit Group)* discussed the question of how to best deal with very large financial institutions during a crisis.

First of all, *Urs Birchler* pointed out how the relationship between banks and the state has changed over time. While up to 1900, it was the banks that acted as lenders of last resort to the state, the situation has since been reversed; today it is the state that assumes the ultimate responsibility for restructuring insolvent banks that are considered systemically important. A historical comparison illustrated the shift of risk sharing mechanisms to the state. In 1895, JP Morgan refinanced outstanding government debt to the tune of USD 65 million – a volume that was ten times JP Morgan's total assets, corresponding to 0.4% of U.S. GDP. In 2008, the Swiss government decided to refinance UBS, a major bank, with CHF 60 billion – a volume that corresponded to 4% of UBS's total assets or to 13% of Swiss GDP. *Birchler* considers appropriate the state refinancing and guarantee provisions implemented in many countries to curb the effects of the financial crisis on large banks. In the short run, the economic cost of states refraining from such measures would have exceeded the cost of state intervention by far. However, this consideration neglects the fact that once the state gets involved, it will remain involved. The rescue packages did not cause large financial institutions to

shrink, which means that their relevance for the financial system will be even higher in future crisis situations; moreover, future government support measures will be taken for granted and the risk appetite of large banks will not be restrained. This vicious circle would only be broken in the event of sovereign default. The root of the problem is banks' size and their risk appetite (which is rational at the level of the individual institution). In the end, large banks have an interest in maximizing collateral damage to induce the state to act as lender of last resort. Solving the "too big to fail" problem would solve the banking supervision problem, too. According to *Birchler*, restricting banks' size by breaking them up along business lines, into branches or by implementing bank-specific liquidation rules would be an appropriate measure to reduce the costs of state interventions. Current regulatory measures aimed at preventing bank insolvencies should be complemented not only by the existing regulatory capital requirements, but also by liquidity requirements and possibilities for explicit operational and managerial interventions. In cases where insolvency is inevitable, contingent convertible (CoCo) bonds are an appropriate financing instrument to restore the solvency of the bank in question and minimize the incidence for the tax payers (in case of state participation). The (probably higher) issuing price exposes the bank in question to regulatory market discipline. *Birchler* named *Lloyds TSB* and *Rabobank* as examples for the successful placement of the new CoCo bonds.

Alessandro Profumo attributed the criticism leveled at large banks during the financial crisis regarding their failure to provide a justification for their existence by explaining the value added they provide to the economy. The pro-

vision of economies of scale, the creation of value-added for investors and depositors as well as the beneficial effects on risk allocation have not been sufficiently discussed. Given different business models, there is a significant difference between dealing with a large bank like UBS, which is an investment bank, and UniCredit, which has the profile of a private commercial bank. Profumo advocated designing a single European market for banking regulation and supervision – along the lines of the single economic area. He pointed to the risk that country-specific size limits for banks might have negative effects on banking services and, in the end, on the availability of credit in other countries. As an example, he mentioned the large Austrian banks, whose sizeable exposure to Eastern Europe might be considered too large for Austria if a size criterion was introduced. Another problematic issue he mentioned was the fact that governments' future budget consolidation is based on growth, i.e. also on the financial sector's growth contribution. Of the two (extreme) suggestions for crisis prevention and crisis handling, Profumo preferred the approach of coordinating regulation and supervision across the EU to having the banking system alone finance a crisis stabilization fund. He expected a strengthened and more active European supervisory body to contain the moral hazard problem, which is a critical element in any financial market activity. Regulation should prevent liquidity crises in the first place and, if they are inevitable, should provide rules for an orderly insolvency procedure combined with an adequate burden-sharing between shareholders and creditors (in particular institutional creditors). Profumo was critical about a stabilization fund that would be financed entirely by the financial sector

itself, since the volume of fund capital, which would depend on the financial system-specific and macroeconomic costs of a systemic crisis, is very difficult to estimate. Moreover, such a fund would provide aid only to solvent banks subject to a change in management or other conditions. The problem of dealing with insolvent banks would again be left to the state. Finally, regarding the current focus on the regulation of equity ratios, Profumo noted that if the banking system is to remain in private hands, banks need to be able to cover the cost of equity – which currently ranges from 9.5% to 12% – in full at any time. Raising equity ratios too much might prompt private investors and creditors to withdraw their investments and might thus increase the urgency of government refinancing. According to Profumo, the financial crisis did not originate from deficient equity ratios but from mismanagement in the balance sheet structure (assets-to-liabilities ratio). Longer-term stability could only be reached by quickly reestablishing confidence in the common European project.

