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5 Years After – Austria's Experience with the Euro

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Opinions expressed by the authors of studies do not necessarily reflect the official viewpoint of the OeNB.

Editorial

Euro banknotes and coins were introduced as legal tender in Austria on January 1, 2002. Following the introduction of the euro in Slovenia on January 1, 2007, some 317 million Europeans in 13 euro area countries now have the euro as their currency. At the turn of the year 2006 to 2007, five years after the “physical” introduction of the euro, numerous Austrian media took stock of the history of euro cash and its performance so far. Their assessment covers a broad range of views from “the euro’s performance is exemplary” and “the euro – a success story” to “the euro – unloved birthday boy” and “the euro continues to boost prices.”¹

People Consider Stable Money Very Important

These contradictory headlines have one thing in common: the euro is still an emotional topic. The contrasting captions, for one thing, signal people’s fundamental interest in money and its stability. Indeed, opinion poll results² show that 94% of Austrian respondents attach great importance to monetary stability. People’s interest appears to be reinforced by the fact that the euro is still a fairly new currency. After all, five years³ is not a long time for the life of a currency by historical standards. For another thing, the ambivalent and emotional reactions to the euro demonstrate that the need for communication is still there. Against this background, the Oesterreichische Nationalbank (OeNB) has taken the euro’s 5th anniversary as an occasion to examine the euro experience from various angles in this special issue of “Monetary Policy & the Economy.”

People Find the Euro Increasingly Easy to Use – The Euro Enjoys a High Degree of Acceptance

A currency must be accepted by the general public to fulfill its functions as a means of payment, unit of account and store of value. The first analysis in this special issue (*Fluch, Gnan and Schlägl*) approaches this theme by analyzing Austrian public opinion on the euro using the results of regular surveys conducted by the OeNB and the European Commission. The authors find that in 2006, 62% of the Austrians were convinced of the benefits of the euro and euro cash. Austrians acknowledge the economic and practical benefits of the euro, in particular as it has made traveling easier and prices more transparent, and as it has had positive effects on the European economy. However, relatively few people realize that the euro has made cross-border payments within the euro area cheaper. The difficulties people encountered in day-to-day use of the euro – when paying for purchases and trying to tell the various denominations apart – declined sharply during the five years from 2002 to 2006. After initial problems, people have found the euro increasingly easy to use, especially since 2004. In 2006, 93% of all Austrians considered themselves adept at handling

¹ Headlines on December 27, 2006 (taken from Austrian dailies, e.g. *Die Presse*, *Kurier* and *Der Standard*; German originals: *Musterschüler Euro*; *der Euro als Erfolgsstory*; *Euro – der ungeliebte Jubilar*; *Euro bleibt Teuro*).

² Source: OeNB Barometer, Report on the 4th quarter of 2006, November/December 2006.

³ Five years since the introduction of euro cash; eight years since the introduction of the euro for noncash payments.

the new banknotes (68% found it very easy or easy to handle euro coins). Austrians have become accustomed to using the euro as a unit of value for daily purchases. Only 12% still had major difficulties using the euro value scale in 2006. According to the OeNB Barometer survey of December 2006, 56% of all Austrians found it easy to gauge the value of euro prices. Through a broad range of information activities, the OeNB and its partner institutions were able to contribute substantially to making people familiar with the euro.

Perceived Inflation Declines as People Become More Used to the Euro

As *Fluch and Stix* argue, dispelling the mistaken impression that the euro has led to price increases remains a challenge. Given the dynamics of the psychology of perception and the high visibility of above-average price increases in some categories of items bought on a day-to-day basis, people perceived rises in inflation after the cash changeover but hardly registered the sharp decline in the price of other items in the basket of consumer goods. Economic psychologists are aware of the phenomenon of the biased perception of price increases. People's deep-seated expectation that the introduction of the euro would make prices rise, the slow pace of familiarization with euro pricing and the inclination to keep thinking in schilling terms, especially for large, exceptional purchases, reinforced the impression of euro-induced inflation. However, the discrepancy between perceived and actual inflation, which was especially prevalent during the first years following the changeover, had become perceptibly smaller by the end of 2006. Moreover, Austrians have developed a feel for the new currency over time and have become accustomed to using the euro as a unit of value. These developments give rise to the hope that people have largely overcome their impression of a "euro price shock" and that actual and perceived inflation will converge again.

Price Increases and Price Cuts Roughly Balanced Each Other Out during the Cash Changeover

The analysis of individual price data in the Austrian consumer price index (*Glatzer and Rumler*) reveals that price-setting habits and the structure of Austrian consumer prices have not changed significantly since the cash changeover. The authors find that at the time of the changeover itself, the observed price changes were more frequent but smaller than usual. Moreover, as upward and downward price adjustments were also fairly balanced, the cash changeover had no significant overall inflationary effects. The enforcement of the dual pricing law caused the share of attractive prices (i.e. prices ending in 9 or 90, and even prices) to plummet temporarily in the first few months following the introduction of euro cash. In the course of the next four years, however, this share again approached the 60% level observed before the changeover.

Price Level Convergence in the Euro Area Remains Smaller than Expected

Theoretical arguments would suggest a convergence of prices in the euro area as a result of both product market integration in the EU's Single Market and more transparent prices across borders following the introduction of the common currency. *Crespo Cuaresma, Égert and Silgoner* empirically assess this hypothesis for 27 European countries on the basis of the development of 160 goods and service prices. The authors' conclusions confirm that prices had converged already at the beginning of the 1990s following the establishment of the EU's Single Market. Overall, the introduction of the single currency did not lead to a further significant narrowing of price differentials in the euro area since 1999, except in the case of some tradable goods – e.g. cars – and, perhaps surprisingly, some services. This could be explained by product market integration having been substantially promoted by exchange rate stability within the Exchange Rate Mechanism of the European Monetary System in the run-up to Economic and Monetary Union (EMU). The fact that price convergence did not continue since 1999 may be due partly to the different pace of liberalization across the euro area, which even caused price differentials across countries to widen temporarily. Still existing regulatory obstacles may be another reason why price differentials did not narrow further. These obstacles should be eliminated in the course of the completion of the Single Market.

Widespread Use of the Euro across Central, Eastern and Southeastern Europe

As *Backé, Ritzberger-Grünwald and Stix* demonstrate, many Central, Eastern and Southeastern European EU Member States have euro-denominated cash holdings, savings and loans. The euro also plays an increasingly important role on Eastern European capital markets. At the end of 2006, 30% of all Czechs and Slovaks, 25% of Croatians and 7% of Hungarians held euro cash. Cash holdings are contingent on geographical proximity along with close economic ties, foreign ownership of banks, risk considerations and traditions. The volume of domestic payments in euro, however, tends to be insignificant. The strong presence of the euro influences the transmission of monetary policy impulses in Central, Eastern and Southeastern European EU Member States and may have an impact on financial stability and economic activity. "Euroization" does not influence the time at which these countries enter the euro area; much rather, entry is contingent on progress with convergence, as prescribed by the Maastricht Treaty.

Euro Cash Moves through the Euro Area at a Fast Pace

Schneeberger and Süß show that the pace of banknote migration through the euro area is very fast. An Austrian wallet will typically hold coins and banknotes from all euro area countries. The national origin of euro coins is readily discernible, as all coins have a distinct national face, and the letter contained in the banknote's number indicates the country of origin. The share of foreign banknotes and coins in Austria has been edging up. Migration of banknotes took place at a much faster rate than migration of euro coins. Austria is largely

an “importer” especially of EUR 50, EUR 20 and EUR 5 banknotes. Banknote migration in Austria commenced at a very rapid pace and on a large scale, evidently above all because of the country’s geographical location, tourism and commuter movements and, particularly, owing to the strong presence of Austrian banks in Eastern Europe. With the advent of the common currency, cash is no longer national. It is European.

Euro Cash is Secure

In Austria, cash is used for 86% of all payment transactions, making it the most prevalent means of payment by far, as *Schautzer* reports. To ensure that Austria’s business community and the general public have an ample supply of cash, the OeNB and its subsidiaries (Oesterreichische Banknoten- und Sicherheitsdruck GmbH, Münze Österreich AG, GELDSERVICE AUSTRIA Logistik für Wertgestionierung und Transportkoordination G.m.b.H.) have in place efficient distribution logistics. A banknote is returned an average of three to four times to the OeNB, where it is counted and checked with high-performance banknote processing machines and, if necessary, withdrawn from circulation. In 2006, 1.2 billion banknotes and 1.7 billion coins were examined to establish whether they were fit for reuse and prepared for recirculation. The total of counterfeit notes withdrawn from circulation in Austria more than halved from roughly 13,000 in 2004 to less than 6,000 in 2006. To secure trust in the currency, the authorities will continue to invest in the integrity of euro cash. Preparations for the next generation of euro banknotes are already well under way.

The Euro Influences NCB Balance Sheets and Monetary Income

Banknotes in circulation have always been the most important liability in central banks’ balance sheets. The euro has changed the presentation and development of this item, which had been a purely national liability item prior to the introduction of the euro. As *Handig* and *Holzfeind* show, banknote migration between euro area countries has a strong impact on this liability item in every national central bank’s (NCBs) balance sheet. To ensure an unbiased balance sheet presentation of banknotes in circulation, national circulation is not determined on the basis of banknotes physically issued and withdrawn by individual NCBs. Much rather, of the total value of euro banknotes placed in circulation by the Eurosystem, the European Central Bank (ECB) is allocated a share of 8%, while the remainder is allocated to NCBs according to their weightings in the capital key of the ECB (the OeNB’s share has stood at 2.9002% since January 1, 2007). The monetary income of the Eurosystem – income that accrues to the NCBs in the performance of the Eurosystem’s monetary policy function – is also distributed to the NCBs in line with their respective shares in the capital of the ECB. Five years of experience with euro cash have shown that the stipulations on banknotes in circulation and monetary income provide for an equitable distribution of seigniorage income within the Eurosystem.

The Euro Strengthens Economic Performance in the Euro Area and in Austria

At the end of December 2006, the value of euro cash in circulation totaled some EUR 646 billion – which is actually above the value of circulating U.S. dollars – and consisted of 11 billion banknotes and 70 billion coins.

The euro has boosted the euro area's economic performance. The steady low rate of inflation anchors inflation expectations and keeps real interest rates at low levels. Between 1999 and 2006, euro area inflation averaged 2.1% a year. Despite the surge in oil prices and other unfavorable shocks, inflation has also been comparatively low at an average of 2.2% since the cash changeover. These stable framework conditions foster investment, economic growth and employment.

Along with Finland and Germany, Austria figures among the three euro area countries with the lowest inflation rates. Inflation in Austria as measured by the Harmonized Index of Consumer Prices (HICP) came to 1.7% a year on average for the period from 1999 to 2006 – the lowest eight-year average since 1945 – and likewise averaged only 1.7% in the five years since the euro cash changeover, notwithstanding the sharp rise in oil prices in that period.

Transparency and Information Promote Confidence

According to an OeNB survey, at the end of 2006, three-quarters of all Austrians considered the euro a stable currency. Roughly the same percentage expects the euro to remain stable in the short run (one year), and close to 70% expect the euro to remain stable in the next five years. Moreover, Austrians ascribe the Eurosystem and the OeNB high competence in securing the stability of the euro. The Eurosystem and the OeNB will do their utmost to keep living up to the high expectations the public has placed in them by pursuing a stability-oriented monetary policy and by providing comprehensive information to the public. Confidence requires transparency and information – which is why we are publishing these studies in “Monetary Policy & the Economy.”

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A N A L Y S E S

Euro Area Growth Broad-Based in Early 2006

Lower Rate of Inflation

Gerhard Fenz,
Josef Schreiner,
Maria Antoinette
Silgner

The global economy continued to look robust at end-2006. In the U.S.A. private consumption increased, notwithstanding the protracted housing slowdown, and the services sector continued to grow at a dynamic pace. In view of the still buoyant economy, a cut in U.S. interest rates does not appear imminent. In Japan, the economic recovery persisted, leading the Bank of Japan to raise interest rates in February 2007 – for the first time since ending six years of zero interest rates in July 2006. In China and Southeast Asia, the rapid pace of growth continued to accelerate.

In the euro area, real GDP growth accelerated in the fourth quarter of 2006 and is, moreover, increasingly being driven by domestic demand. The latest forecasts indicate above-potential GDP growth in 2007. Furthermore, the labor market developed favorably, with both the actual and structural unemployment rate down by a significant margin. Since September 2006, the rate of inflation has been below the 2% mark owing to, among other factors, the fall in crude oil prices and the hitherto weak pass-through of the increase in Germany's VAT rate to consumer prices. In this climate the short-term prospects for price stability have improved as well.

The economies of the new EU Member States continued to outperform the euro area economies in the second and third quarter of 2006. This was primarily attributable to soaring domestic demand. Inflation rates visibly declined in most countries on the back of falling oil prices in the second half of 2006.

The Austrian economy will expand at a dynamic pace also in the first half of 2007. For both the first and second quarter of 2007, the current OeNB economic indicator forecasts real GDP growth of 0.7% on a seasonally-adjusted and quarterly basis. The Austrian economy will thus continue to grow at the rate it expanded in 2006. For 2007 as a whole, therefore, growth of 3% (or just above this figure) looks feasible from a current perspective.

JEL classification: E200, E300, O100

Keywords: economic developments, global outlook, euro area, central and (south-)eastern Europe, Austria.

1 Continued Growth of the World Economy

1.1 U.S.A.: Moderate Economic Growth in the Fourth Quarter of 2006

In the fourth quarter of 2006, the U.S. economy showed moderate real GDP growth of 2.2% on an annualized basis after having slowed down visibly already in the previous two quarters. The cooling has so far largely reflected a housing slowdown, although the slowdown in inventory investment and in corporate investment also dampened output growth in the fourth quarter of 2006. However, consumer spending increased

by 4.2% on a quarterly basis and thus remained relatively robust in the fourth quarter of 2006, thanks to the favorable labor market situation, steep wage increases and relatively low oil prices. At 3.4%, real GDP growth in 2006 as a whole outperformed the long-term trend of some 3%. Productivity growth, while increasing sharply to 3% in the fourth quarter of 2006, only reached 2.1% on an annual basis, thus remaining below the figure for 2005 (2.3%).

In mid-February 2007, the Federal Reserve issued an optimistic statement on growth and the trend in inflation. In its opinion, the U.S.

Cutoff date for data:
March 9, 2007.

economy is expanding at a solid pace. Consequently, the Federal Reserve once more did not signal an early cut in interest rates, after having increased key interest rates 17 times in succession from mid-2004 to mid-2006 by 25 basis points each time to 5.25%.

The Federal Reserve statement was relativized somewhat by a recent release of data for January 2007. The number of new housing starts, for instance, was markedly down. In addition, U.S. consumer prices advanced at a stronger year-on-year rate (2.1%) in January 2007 than expected (December 2006: 2.5%). The increase in the core rate amounted to 2.7%. For 2007 as a whole, the Federal Reserve predicts that core inflation will decelerate to between 2.0% and 2.25% (2008: between 1.75% and 2.0%).

In January 2007, the Conference Board index of leading indicators firmed slightly compared with the previous month. This means that the index is continuing its slight uptrend of the past few months, signaling a modest acceleration of economic momentum in the second half of 2007. The Federal Reserve predicts real GDP growth of 2.5% to 3.0% in 2007 and 2.75% to 3.0% in 2008. According to the OECD's fall 2006 economic outlook, real GDP growth will be 2.4% in 2007.

The unemployment rate, which has been falling since mid-2003, reached a low of 4.5% toward end-2006 only to rise slightly to 4.6% in January 2007. Nonfarm enterprises created 111,000 new jobs in January on a seasonally-adjusted basis (2006 average: 187,000 per month). Employment grew in both the services and construction sector while manufacturing continued to shed jobs. Nonetheless, the labor force partici-

pation rate was 0.3 percentage point higher in January 2007 than 12 months earlier.

The risks to the U.S. economy remain its imbalances, which are its high current account deficit as well as consumers' high levels of debt and their low propensity to save. In addition, higher mortgage rates since mid-2004 are checking the take-up of additional mortgage loans and are thus contributing to a cooling of the housing market, which could dampen private consumption.

1.2 Japan: Renewed Hike in Interest Rates in View of Stable Growth Prospects

At 1.2%, Japan's real GDP grew for the eighth time in a row on a quarterly basis in the fourth quarter of 2006. GDP growth was driven by rebounding consumer spending, investment and exports, which accounted for a half, a third and a sixth of the total, respectively. However, since employees have so far hardly derived any benefit from high corporate profits, the adequate sustainability of consumer spending is not assured.

The Bank of Japan (BoJ) continues to assess the state of the Japanese economy as it did in October 2006. The central bank expects the Japanese economy to expand by 2.4% in the current fiscal year ending on March 31, 2007 (fiscal year 2007/08: 2.1%). In the calendar year 2006, the Japanese economy grew by 2.2% in real terms, i.e. for the seventh year in succession. In the OECD's fall 2006 economic outlook, Japan's GDP growth is set to be 2.0% in 2007. Although very healthy corporate profitability and buoyant export markets will continue to fuel Japan's growth, the latter depends on support from household spending. The

consumer price index (CPI) excluding fresh food, which is of key importance for monetary policy, remained unchanged on an annualized basis in January 2007 (full-year 2006: +0.1%). Since enterprises are starting to pass on their high energy costs to consumers and fiscal consolidation measures will necessitate an increase in VAT, consumer prices are likely to continue rising in future. For 2007, the OECD predicts an inflation rate of 0.3%.

In view of stable economic growth in the fourth quarter of 2006, the BoJ decided on February 21, 2007, to raise key interest rates by 25 basis points to 0.5%. In addition, the BoJ bases its rationale for this decision on a "forward-looking monetary policy" with a horizon of one to two years. The increase in overnight rates can also be seen as a warning signal regarding the recent surge in carry trades, which are based on raising funds in low-yield currencies for the purposes of investing profitably in high-yield currencies. In the past few months, carry trades have become a crucial driving force behind exchange rate fluctuations. However, since the interest rate gap continues to remain wide relative to major currency areas and the BoJ has not announced any further interest rate hikes for the near future, these arbitrage transactions will not lose their appeal for the time being. This is reflected in the renewed weakness of the Japanese yen.

1.3 Asia: Robust Economy, China Further Tightens Monetary Policy

Real GDP growth accelerated in a number of countries in non-Japan Asia (NJA: India, Malaysia, the Philippines, South Korea, Taiwan and Thailand). Both the domestic economy and the external sector contin-

ued to be important pillars of growth even though external demand was weaker in part (especially in the Special Administration Region of Hong Kong). Although Indonesia's economy was hit by exceptional factors (floods, earthquake) in the fourth quarter of 2006, it grew by 5.5% in real terms over the year as a whole. In NJA, countries still enjoy a favorable economic outlook, with the main risk considered to be a stronger U.S. economic downturn.

Furthermore, China's GDP growth continued to soar to 10.7%, driven by dynamic growth in gross fixed capital formation and exports. Continued growth in the trade balance surplus as well as direct investment inflows mean that China now leads the world in terms of currency reserves. Since bank lending and money supply growth have also increased at a faster than average pace, China's central bank raised key interest rates twice in 2006 and repeatedly lifted the minimum reserve rate for deposits, most recently in January and February 2007. In addition, it instructed commercial banks to restrict lending, and it absorbed liquidity by issuing bonds.

2 Euro Area: Good GDP Growth, Inflation Remains Below 2%

2.1 GDP Growth Beats Expectations

In the last quarter of 2006, the euro area economy picked up marked momentum. Real GDP grew by 0.9% on the previous quarter and by as much as 3.3% on the fourth quarter of 2005, showing the usual signs of firming. While initially the cyclical upturn was primarily export-led, domestic demand has since started to support economic growth as well. In the fourth quarter of 2006, household

consumption contributed 0.3 percentage point to GDP growth. Gross fixed capital formation, which was fueled by high capacity utilization, made an equally high contribution to GDP growth. According to a European Commission survey, capacity utilization has exceeded its historical average of 81.8% since early 2006 (first quarter of 2007: 84.4%). Net exports registered strong growth rates, particularly in export-oriented countries such as Germany and Italy. All in all, average real GDP growth stood at 2.6% in 2006 as a whole.

In the fourth quarter of 2006, growth accelerated especially strongly in Italy and France. In Germany, too, economic growth gathered momentum at the end of the year. The acceleration in growth is primarily attributable to buoyant net exports. By contrast, domestic demand grew at only a moderate pace and was even more sluggish than in the third quarter of 2006. This is not in line with expectations of consumers rushing to beat the VAT increase from 16% to 19% effective from 2007 onward. Al-

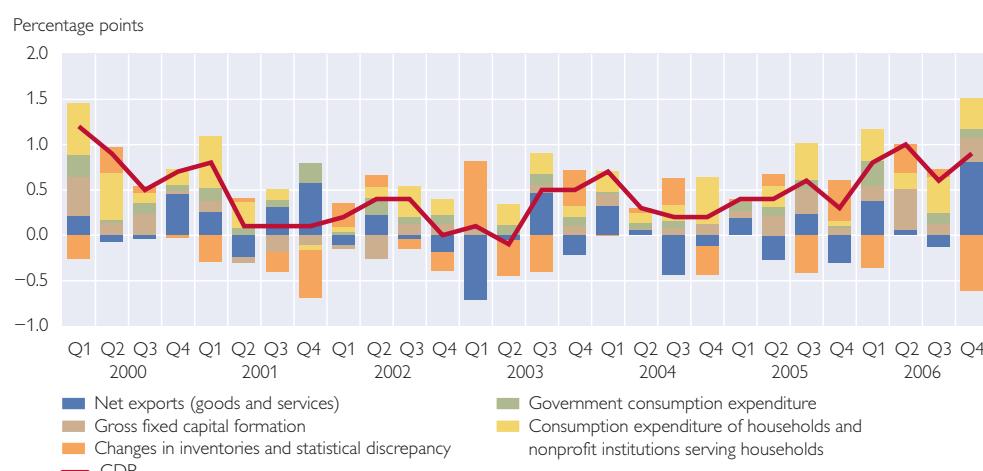
though car manufacturers and furniture makers benefited from robust demand, continued modest income trends clearly curtailed further demand. Furthermore, many retailers announced credibly that they intended to refrain from passing through the bulk of the VAT increase to consumers. In addition, domestic demand was dampened by the fact that the dynamic demand for export goods was met primarily by an inventory rundown.