Presentation of the Klaus Liebscher Award

Zeno Enders (University of Bonn), Philipp Jung (University of Mannheim) and Gernot Müller (University of Bonn) are the winners of the sixth Klaus Liebscher Award. *OeNB Vice President Max Kothbauer and OeNB Governor Ewald Nowotny* commended their joint paper "Has the Euro Changed the Business Cycle?", which studies to what extent monetary union has changed the European business cycle. The authors analyze the business cycle from the perspective of the volatility of fundamental macroeconomic variables and their correlation across individual euro area countries. Their model neatly captures

and reproduces the volatility of real exchange rates as it decreased during the implementation of monetary union and the unchanged correlation between macroeconomic fundamentals. Moreover, their analysis shows that the

introduction of the euro has caused important changes in the European business cycle: While cross-country spillovers have increased, the effects of domestic shocks relative to those of foreign shocks have weakened.

Notes

Abbreviations

| | | | |
|----------|---|------------|--|
| A-SIT | Secure Information Technology Center – Austria | IHS | Institut für Höhere Studien und Wissenschaftliche Forschung – Institute for Advanced Studies, Vienna |
| ASVG | Allgemeines Sozialversicherungsgesetz – General Social Security Act | IIF | Institute of International Finance |
| A-Trust | A-Trust Gesellschaft für Sicherheitssysteme im elektronischen Datenverkehr GmbH (accredited certification service provider) | IIP | international investment position |
| ATX | Austrian Traded Index | IMF | International Monetary Fund |
| BCBS | Basel Committee on Banking Supervision (BIS) | ISO | International Organization for Standardization |
| BIC | Bank Identifier Code | IWI | Industriewissenschaftliches Institut – Austrian Institute for Industrial Research, Vienna |
| BIS | Bank for International Settlements | JVI | Joint Vienna Institute |
| BOP | balance of payments | LIBOR | London Interbank Offered Rate |
| BSC | Banking Supervision Committee (ESCB) | M3 | broad monetary aggregate M3 |
| CACs | collective action clauses | MFI | monetary financial institution |
| CEBS | Committee of European Banking Supervisors (EU) | MRO | main refinancing operation |
| CEE | Central and Eastern Europe | MoU | memorandum of understanding |
| CEEC(s) | Central and Eastern European country (countries) | NACE | Statistical Classification of Economic Activities in the European Community |
| CESEE | Central, Eastern and Southeastern Europe | NCB | national central bank |
| CESR | Committee of European Securities Regulators | OeBS | Oesterreichische Banknoten- und Sicherheitsdruck GmbH (Austrian banknote and security printing works) |
| CIS | Commonwealth of Independent States | OECD | Organisation for Economic Co-operation and Development |
| CPI | consumer price index | OeKB | Oesterreichische Kontrollbank (Austria's main financial and information service provider for the export industry and the capital market) |
| EBA | Euro Banking Association | OeNB | Oesterreichische Nationalbank (Austria's central bank) |
| EBRD | European Bank for Reconstruction and Development | OPEC | Organization of the Petroleum Exporting Countries |
| EC | European Community | ÖBFA | Österreichische Bundesfinanzierungsagentur – Austrian Federal Financing Agency |
| ECB | European Central Bank | ÖNACE | Austrian Statistical Classification of Economic Activities |
| Ecofin | Economic and Financial Affairs Council (EU) | POS | point of sale |
| EEA | European Economic Area | PRGF | Poverty Reduction and Growth Facility (IMF) |
| EFC | Economic and Financial Committee (EU) | R&D | Research & Development |
| EIB | European Investment Bank | RTGS | Real-Time Gross Settlement |
| EMS | European Monetary System | SDR | Special Drawing Right (IMF) |
| EMU | Economic and Monetary Union | SDRM | Sovereign Debt Restructuring Mechanism (IMF) |
| EONIA | Euro OverNight Index Average | SEPA | Single Euro Payments Area |
| ERM II | exchange rate mechanism II (EU) | SPF | Survey of Professional Forecasters |
| ERP | European Recovery Program | STEP2 | Straight-Through Euro Processing system provided by the Euro Banking Association |
| ESA | European System of Accounts | STUZZA | Studiengesellschaft für Zusammenarbeit im Zahlungsverkehr G.m.b.H. – Austrian Society for Payment System Research and Cooperation |
| ESAF | Enhanced Structural Adjustment Facility (IMF) | S.W.I.F.T. | Society for Worldwide Interbank Financial Telecommunication |
| ESCB | European System of Central Banks | TARGET | Trans-European Automated Real-time Gross settlement Express Transfer |
| ESRI | Economic and Social Research Institute, Dublin | Treaty | Treaty establishing the European Community |
| EU | European Union | UCIT(s) | undertaking(s) for collective investment in transferable securities |
| EURIBOR | Euro Interbank Offered Rate | ULC | unit labor cost |
| Eurostat | Statistical Office of the European Communities | UN | United Nations Organization |
| FATF | Financial Action Task Force on Money Laundering | UNCTAD | United Nations Conference on Trade and Development |
| FDI | foreign direct investment | VaR | value at risk |
| Fed | Federal Reserve System (U.S.A.) | WBI | Wiener Börse Index (all-share index of the Vienna stock exchange) |
| FMA | Austrian Financial Market Authority | WEF | World Economic Forum |
| FOMC | Federal Open Market Committee (U.S.A.) | WIFO | Österreichisches Institut für Wirtschaftsforschung – Austrian Institute of Economic Research |
| FSAP | Financial Sector Assessment Program (IMF/World Bank) | wiiw | Wiener Institut für internationale Wirtschaftsvergleiche – The Vienna Institute for International Economic Studies |
| FWF | Fonds zur Förderung der wissenschaftlichen Forschung – Austrian Science Fund | WKÖ | Wirtschaftskammer Österreich – Austrian Federal Economic Chamber |
| GAB | General Arrangements to Borrow | WTO | World Trade Organization |
| GATS | General Agreement on Trade in Services | | |
| GDP | gross domestic product | | |
| GNP | gross national product | | |
| GSA | GELDSERVICE AUSTRIA Logistik für Wertgestionierung und Transportkoordination GmbH (Austrian cash logistics company) | | |
| HICP | Harmonised Index of Consumer Prices | | |
| HIPC | Heavily Indebted Poor Countries | | |
| HOAM.AT | Home Accounting Module Austria | | |
| IBAN | International Bank Account Number | | |
| IBRD | International Bank for Reconstruction and Development | | |
| ICT | information and communication technology | | |
| IDB | Inter-American Development Bank | | |
| IFES | Institut für empirische Sozialforschung GesmbH – Institute for Empirical Social Research, Vienna | | |
| Ifo | Ifo Institute for Economic Research, Munich | | |