Unemployment in the euro area continued to decline sharply thanks to robust economic growth. The unemployment rate gradually fell from a record high in mid-2004 (8.9%) to 7.4% in January 2007, reaching its lowest level in more than a decade. However, this decline is not only cyclically induced. The structural reforms of the past few years also reduced the structural unemployment rate. As a result, GDP growth is currently associated with considerably higher employment effects than a few years ago. In the second and third quarter of 2006, employment growth

Chart 1

Growth Contribution of Real GDP Components in the Euro Area

Quarter-on-quarter changes



Source: Eurostat.

on a quarterly basis stood at 0.4%, a level not seen since 2000. The European Commission's employment expectations in industry and the services sector suggest that the trend in employment will be dynamic in the months to come.

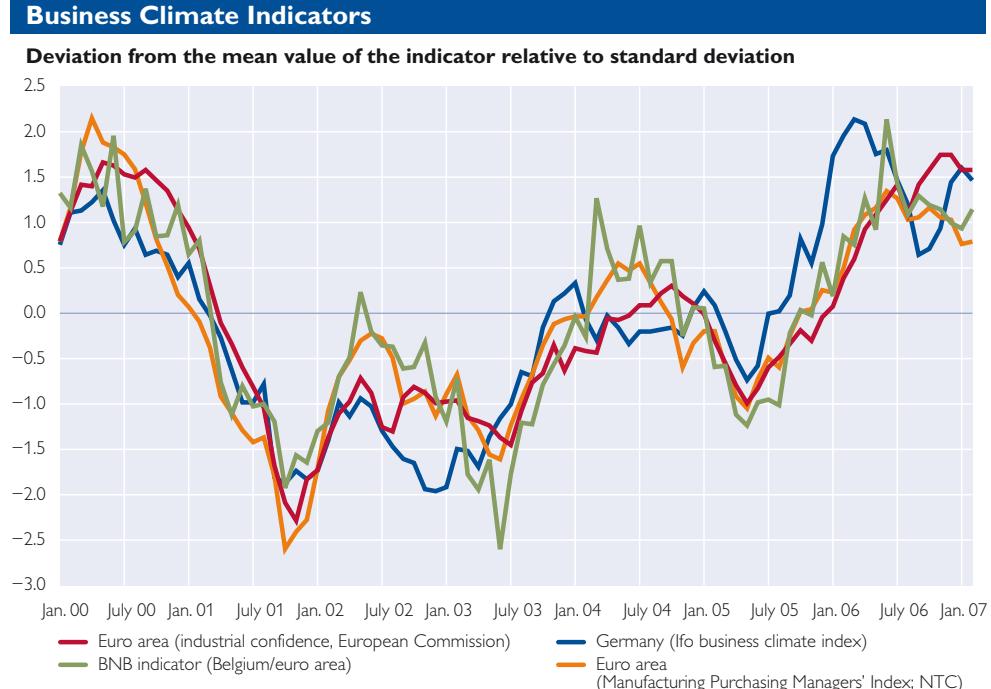
2.2 Forecasts Indicate Continued Growth

In coming quarters, the conditions required for the economy to continue developing favorably will prevail. Even the hitherto expected deceleration of GDP growth in the first quarter of 2007 will prove to be more moderate from a current perspective, as German consumers did not rush to beat the VAT increase, which would have sharply depressed consumer demand in the following quarters. Although some industrial sentiment indicators have slipped slightly since early 2007, they remain well above their historical averages, thus still signaling above-potential growth. There

are without exception positive signs for private consumption, which is being fueled by the improved labor market situation and the favorable inflation expectations. For instance, a survey conducted by the European Commission shows that consumer confidence is in a stable uptrend. As a result, domestic demand should remain the mainstay of the economy.

The European Commission endorses this assessment. According to its euro area GDP growth projection, growth for the first quarter of 2007 will be between 0.4% and 0.8% and, for the second quarter of 2007, between 0.5% and 0.9%. In its interim update for the fall 2006 economic outlook, the European Commission revised upward its growth expectations for 2007 as a whole by 0.3 percentage point to 2.4%. It expects the growth differentials between Europe's largest economies to converge and deems the forecasting risks to be balanced.

Chart 2



Source: European Commission, Ifo, NTC, BNB, OeNB calculations.

In addition, the ECB released upbeat staff projections in March 2007. ECB staff experts expect GDP growth to range between 2.1% and 2.9% in 2007 and between 1.9% and 2.9% in 2008, with both external and domestic demand likely to fuel the economy.

2.3 Euro Area Inflation Remains below 2% in Early 2007 thanks to Unexpectedly Weak VAT Effects in Germany

It was assumed as late as fall 2006 that a good chunk of Germany's VAT reform would be passed onto consumers in the form of higher prices. As a result some forecasts saw inflation in the euro area rise by as much as 0.4 percentage point. However, the first few months of 2007 showed that this effect was more modest. Clearly, fierce competition counteracted a full pass-through to consumers, as healthy profitability allowed enterprises to absorb the effect.

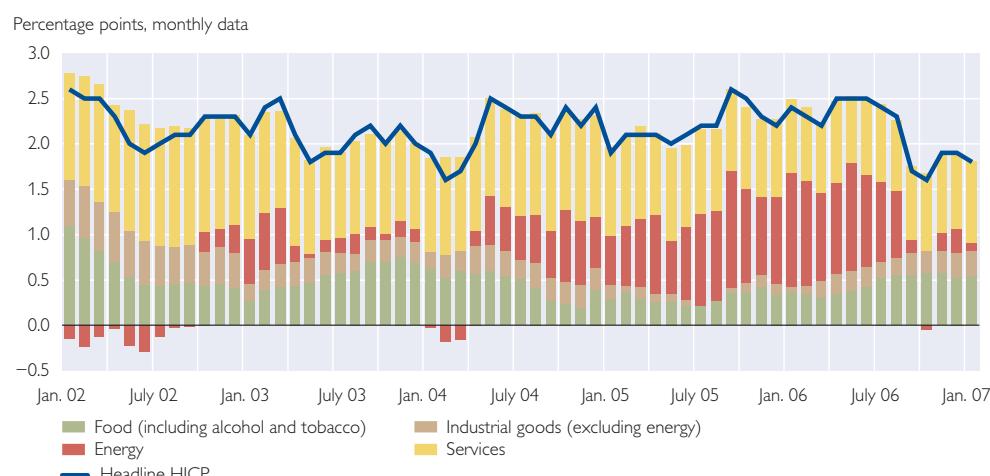
In the euro area (including Slovenia), the inflation rate of the Harmonized Index of Consumer Prices

(HICP) fell to 1.8% in January 2007. The HICP flash estimate for February 2007 was also 1.8%. Since September 2006, inflation has therefore been below the 2% mark. This is attributable primarily to the fall in crude oil prices. The contribution of energy goods to inflation has been minimal or even negative in the last few months. Unprocessed food prices, which registered the highest growth rates in four years in fall 2006 as a result of the hot dry summer, recently rose at a slower pace, due to the mild winter among other things.

In the second half of 2006, core inflation (excluding energy and unprocessed food) steadied, ranging from 1.5% to 1.6%. In January 2007, however, core inflation then climbed to 1.8%. This might imply certain risks for the future. For instance, although the inflation rate for industrial goods (excluding energy) remains low thanks to fierce international competition, it has steadily risen from 0% in mid-2005 to almost 1%. As for services, several exceptional factors (telecoms, administered

Chart 3

HICP Components: Contributions to Inflation



Source: Eurostat.

prices) have dampened price increases since mid-2004. These downward pressures on inflation should now become less important.

The complexity of the development of prices is also noted by the European Commission. Although it markedly revised downward its interim inflation outlook to 1.8% in view of weak inflation effects in Germany and moderate oil prices, it sees risks in upward pressures on producer prices and a possible lack of wage restraint. Wages have so far risen at a moderate pace, however. In the third quarter of 2006, unit labor cost growth stabilized at 0.8%. As a result, no significant second-round effects generated by oil prices are identifiable.

According to ECB staff projections released in March 2007, the HICP inflation rate will range between 1.5% and 2.1% in 2007 and between 1.4% and 2.6% in 2008. Whereas lower oil prices have improved the inflation outlook, the Governing Council of the ECB is vigilant vis-à-vis the future wage trend, particularly, in view of predicted higher GDP growth.

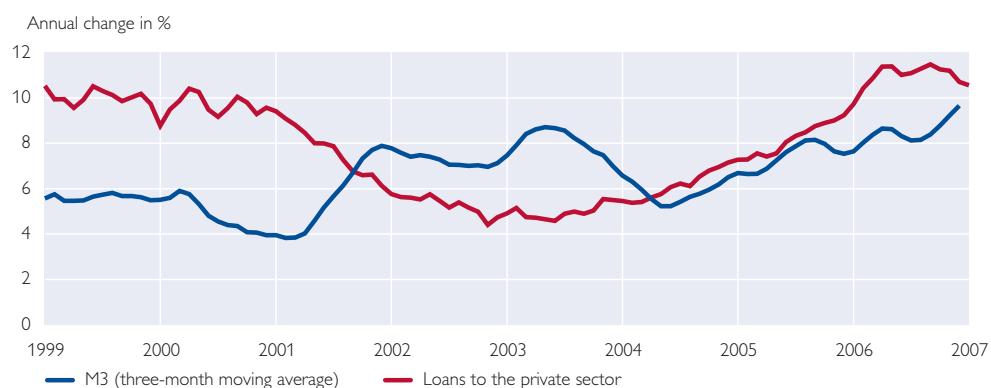
2.4 Historical Highs for Money Supply and Lending Growth

Money supply growth has been steadily accelerating since mid-2004. In the period from November 2006 to January 2007, the three-month average of annual money supply growth M3 was 9.7%, attaining a new high. This trend reflects, above all, accelerating growth in short-term deposits. Clearly, the increased rates for maturities of up to two years raise the appeal of investing in short-term assets. Falling, albeit continued high growth of M1 is due to still relatively low interest rates in the euro area.

However, lending growth recently slowed down following historical highs. Growth in private sector loans, which are of particular significance given their sheer volume, fell to their lowest level in almost a year. The reasons for the nonetheless continued high growth in lending lie in the historically low level of both short- and long-term interest rates as well as in the dynamic growth in housing purchases. The surge in M&A activities in the euro area is likely to have contributed to the rapid expansion of corporate borrowing.

Chart 4

M3 and Loan Developments in the Euro Area



Source: ECB.

2.5 Further Hike in Key Interest Rates by 25 Basis Points

On March 8, 2007, the Governing Council of the ECB endorsed a further increase in key interest rates by 25 basis points to 3.75%. This means that key rates have been raised by a total of 175 basis points since December 2005. This rate hike was justified on the basis of the favorable economic climate and the potential risks for price stability.

The markets largely anticipated this increase, which had already been factored into the three-month interbank rates prior to the Governing Council's decision. The yield curve has become steeper since early 2007, with the interest rates for ten-year euro bonds rising more rapidly than the three-month rates. Even though the yield curve exhibits a normal trend, the margin between interest rates at the long and short end remains historically low.

Following the turmoil in mid-2006, stock markets rallied quickly, attaining new highs in mid-February 2007. Contributory factors were healthy profitability and lower oil prices, as well as robust demand for stocks fueled by M&A activities. The Dow Jones EURO STOXX rose by some 20% in 2006, posting a historically high increase. At end-February 2007, however, stock markets were subjected to sharp price corrections and substantially increased volatility. This is likely to reflect increased risk aversion as well as jitters on the part of investors vis-à-vis the future trend of the U.S. economy.

The strong euro trend in the foreign exchange markets continued initially in fall 2006. This was due to, among other factors, the narrowing of the negative interest rate differential between the euro and the U.S.

dollar. The EUR/USD exchange rate appreciated to some extent in early 2007. Early 2007 also saw pound sterling firm relative to the euro. By contrast, the Swiss franc and the Japanese yen softened, which may be attributable to an ample currency supply of Swiss francs and Japanese yen fueled by carry trades. At end-February 2007, the euro outperformed its average in 2006 by some 2% in effective nominal terms.

3 Economic Growth in Central and Eastern Europe (CEE)

3.1 Strong Economic Momentum in the New EU Member States

In the first half of 2006, average real GDP growth in Bulgaria, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic and Slovenia fell just short of 6% year on year whereas, in the third quarter of 2006, came to just above 6% compared with the same period a year ago. This means that CEE countries continued to enjoy accelerating growth – evident as early as 2005 – in 2006. Preliminary data on GDP growth in the fourth quarter of 2006 suggest the continuation of this trend. This region's economic momentum is attributable primarily to Poland and Romania. In Poland – the region's largest economy in GDP terms – growth accelerated from 3.5% in 2005 as a whole to 5.8% in the third quarter of 2006. In Romania – the third largest economy of the EU's Eastern and Southeastern European Member States – GDP growth doubled compared with 2005 as a whole. In addition, Bulgaria and the Slovak Republic registered higher than average growth. At almost 10% in the third quarter of 2006, Slovakia reported the highest growth in real terms since

Table 1

Real GDP Growth in Selected Eastern European Economies						
	Annual change in %					
	2005	2006	Q1 06	Q2 06	Q3 06	Q4 06
Bulgaria	5.5	..	5.6	6.6	6.7	..
Czech Republic	6.1	..	6.4	6.0	5.8	..
Hungary	4.2	..	4.9	3.8	3.8	..
Poland	3.5	5.9	5.2	5.5	5.8	7.0
Romania	4.1	..	6.9	7.8	8.3	..
Slovak Republic	6.0	8.2	6.7	6.7	9.8	9.5
Slovenia	4.0	..	5.1	4.8	5.6	..
Croatia	4.3	..	6.0	3.6	4.7	..

Source: Eurostat, national statistical offices.

the founding of the Republic in 1993. In Hungary, however, GDP growth was more sluggish than in the other countries of the region. In Croatia, the economy gained momentum in the third quarter of 2006 after a muted second quarter.

In almost all the countries of this region reviewed here, growth was largely driven by domestic demand. Both private consumption and corporate investment soared. Household spending was fueled primarily by an improved labor market situation. Growing employment, falling jobless rates and increasing real wages strengthened consumer confidence. Furthermore, lending growth, which was robust in some countries, boosted consumption.

High levels of macroeconomic demand, coupled with favorable financing conditions, good capacity utilization and satisfactory profit performance generated strong investment growth. This development was particularly marked in Poland, Slovenia and the new EU Member States in Southeastern Europe. In all the aforementioned economies, investment activity registered double-digit growth rates in the third quarter of 2006. In Poland, this amounted to almost 20%. Above all, Bulgaria and

Romania continued to benefit from high FDI inflows.

This general picture of growth fueled by domestic demand is shattered only by Hungary, where private consumption has been stagnating since early 2006. Both public consumption and investment expenditure registered negative growth in the second and third quarter of 2006. This was due to a comprehensive budget consolidation package necessitated by a very high budget deficit (2006: 10.1% of GDP). Growth generated in Hungary is almost entirely attributable to net exports. This is based on the continued robust growth in exports. By contrast, the weak domestic economy is currently dampening the growth in imports.

In the other CEE countries, net exports relative to GDP growth were hardly of any consequence in the third quarter of 2006 and were for the most part slightly negative. In Bulgaria and Romania, the trend in high and accelerating import growth continued, as a result of which net exports were deep in the red despite quite robust export growth. Both countries saw considerable improvement in their economic outlooks in connection with their accession to the EU and their dynamic GDP

growth. In anticipation of rising income, Bulgarian and Romanian households have been stepping up consumption, which has in turn caused lending to the private sector to soar. Strong consumer activity is reflected in both countries' high and growing current account deficits as well. By the third quarter of 2006, both Bulgaria and Romania had accumulated a current account deficit of some 11% of GDP, i.e. about 3 percentage points higher than in the comparable period in 2005. In both cases, this development can be attributed to a strong trade deficit. In the third quarter of 2006, the average current account deficit of the five CEE countries stood at 3.2% of GDP. At 8.9% of GDP, the Slovak Republic posted a considerably higher deficit. This country's deficit can be attributed in equal parts to its trade balance and to a deficit on its income account.

Croatia's GDP growth was also fueled by a buoyant domestic economy, in particular. Investment activity, followed by private consumption, made the biggest contribution to growth. The external sector's contribution to growth was slightly negative.

3.2 Pricing Pressures Ease toward End-2006

In the second half of 2006, a reduction in inflation was evident in most countries of this region. In December, inflation ranged from 1.4 % in Poland to 6.6% in Hungary. First and foremost, this downtrend in inflation was due to the fall in crude oil prices. Whereas energy was on average responsible for almost 50% of inflation measured in the first three quarters of 2006, this share fell to only around 25% in the fourth quarter of 2006. Hungary, where energy's contribution to inflation indeed rose slightly on the back of higher gas prices, represents the outlier of this general trend. In Hungary, as in Bulgaria, the trend in inflation was marked primarily by the prices of processed food (including alcohol and tobacco). In both cases, this is attributable above all to the increase in indirect taxes.

In Romania, the inflation rate tumbled to below 5% at end-2006. In addition to the decreasing contribution of the energy component, this disinflation process can be attributed primarily to the development in unprocessed food prices. After 2005, which was marked by weather-induced catastrophes and floods, agri-

Table 2

Price Development in Selected Eastern European Economies

Annual change in HICP (%)

	2005	2006	July 06	Aug. 06	Sep. 06	Oct. 06	Nov. 06	Dec. 06
Bulgaria	5.0	7.3	7.6	6.8	5.6	5.7	6.1	6.5
Czech Republic	1.6	2.1	2.4	2.6	2.2	0.8	1.0	1.5
Hungary	3.5	4.0	3.2	4.7	5.9	6.3	6.4	6.6
Poland	2.2	1.3	1.4	1.7	1.4	1.1	1.3	1.4
Romania	9.1	6.6	6.2	6.1	5.5	4.8	4.7	4.9
Slovak Republic	2.8	4.3	5.0	5.0	4.5	3.1	3.7	3.7
Slovenia	2.5	2.5	1.9	3.1	2.5	1.5	2.4	3.0
Croatia ¹	3.4	3.2	3.4	3.4	2.8	2.1	2.5	2.0

Source: Eurostat, national statistical offices.

¹ CPI.

cultural production made a strong recovery in the course of 2006. Since September 2006, unprocessed food prices have exerted a dampening effect on inflation after having contributed 1.7 percentage points to inflation early that year. In Poland, more gradually rising processed food prices and falling industrial goods prices favored the trend in inflation.

In December 2006, core inflation rates (overall inflation adjusted for energy and unprocessed food) ranged from 1.1% in Poland to 8.8% in Bulgaria. Compared with early 2006, all the countries of this region (excluding Romania) witnessed a rise in this measure of inflation. This pressure on prices was triggered primarily by high growth momentum and stronger wage growth owing to capacity constraints in the labor markets.

3.3 Easing in Most Labor Markets

In the course of 2006, the labor market situation improved in all the countries of this region reviewed here thanks to the still dynamic economy. Successful structural reforms, high FDI inflows in expanding sectors and, to a certain extent, migration to other EU Member States contributed to a decline in unemployment rates. Labor market conditions improved above all in Poland and the Slovak Republic, the two countries within the EU with the highest rates of unemployment. In Poland, unemployment was reduced from 16.3% in the first quarter of 2006 to 13.2% in the third quarter of 2006. In the Slovak Republic, it was reduced from 15.0% to 12.9% over the same period. In both countries, employment growth accelerated to some 4% in the third quarter of 2006. A decline in long-term unemployment is also evident in most countries of this region.

3.4 Enlargement of the Euro Area

Slovenia was the first country from the EU enlargement round of May 2004 to introduce the euro as legal tender on January 1, 2007. The decision to do so was taken on July 11, 2006, by the Ecofin Council after the ECB and the European Commission had positively assessed Slovenia's convergence in their respective convergence reports. One of the key challenges facing the introduction of the euro in Slovenia was the avoidance of unjustified price increases. According to the Slovenian statistical office, in the direct run-up to the introduction of the euro (i.e. in December 2006), some goods and services categories (e.g. cafés and restaurants, furniture, cosmetic articles, textiles, personal services) were subjected to unusually high price increases, which might partly be associated with the introduction of the euro. In January 2007, however, inflation in fact registered an overall decline.

Both Malta and Cyprus intend to introduce the euro in 2008 and thus applied to the European Commission for a convergence test in February 2007. Their respective convergence reports will probably be presented in May.

4 Austria: OeNB Economic Indicator Signals Continued High Levels of Growth in the First Half of 2007

4.1 Peak of Economic Recovery Appears Attained

Fueled by exports and investment, Austria's GDP growth came to 3.4% on a seasonally adjusted basis in 2006 (nonseasonally adjusted: 3.2%). Austria benefited, in particular, from extremely buoyant demand in its export markets, which rose by just under 10% in real terms, compared

with 2005. Whereas U.S. output growth slowed slightly in the course of 2006, the economies of Austria's key trading partners, Germany and Italy, made a strong recovery. The national accounts show export growth to have reached 8.3% (table 3) but are likely to underestimate the expansion due to changes made to the compilation method for trade in services.¹ The high export momentum is reflected primarily in the performance of the goods balance compiled by Statistics Austria. In 2006, exports rose by 12.7% in nominal terms, attaining for the first time a value in excess of EUR 100 billion. Despite rising energy prices, the goods balance improved by more than EUR 1.6 billion and, with a deficit of only EUR 150 million, can be described as being almost balanced. On the strength of favorable external conditions, it looks quite likely that the goods balance will be back in the black in 2007. In particular, the strong advance in exports to new EU Member States Bulgaria and Romania was noticeable in

terms of the regional breakdown. In the services sector, the mild winter may negatively affect the services balance for the first quarter of 2007, given that overnight stays fell by 3.6% due to poor snow cover in January.

In 2006, external effects helped strongly revive investment activity. Gross fixed capital formation increased by 4.1% in real terms, with investment in construction as well as plant and equipment registering growth. Currently high levels of capacity utilization (85.1%) and the extremely positive results of the latest investment survey conducted by the Austrian Institute of Economic Research (WIFO) suggest undiminished investment momentum in 2007. While replacement investment is increasingly becoming less important as an engine for investment, favorable demand expectations and recently outstanding corporate profitability are becoming determinant factors.