Legend

- x = No data can be indicated for technical reasons
- .. = Data not available at the reporting date
- 0 = The numerical value is zero or smaller than half of the unit indicated

Discrepancies may arise from rounding.

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Monetary Policy & the Economy quarterly

This quarterly publication, issued both in German and English, offers analyses of current cyclical developments, medium-term macroeconomic forecasts and studies on central banking and economic policy topics. It also provides summary findings of macroeconomic workshops and conferences organized by the OeNB.

Focus on European Economic Integration quarterly

The Focus on European Economic Integration (FEEI) is a channel for communicating the OeNB's ongoing research on Central, Eastern and Southeastern European (CESEE) countries, thus reflecting a strategic regional research priority of the OeNB. Contributions to the quarterly FEEI include peer reviewed studies dealing primarily with macrofinancial and monetary integration as well as economic country analyses and cross-regional comparisons.

Statistiken – Daten & Analysen quarterly

This publication contains brief reports and analyses focusing on Austrian financial institutions, cross-border transactions and positions as well as financial flows. The contributions are in German, with executive summaries of the analyses in English. The statistical part covers tables and explanatory notes on a wide range of macroeconomic, financial and monetary indicators (these indicators and others are also available online in both German and English). In addition, this series includes special issues on selected statistics topics published at irregular intervals.

Research Update quarterly

The quarterly English-language research update is published only on the Internet and informs an international readership about selected findings, research topics and activities of the OeNB's Economic Analysis and Research Department. This publication addresses colleagues from other central banks or international institutions, economic policy researchers, decision makers and anyone with an interest in macroeconomics. Furthermore, the research update offers information on publications, studies or working papers as well as events (conferences, lectures and workshops).

For further details see www.oenb.at/research.update

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Issued both in German and English, the Financial Stability Report contains first, a regular analysis of Austrian and international developments with an impact on financial stability and second, studies designed to provide in-depth insights into specific topics related to financial market stability.

Workshops – Proceedings of OeNB Workshops

three to four issues a year

The Proceedings of OeNB Workshops were introduced in 2004 and typically comprise papers presented at OeNB workshops at which national and international experts, including economists, researchers, politicians and journalists, discuss monetary and economic policy issues. Workshop proceedings are generally available in English only.

Working Papers

about ten papers a year

The OeNB's Working Paper series is designed to disseminate, and provide a platform for discussing, findings of OeNB economists or outside contributors on topics which are of special interest to the OeNB. To ensure the high quality of their content, the contributions are subjected to an international refereeing process.

Conference Proceedings of the Economics Conference annual

The Economics Conference hosted by the OeNB is an international platform for exchanging views and information on monetary and economic policy as well as financial market issues. It convenes central bank representatives, economic policy-makers, financial market players, academics and researchers. The conference proceedings comprise all papers presented at the conference.

Conference Proceedings of the Conference on European Economic Integration

annual

The OeNB's Conference on European Economic Integration (CEEI) focuses on Central, Eastern and Southeastern European issues and the ongoing EU enlargement process. The Conference Proceedings comprise contributions to the CEEI and are published in English by a renowned international publishing house.

For further details see <http://ceec.oenb.at>

Annual Report (Sustainability Report)

annual

The Annual Report of the OeNB provides a broad review of Austrian monetary policy, economic conditions, new developments in the financial markets in general and in financial market supervision in particular as well as of the OeNB's changing responsibilities and its role as an international partner in cooperation and dialogue. It also contains the OeNB's financial statements, its Intellectual Capital Report and its Environmental Statement.

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