By contrast, private consumption growth remained fairly subdued despite rising real wages and falling un-

Table 3

	2005	2006	Q1 06	Q2 06	Q3 06	Q4 06
Annual change in % (seasonally and working day adjusted)		Quarterly change in % (seasonally and working day adjusted)				
GDP	+2.6	+3.4	+0.7	+0.9	+1.0	+0.8
Private consumption	+1.6	+1.8	+0.4	+0.4	+0.4	+0.3
Public consumption	+1.9	+0.9	+0.3	-0.0	+0.0	+0.2
Gross fixed capital formation	+1.3	+4.1	+1.2	+1.3	+1.3	+1.1
Exports	+6.9	+8.3	+2.6	+1.8	+1.8	+1.9
of which: goods	+6.4	+9.7	+2.7	+2.3	+2.0	+2.3
services	+6.7	+4.5	-0.4	+1.5	+1.4	+1.4
Imports	+6.1	+6.2	+2.3	+1.5	+1.1	+0.5
of which: goods	+7.0	+6.1	+1.7	+1.9	+1.2	+0.4
services	+2.8	+6.8	+3.4	+1.1	+1.3	+1.3

Source: WIFO (quarterly national accounts data).

¹ On January 1, 2006, the reporting system for compiling the Austrian balance of payments (which represents the basis for trade in services in the quarterly national accounts) was modified in line with international trends: cross-border payments are no longer reported by banks but are collected directly from economic agents. This change has caused a break in the time series.

employment rates during 2006 as a whole. In the fourth quarter of 2006, private consumption growth in fact slipped to 0.3% (in real terms, seasonally adjusted and on a quarterly basis) after having stood at 0.4% in each of the first three quarters of that year. The future development of private consumption will however be very crucial for the further develop-

ment of the economy. The OeNB's current short-term economic indicator (box 1) is based on the scenario of a gradual recovery in private consumption in the course of 2007. A faster and stronger than expected strengthening of private consumption would increasingly make growth self-sustaining and represents an upside risk for the short-term GDP outlook.

Box 1

OeNB Economic Indicator from March 2007: Growth Rate Remains High¹

The Austrian economy will expand at quite a dynamic pace in the first half of 2007. For both the first and second quarter of 2007, the current OeNB economic indicator forecasts real GDP growth of 0.7% (on a seasonally-adjusted and quarterly basis). This means that the Austrian economy will continue to grow at the rate it expanded in 2006. For 2007 as a whole, therefore, growth of 3% (or just above this figure) looks quite feasible from a current perspective.

Table 4

Short-Term Outlook for Austria's Real GDP in the First and Second Quarter of 2007 (seasonally and working day adjusted)

2005				2006				2007			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Quarterly year-on-year change (%)											
2.5	2.5	2.6	2.9	3.2	3.4	3.5	3.6	3.5	3.3		
Change from previous quarter (%)											
0.4	0.7	0.9	0.8	0.7	0.9	1.0	0.8	0.7	0.7		
Change from previous year (%)											
2.6				3.4				x			

Source: OeNB – Results of the OeNB indicator of March 2007, Eurostat.

In view of the buoyant demand for exports, well-filled order books and high levels of capacity utilization, vigorous export and investment activity will fuel the economy also in 2007. In the course of 2007, this momentum will carry over to private consumption, the growth of which has been fairly subdued in the past. Declining unemployment and a strong improvement in consumer sentiment indicate an acceleration in consumer spending – also stoked by the expected decline in inflation. In January 2007, inflation measured against the HICP came to 1.8%. Assuming stable crude oil prices, inflation in the next few months will tend to weaken as a result of base effects from past energy price increases and to strengthen real wage growth.

¹ Since the first quarter of 2003, the short-term indicator of the OeNB has been published four times a year. It forecasts real GDP growth for the current quarter and the next (in each case, on a quarterly basis, using seasonally adjusted data). The figures are based on the results of two econometric models, a stochastic state space model and a dynamic factor model. Further details on the models used can be found at www.oenb.at under the item "Forecasts" in the Monetary Policy and Economics section. The next publication is due in July 2007.

The risk of the current outlook is slightly to the upside. If consumer demand increases at an earlier stage and at a faster rate than assumed by the current OeNB economic indicator, even stronger GDP growth cannot be ruled out in the first half of 2007. Two exceptional factors increase the uncertainty of the outlook for the first half of 2007. First, the increase in VAT in Germany adversely affected GDP growth at the start of the year. However, the German economy and, above all, consumer confidence should now be so robust that the growth slowdown can be expected to have been a temporary dent. The impact on the Austrian economy is likely to be concentrated on the first half of 2007 and to dampen growth by no more than 0.1 percentage point. Second, the unusually mild winter has affected the economy particularly in the tourism and construction sectors, which both account for almost 10% of value added. However, the positive growth effects from additional construction activity are likely to more than offset the negative growth effects from tourism.

4.2 Confidence Indicators Signal Continued Economic Boom

The economic assessment indicator for Austria, which has been published by the European Commission since 1995, posted 123 points in February 2007, attaining its highest value ever measured. The strong improvement in consumer confidence is particularly good news, since it implies that the booming economy may have a knock-on effect on private consumption in 2007. These expectations are not reflected in the retail confidence indicator, which moved sideways – unlike the general trend of the last twelve months.

Industrials are currently very confident about the future. The assessment of industrial production in the past few months continued to improve, and expectations for the next few months are stagnating at a high level (chart 5). This is an indication that the peak of the industrial cycle has possibly been reached and that any further acceleration in growth should not be expected. From a current perspective, however, a turning point in the cycle is not identifiable. The assessment of both the domestic and foreign order book is favorable, which means that continued strong growth in industrial production

Chart 5

Assessment of Industrial Production in Recent and Upcoming Months¹



Source: European Commission.

¹ Both series were centered by their average of the period from February 2001 to February 2007.

should also be expected in the next few months. The outlook for the construction industry is also favorable. Both construction and civil engineering enterprises have well-filled order books, and the mild winter ensured additional growth impetus.

4.3 Inflation Remains Below 2% despite Economic Upturn

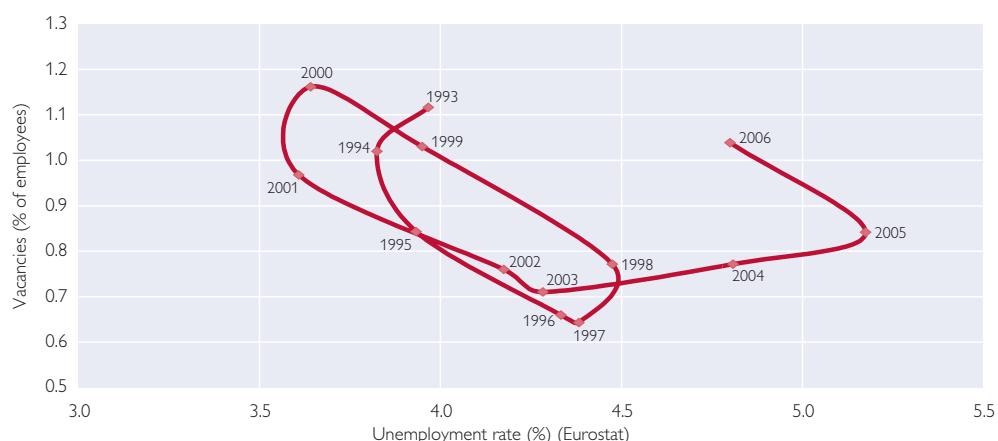
The inflation rate measured against the HICP has been climbing back since October 2006, reaching 1.8% in January 2007 (1.3%). The biggest surge in prices was seen in unprocessed food (+3.5%), processed food (+2.6%) and services (+2.5%) at the start of this year. In the energy sector, increases in electricity and gas prices contributed to the rise in inflation (+2.3%). However, the price development in industrial goods (excluding energy) had the opposite effect, dampening inflation (-0.1%). In January 2007, wage growth was 2.4%, falling slightly short of the annual average in 2006 (+2.7%). At +2.9%, wage growth in general government was stronger than other wage growth.

4.4 Employment Growth Beats Expectations

With a time lag, the surge in economic activity has now also filtered through to the labor market. Current employment growth – in February 2007, the number of employees increased by 2.4% – beats expectations. Similarly high growth was last witnessed in 1992. By contrast, employment growth persisted at below 1.5% even at the time of the economic boom in the late 1990s and in 2000. Employment growth is now so strong that, despite continued labor supply growth, unemployment is falling sharply. Since peaking in September 2005 (5.3%), the unemployment rate has fallen by almost 1 percentage point to 4.4% (Eurostat definition). In February 2007, 276,652 persons reported as being unemployed, i.e. around 35,000 fewer than in February 2006. In addition to the unbroken trend toward part-time work, temporary factors such as the mild winter are boosting the current momentum in the labor market. The number of unemployed fell by 15,000 in the construction industry alone. If

Chart 6

Beveridge Curve for Austria from 1993 to 2006



Source: Eurostat, Austrian Public Employment Service.

this trend in the construction industry had followed that of the remaining economy, the drop would have amounted to only somewhat more than 7,000 persons. The mild winter is therefore likely to explain around 50% of the reduction in unemployment within the construction industry.

In addition to temporary factors, there appear to have been signs of changes to structural conditions in the Austrian labor market. In the last

few years, for instance, the inverse correlation between reported vacancies and the unemployment rate, which is represented in the Beveridge curve, has shifted outward. This shift coincides with the introduction of various pension reforms. However, only time will tell whether this is a sign that Austrians should gear themselves up to a general rise in unemployment rates or whether this is just a temporary phenomenon.

IN FOCUS:
5 YEARS AFTER —
AUSTRIA'S EXPERIENCE WITH THE EURO

Euro Cash in Austria Five Years after Its Introduction – What the Public Thinks

Manfred Fluch,
Ernest Gnan,
Sabine Schlägl¹

This paper analyzes Austrian and euro area opinion polls to assess the Austrian public's views about the single currency five years after the introduction of euro cash. The analysis focuses on the following questions: How are Austrians managing with the euro now? How do Austrians assess the opportunities the euro offers? How did the Oesterreichische Nationalbank (OeNB) and other institutions cope with the communication policy challenges involved in the introduction of the euro? How good a feel have people developed for euro prices? How happy are Austrians with the euro compared with people in other euro area countries?

The survey results show that the euro is recognized as a stable currency; it fulfills Austrians' demand for price stability. People have largely overcome whatever problems they had using the euro in day-to-day transactions initially. The overwhelming majority of people are aware of the advantages the euro has for the economy and for them personally. People's perception of the value of euro prices is getting better by the year; euro cash is widely accepted. The OeNB's activities have contributed substantially to the positive attitude toward the euro. A final remaining challenge is the need to dispel the mistaken impression that the euro has contributed to price increases. Other empirical evidence corroborates the widely held belief that the euro has resulted in only a limited degree of price convergence in the euro area.

JEL classification: E52

Keywords: Euro introduction, assessment, Austria, opinion polls, information measures.

1 Introduction

In 2002, roughly two-thirds of the euro area's over 300 million citizens ranked the establishment of economic and monetary union (EMU) and the introduction of euro cash among the biggest achievements of the European Union (EU) (European Commission, 2002; Eurobarometer). Some 50% of Europeans were happy with the euro notes and coins, whereas 40% were skeptical.

Now that euro cash has been in circulation for five years, it is time to take stock and to assess the Austrian public's views about the euro and its effects, as we do in this paper. Has the euro brought the expected benefits in the eyes of the Austrian population? How well have Europeans coped with the challenges involved in

the introduction of the euro? We have evaluated the results of surveys commissioned by the OeNB and the European Commission over the past few years – results with which the public is not very familiar – to answer these questions.

Section 2 summarizes the opportunities and challenges of the euro as they were discussed in the economic literature, by economic policymakers and by the public before the cash changeover and from this material derives questions to be dealt with in later sections of this study. Section 3 presents the measures that the OeNB and other institutions took to assist the public upon the introduction of the euro. Section 4 uses survey results to analyze how the Austrian public assesses the advantages of the

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euro five years after its introduction and how it has come to terms with the practical challenges of euro cash. In particular, changes in the public's and individual groups' opinions about the euro over the past five years are examined against the backdrop of the OeNB's comprehensive information activities, and Austrian survey results are compared with those of other euro area countries. Chapter 5 summarizes and draws conclusions.

2 The New Euro Cash: Opportunities and Challenges

At the EU level, the economic opportunities and challenges of EMU were discussed in great detail within the framework of the "Delors Report"² and during the negotiations on the Maastricht Treaty at the end of the 1980s and beginning of the 1990s. The discussion then was centered around the Optimal Currency Area (OCA) theory and on how EMU would ensure monetary stability and, as a result of complementary fiscal policy rules, sound public finances throughout the euro area.

In Austria, a number of summary publications were presented to the public on the prospective impact of EMU in 1997 and 1998 (e.g. Baumgartner et al., 1997; Handler, 1997; OeNB, 1997), and the media ran lengthy series on the subject (e.g. the Austrian daily "Die Presse," 1996). In the run-up to the cash changeover, public institutions increasingly concentrated on the practical aspects of the introduction of

euro banknotes and coins in their analyses and external communications – on the one hand on logistical and legal aspects, and on the other hand on the expected impact of the changeover on prices and the prevention of price increases (with the latter issues being covered above all by the OeNB and consumer protection organizations). In this context, yet fairly late during the preparations for EMU, policymakers also pondered what impact the switch to a new unit of value and means of payment would have on people's perception of prices and their consumer behavior.

At the time, the following key arguments were cited in favor of the introduction of the euro:³

- The euro will guarantee lasting price stability throughout the monetary union on the basis of the Maastricht Treaty, which provides for the establishment of an independent central banking system with price stability as its primary objective.
- The euro will save transaction costs – it will eliminate currency conversion and hedging costs and will make cross-border transfers and cash withdrawals in other euro area countries cheaper. By this token, the euro will facilitate and promote trade and business between euro area countries.
- The euro will make prices more transparent, thus stepping up competition within the Single Market and dampening price increases.

² The Delors Report compiled in 1988/89 set out a plan to introduce EMU in three stages.

³ This list is limited to the aspects that are relevant to the sections below and for which empirical evidence from the survey results is available. For a detailed economic analysis of the pros and cons of the euro from the Austrian perspective, see e.g. Baumgartner et al. (1997), Handler (1997) and Dirschmid et al. (2001).

- The euro will give Austria and other countries, which had pegged their currencies to the Deutsche mark and basically followed Germany's monetary policy lead, a greater say in monetary policy-making, as their national central bank (NCB) governors have a voice in the Governing Council of the European Central Bank (ECB).
 - The euro will be widely used and will therefore establish itself as an important international currency alongside the U.S. dollar.
 - Finally, as a tangible result of European unity, the euro should enhance European citizens' identification with the concept of "Europe" in their everyday lives.
- Conversely, as the deadline for the introduction of euro cash drew nearer, economic policymakers also reflected more strongly on the challenges involved:⁴
- People will have to get used to handling the new banknotes and coins and will have to familiarize themselves with the denominations and security features; they will have to learn to identify themselves with the new money.
 - Economic psychology experts discussed the possibility that people's price perception would be affected for some time, maybe even for a lengthy period (Kirchler et al., 2004).
 - A different accounting unit will change the structure of relative prices as a result of rounding, psychological pricing and similar effects.
 - Actual price increases in some sectors in the wake of the introduction of euro cash as well as perceived price increases reflecting an impaired awareness of prices (Fluch and Stix, 2005, 2007) might also have an impact on people's feel for the value of the euro and their acceptance of the currency.
 - An impaired perception of prices might also affect people's consumption behavior.
- Below, we analyze the degree to which these advantages and challenges are reflected by respondents' answers and what effect the communication activities of the OeNB and other institutions had on public opinion.

3 The New Euro Cash: Information Measures

3.1 The OeNB as a Changeover Partner

The OeNB played a leading role in coping with the logistical and public communications challenges in the run-up to the changeover as well as during the introduction of euro banknotes and coins in 2002. Various institutions' public information services were coordinated to extensively inform businesses and the public about the new cash. After the changeover, the OeNB continued to take numerous initiatives to enhance the public's receptiveness to the new currency. In addition to launching an information campaign in the print media and establishing dedicated sections on its website, the OeNB organized lectures, press conferences and TV report broadcasts, set up a

⁴ This study does not treat the euro changeover costs. For more information about such costs, see e.g. Dirschmid et al. (2001).

euro hotline and conducted other euro information campaigns. Trade fairs provided an opportunity for direct contacts between the OeNB and businesses and consumers.

The OeNB commissioned regular surveys on the euro and related topics long before the changeover to euro cash to gauge public sentiment. As early as 1996, the public opinion research institute Karmasin Motivforschung Ges.m.b.H (Karmasin, 1996) conducted a qualitative survey feeding into the OeNB's communications strategy for making the Austrian public familiar with "Eine neue Währung für Europa" (a new currency for Europe). The OeNB Barometer survey conducted by the Institut für Empirische Sozialforschung (IFES) has included questions related to the euro since 1998. Moreover, the OeNB commissioned a study on consumers' euro price awareness with FESSEL-GfK Institute for Market Research in cooperation with the University of Vienna (FESSEL-GfK and University of Vienna, 2001 and 2002). This study examined how people perceived euro prices, how they coped with dual pricing and what expectations they had of the new money. The OeNB regularly tracked and evaluated media reports on euro-related themes.

In 2000, the OeNB prepared information campaigns and a partnership program to extend the reach and multiply the impact of euro information. The program was targeted at commercial banks and schools with the purpose of reaching as many people at as many levels as possible through the network of each partner – such as teachers, students and parents in the case of schools. Cooperation with the Austrian Federal Economic Chamber, the Austrian con-

sumer affairs organization, and various federal ministries enabled the OeNB to channel information to the main target groups. Measures directed at the general public were started low-key and gradually intensified, to minimize the risk of people losing interest in the subject and rejecting the new banknotes and coins. Accordingly, the OeNB placed only a small number of targeted advertisements and addressed selected multipliers to gradually raise people's awareness that the changeover was imminent. The crucial final stage with a broad campaign was launched mid-2001 with the centerpiece campaign "Mit der Nationalbank zum Euro" (The OeNB – Making the Euro Yours), in which ads in the print media and TV commercials represented core confidence-building elements.

In addition to actively pursuing external communications activities, the OeNB also handled queries by businesses and the public. Questions ranged from simple conversion to complex queries about the logistical, technical and legal aspects of the euro changeover. In the last seven months preceding the introduction of the euro, the OeNB's Call Center fielded more than 9,000 calls.

3.2 Target Group-Specific Public Relations Activities

The OeNB met its communications objective of reaching as many people as possible with in-depth information about the new money by providing a broad range of information products customized to address specific target groups. The products included: e.g. (1) posters with illustrations of the euro notes and coins, of which over 4 million were produced and distributed especially to schools, banks and

businesses; (2) a series of miniature folders with replica illustrations of euro banknotes and coins, of which 7 million were printed to help consumers identify the new money while shopping; (3) a euro coin folder with front and back representations of the euro coins of each euro area country. All in all, over 30 million print products were furnished to banks, government agencies and businesses for visitors and customers. Special envelopes illustrated with euro banknotes were made available to customers at bank tellers' counters.

Moreover, information was broadcast via TV and radio commercials. In the second half of 2001, the OeNB, in cooperation with the Austrian Federal Economic Chamber and the Austrian Federal Railways, sent the "Eurotrain" to 60 cities across Austria to provide first-hand information and advice. Furthermore, numerous press conferences, press releases, lectures and speeches were launched to inform people about the euro.

The crowning touch, however, was the presentation of the actual new banknotes. For security reasons, it was not possible to reveal the appearance of the banknotes too early – on the other hand, people were supposed to be familiar with the security features of the new banknotes. With this tradeoff in mind, the ECB chose August 30, 2001, as the date for the very first presentation of the euro banknotes in public, and the OeNB followed on August 31, 2001.

3.3 The OeNB's Cooperation with Other Institutions

The OeNB reached various target groups especially by cooperating with national and international institutions. At the European level, the ECB was the OeNB's main partner for

information activities. One public relations campaign was the Euro Superstar game designed to familiarize children aged eight to ten with the new cash in the form of a contest. The OeNB cooperated with the Austrian Museum for Social and Economic Affairs to inform 10- to 18-year-olds about the euro by means of lectures and discussions.

This information campaign complemented the OeNB's own products, such as the "money and currency" school kit or various videos. "Confetti TV," a children's program of the Austrian Broadcasting Corporation (ORF), was also used to inform children about the new money. Together with the Euro Initiative of the Austrian federal government, the OeNB organized and hosted euro information days in the capitals of the Austrian provinces. To be in touch with the public, the OeNB also participated in the euromobile initiative of the Austrian Federal Economic Chamber – the euromobile being a car that toured through Austria and provided businesses with information about the euro – and in press conferences of the Austrian Federal Economic Chamber. In cooperation with Studiengesellschaft für Zusammenarbeit im Zahlungsverkehr (STUZZA) G.m.b.H., the Austrian Federal Economic Chamber, the Euro Initiative of the Austrian Federal Government and commercial banks, the OeNB produced the brochure "Der Euro – unser neues Bargeld" (The euro – our new cash) and had it translated into several languages. In cooperation with the Austrian Blind Union, the OeNB distributed slide ruler-type devices to help blind or visually impaired persons to discriminate between the euro notes and coins with greater ease.

Also, the Austrian federal government's Euro Initiative provided leaflets and booklets specifically targeted at consumers, entrepreneurs, mayors, doctors and senior citizens. The Federal Ministry of the Interior distributed stuffed animals to children in elementary schools in a campaign to prepare children for the new money in an entertaining and easy to grasp manner. The Federal Ministry for Education, Science and Culture launched contests for schools. The Austrian Federal Economic Chamber's information initiatives included competitions, the establishment of call centers and guidance for small and medium-sized enterprises. Moreover, the Chamber of Labor was involved in the drafting of the Euro-Related Pricing Act, which regulated e.g. dual pricing. The Austrian pro-

vincial authorities organized seminars, lectures and other events to inform their own staff and the public. Finally, the Austrian Broadcasting Organization dedicated numerous programs to providing information about the euro.

4 The New Euro Cash: Gauging Public Sentiment in Austria

How well could people's expectations of the euro be met, and how did they cope with the challenges involved in the new cash? The answers to these questions can be gleaned from public opinion poll data of the past five years, which we will analyze below. The data also permit a breakdown by sociodemographic groups and allow for a comparison of Austrian and euro area developments.

Box 1

The Use of Survey Data to Gauge Public Sentiment toward the Euro

The analysis of public sentiment on the euro is based primarily on the following survey data.

The OeNB Barometer survey conducted by the market research Institut für Empirische Sozialforschung (IFES) polls a sample of some 2,000 men and women aged 15 and over on numerous topics. The survey data may be broken down by sociodemographic features, to which this study will make occasional reference. Primarily, however, our analysis focuses on questions related to the acceptance of euro cash and the public's impression of monetary stability.

We also analyze data from the European Commission's Flash Eurobarometer survey. Within the framework of the Flash Eurobarometer, Gallup Europe conducts regular telephone surveys on euro-related issues among a sample of about 12,000 people aged 15 years and over in the 12 old Member States. The telephone survey has been made yearly since 2002 and reflects public opinion about the euro within EMU. Moreover, we also draw on results from the regular Eurobarometer survey of the European Commission.

Finally, in 2004 FESSEL-GfK Institute for Market Research conducted a representative survey of 2,000 persons for the OeNB on the topic "The Euro – Daily Purchases and Perceived Inflation." Men and women aged 15 and over were interviewed on their perception of prices during the introduction of the euro, with a special focus on the discrepancy between actual and perceived inflation and the use of the euro in day-to-day transactions.

Chart 1

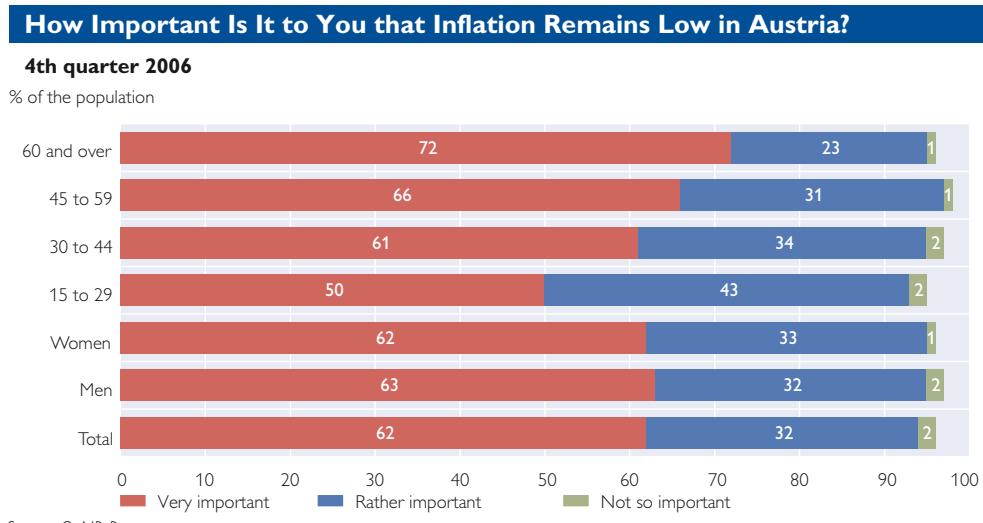


Table 1

How Well Do the Eurosystem/ESCB and the OeNB Provide for the Stability of the Euro?

	Average	Very well (1)	Well (2)	Sufficiently (3)	Badly (4)	Very badly (5)
%						
ESCB/Eurosystem¹						
2002	2.50	7	42	36	6	1
2006	2.30	8	45	27	3	0
OeNB²						
2002	2.12	17	40	18	3	1
2006	2.01	17	43	13	2	1

Source: IFS; OeNB Barometer surveys of 2002 (fourth quarter) and 2006 (fourth quarter).

Note: Sample n = 2000. To calculate the distribution, the number of respondents was set equal to 100%.

¹ The question was: What is your impression today - how well does the ESCB provide for the stability of the euro?

² The question was: How well does the OeNB fulfill its task of providing for monetary stability in order to prevent money from losing its value?

4.1 Price Stability Is Very Important to Austrians

Under the Maastricht Treaty, the primary objective of monetary policy is to maintain price stability. This objective coincides with the Austrian population's desire for price stability. According to the survey results, 94% of all Austrians judge low inflation to be important and say that it should be maintained.

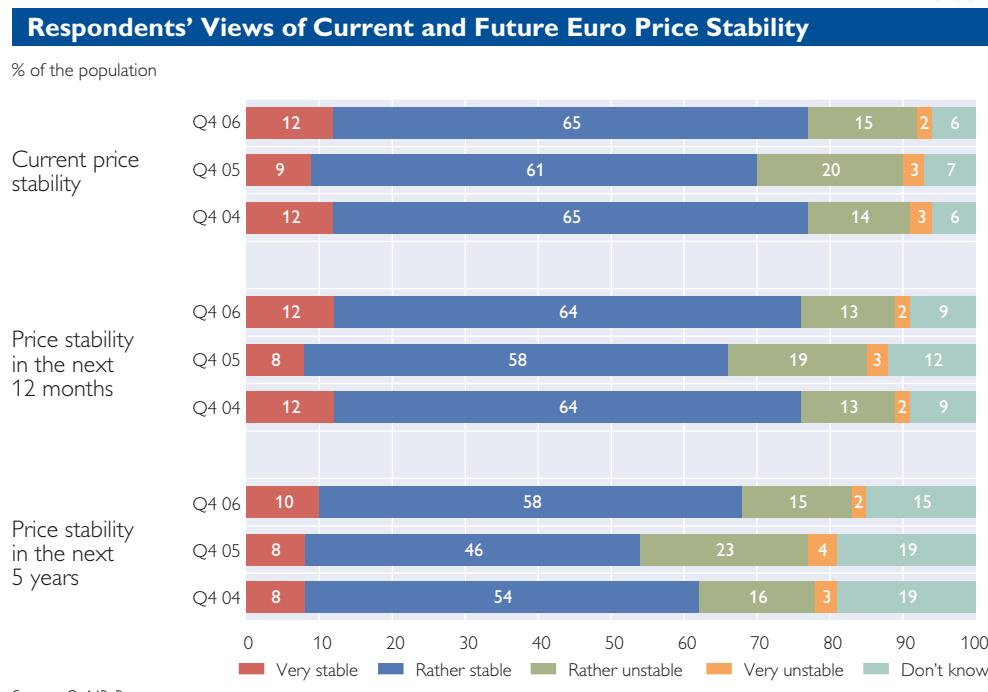
This consensus is found in all sociodemographic groups (chart 1). Interestingly, young people who have not experienced high inflation are

less intent on low inflation than the average population; conversely, older people – who have experienced periods of high inflation – feel more strongly about keeping inflation rates as low as they are.

4.2 Keeping the Euro Stable: High Approval Ratings for the OeNB and the Eurosystem

In 2006, 60% of Austrians polled stated that the OeNB had done very well or well in ensuring stability; somewhat more than 50% thought so about the Eurosystem/European Sys-

Chart 2



tem of Central Banks (ESCB). Since the introduction of euro banknotes and coins, these percentages have improved (in terms of averages) for both institutions (table 1). The assessment of how well the respective institutions fulfill their tasks and the degree to which respondents are informed about these tasks correlate: The more respondents know about these tasks, the better respondents rate fulfillment of these tasks.

According to IFES (2006), there is a broad consensus among Austrians (71% of those polled) that the OeNB is an important monetary institution and enjoys a high degree of credibility among the general public. In 2001, just before the introduction of euro notes and coins, the share was lower (50%). This may have been linked to reports that some of the OeNB's responsibilities would be transferred to the ECB. The substantial changes in public sentiment since 2001 demonstrate that the OeNB has meanwhile

succeeded in clearly defining its role and responsibilities within the ESCB to the public. Today, the great majority of Austrians knows that the OeNB contributes to monetary policy decision making in the euro area.

The high degree of public trust in the Eurosystem and in the OeNB is also mirrored in the public's view of the current price stability of the euro. One in ten respondents is convinced that the euro is a very stable currency (chart 2), a share that has remained almost unchanged for years. Nearly two-thirds see the euro as a rather stable currency. Just under one-sixth of respondents are skeptical, judging the euro to be rather unstable. Very few people considered the euro to be very unstable.

Asking Austrians about their short- and medium-term expectations about price stability confirms this picture. In the fourth quarter of 2006, 76% of the people surveyed believed that the next 12 months

Table 2

Advantages and Disadvantages of the Introduction of the Euro														
	Year	Belgium	Germany	Greece	Spain	France	Ireland	Italy	Luxembourg	Netherlands	Austria	Portugal	Finland	Euro area
The introduction of the euro is														
An advantage; it makes us stronger	2002	72	39	46	62	65	73	57	72	42	52	57	65	54
	2006	58	46	38	55	51	75	41	64	38	62	43	65	48
A disadvantage; it weakens us	2002	16	52	24	18	23	19	29	14	41	25	22	11	32
	2006	20	44	46	26	31	21	48	18	43	24	34	16	38
Advantages:														
It makes traveling easier and cheaper	2006	61	47	25	52	37	63	43	72	34	57	66	58	46
It is easier to compare prices	2006	52	33	17	17	16	48	39	60	29	52	53	39	30
It strengthens Europe's role in the world	2006	23	17	30	25	28	17	53	22	18	17	26	10	27
It makes prices more stable	2006	14	10	18	9	6	22	19	14	7	13	18	7	11
Disadvantages:														
It has contributed to rising prices	2002	66	88	88	81	79	80	91	62	94	84	74	63	84
	2006	88	90	97	97	96	71	96	90	91	88	86	91	93
It makes everyday life more complicated	2006	22	9	15	16	13	12	37	23	7	15	39	9	19
It raises unemployment and reduces growth	2006	13	4	6	3	5	58	11	11	4	12	22	2	7

Source: Flash Eurobarometer.

would be characterized by price stability. Nearly 70% expected the euro to be stable in the next five years, and only a small percentage – just under one-fifth of respondents – were rather worried about the long-term development of the euro.

4.3 The Euro Has Many Benefits for Austrian Consumers and Businesses

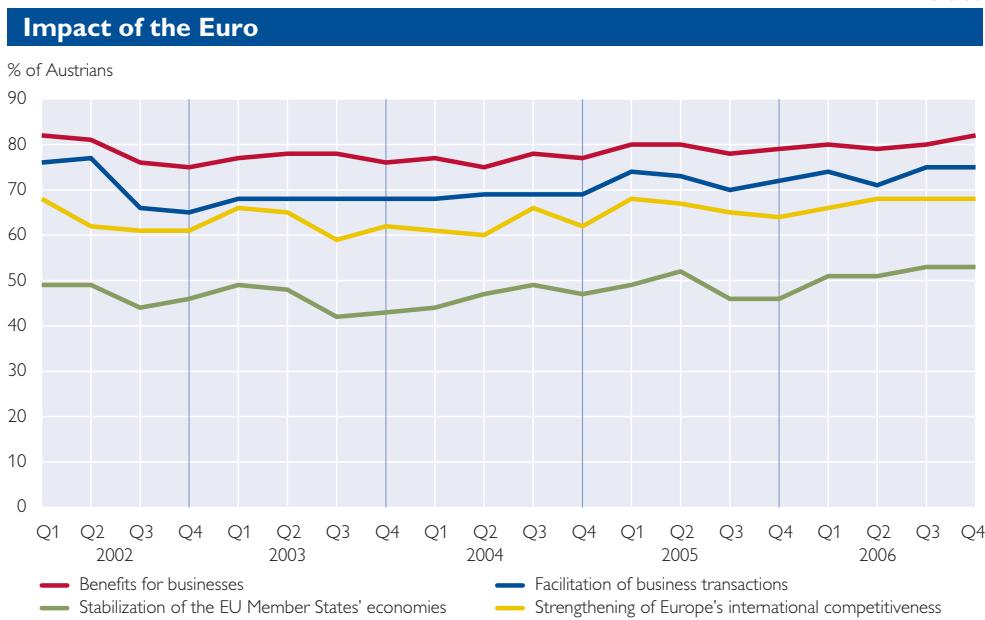
4.3.1 Austrians See More Advantages in the Euro than the Euro Area Population Does

“The euro is good for us; it gives us a stronger position for the future.” According to the European Commission’s Flash Eurobarometer, 62% of all Austrians held this view in 2006 (chart 4 and table 2). 24% of respon-

dents see the disadvantages of the euro as outweighing the advantages; the euro “tends to weaken the country.” 8% of respondents are on the fence, and 6% have no view. These percentages have changed to reflect a clearly more positive overall sentiment than when the euro was introduced.

While enthusiasm for the euro has waned more or less in the euro area as a whole and in most euro area countries, the share of Austrians who see the euro as having mostly advantages rose from 52% in 2002 to 62% in 2006. The euro area average, by contrast, was only 48% in 2006, as the share of respondents for whom the disadvantages prevailed was quite high in large countries like Germany

Chart 3



Source: OeNB Barometer survey.

or Italy. Nevertheless, the shares of respondents for whom the advantages outweighed the disadvantages were larger in the majority of euro area countries (table 2).

4.3.2 The Euro Benefits the Economy

Just over 50% of Austrians are convinced today that the changeover to the euro had positive effects for Austria's economy (very positive: 10%, rather positive: 42%). The major reason cited is the benefit for businesses of easier transactions. In addition, more than half of the respondents in 2006 considered the euro a stabilizing factor for the European economy. Seven of ten respondents were and still are convinced that the euro strengthens Europe's international competitiveness (chart 3).

As unemployment rates in Austria rose from 2003 to 2005, respondents today see the connection between the euro and the labor market in a more pessimistic light than in 2002. The most recent improvements on the

labor market (jobless rates in Austria declined in 2006) fed into a less pessimistic assessment of the impact of the euro on the labor market as of late: While at the end of 2005, four of ten respondents had still thought that the euro had a rather or very negative impact on employment, the share fell to somewhat over a quarter of those surveyed in 2006. A bit less than a quarter of all respondents hold the opposite view. All in all, in 2002 and 2006 the impact of the euro on the labor market is seen as rather neutral (table 3).

Turning to the criteria for which personal experience is likely to play a greater role, the lower cost of vacation travel (2002 and 2006) was emphasized as an advantage. The impact of the euro on the stability of the value of savings was seen as neutral in early surveys and more favorably in 2006. The impact of the euro on the Austrian economy and monetary stability was rated even better in 2006.

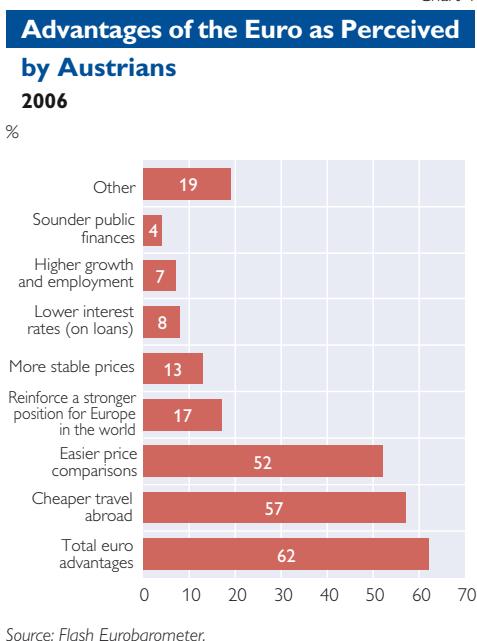
Table 3

The Impact of the Euro on ...					
	The Austrian economy	Monetary stability	Employment and the labor market	The cost of vacation travel in Europe	The value of savings
Average of a five-part scale ¹					
2002	0.39	0.15	-0.02	0.28	0.02
2006	0.49	0.32	-0.06	0.28	0.15

Source: OeNB Barometer.

¹ +2 = very positive, +1 = rather positive, 0 = in balance, -1 = rather negative, -2 = very negative.

Chart 4



Source: Flash Eurobarometer.

4.4 Few Respondents Are Aware of the Savings on Cross-Border Transfers

Throughout the period from the introduction of the euro to 2006, a nearly constant share of roughly 80% of respondents stated that the euro had benefited businesses (chart 3), mainly for cross-border trade and

transactions. While Austrian foreign trade used to be invoiced in Austrian schillings, Deutsche mark, Swiss francs, U.S. dollars and Japanese yen, some 85% of Austria's EUR 200 billion worth of external trade transactions are conducted in euro (Oberndorfer, 2005).

Nearly 60% of all Austrians are also aware that the euro made traveling easier and cheaper (European Commission, 2006; chart 4).⁵

Moreover, the euro area population saved on electronic card payments (cash withdrawals and purchases with bank and/or credit cards,) and on bank transfers. As early as December 2001, an EU Regulation⁶ was adopted to prohibit higher charges on cash withdrawals or card-based purchases in shops in another euro area country from July 2002 ("principle of equal charges"). For credit transfers to other euro area countries, the same charges as for domestic transfers have applied since July 1, 2003. However, not very many people were aware of this yet. In 2003, about a quarter of all Austrian respondents were aware

⁵ Some 4.1 million Austrians traveling on vacation and business within the euro area (about 50% of all cross-border travelers in 2005; Statistics Austria, 2006) no longer had to pay charges for exchanging money. Here is a rough estimate of the savings on exchange charges: The average expenditure per person per trip is around EUR 500 (Statistics Austria, 2005); this amount is assumed to be equivalent to the amount that would have been exchanged. Assuming that exchange charges come to 1% of the total, the single currency saves Austrian travelers approximately EUR 20 million a year. However, this estimate does not take into account the cost of reconvert ing unused foreign currency upon travelers' return or any higher fees for exchanges at hotels or some currency exchange offices. Additionally, the cost of the time travelers save by not having to exchange money is not included.

⁶ Regulation (EC) No 2560/2001 of the European Parliament and of the Council of 19 December 2001 on cross-border payments in euro.

Table 4

Views on Fees for Money and Banking Transactions across the Euro Area

Do you pay supplementary fees?

% of the population

Year	Austria			Euro area		
	no (correct answer)	yes (incorrect answer)	Don't know/not available	no (correct answer)	yes (incorrect answer)	Don't know/not available
For withdrawals of money in another euro area country						
2003	26	27	47	29	31	40
2004	27	32	41	27	37	37
2005	33	27	40	30	34	36
2006	30	27	44	23	27	51
For use of a bank card for purchases in another euro area country						
2003	29	20	51	39	22	39
2004	29	26	45	38	27	35
2005	33	28	38	35	30	35
2006	30	23	48	27	21	53
For bank transfers to another euro area country						
2005	26	40	34	38	23	39
2006	28	30	42	25	16	59

Source: Flash Eurobarometer.

that no extra costs or charges applied to cross-border electronic payment transactions within the euro area. 27% of the people polled believed that such fees applied to withdrawals, and the majority did not know. In 2006, no more than a bit under a third of respondents were aware that no additional fees were charged on such transactions, whereas 27% of respondents claimed that additional charges still applied. A large residual of 44% did not know.

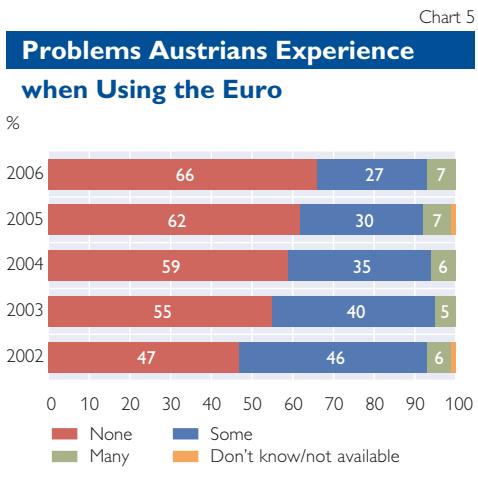
Respondents knew even less about bank transfers: in 2006, only 28% of all those polled in Austria were aware that fees were the same for domestic and euro area transfers. 30% were convinced that fees were higher for transfers within the euro area, and more than 40% did not know. Hence, knowledge about fees for bank transfers is roughly as low as in the euro area as a whole (table 4).

Thus while people are well aware of the lower transaction costs the euro entails for external trade and

travel, they are poorly informed about the principle of equal charges for cross-border electronic payment transactions within the euro area. The changeover to the euro resulted in lasting economies for Austrian businesses, which were estimated at no less than 0.7% to 1% of annual GDP by Dirschnid et al. (2001).

4.5 Thinking in Euro Improves; People Find the Euro Increasingly Easy to Use

The changeover to the euro required the business community and the general public to get used to numerous features of the new currency – its name, denominations, appearance and security features. Moreover, they had to get used to euro pricing, which created uncertainty and met with some apprehension. After initial difficulties upon introduction of the new cash, people became much more adept at using the new currency in the five years which followed.



4.5.1 Problems with the Euro Decline Markedly

In 2006, two-thirds of all Austrians had no problems using the euro in practice. Over a quarter of respondents still had some problems handling the euro, and only 8% still had many problems (chart 5). Compared to 2002, the share of people who

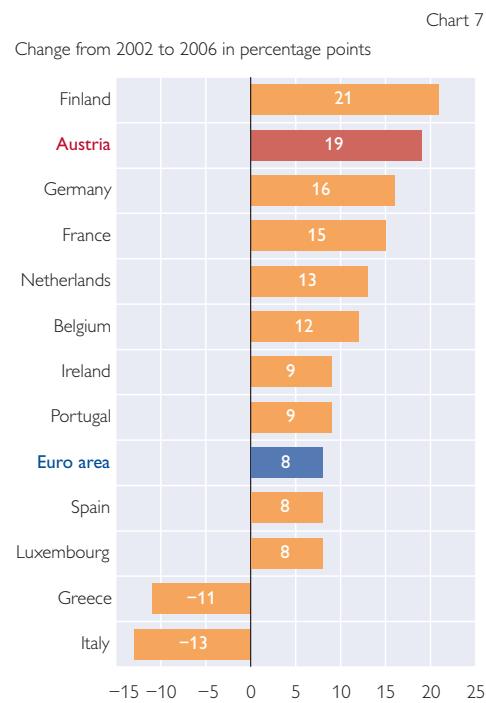
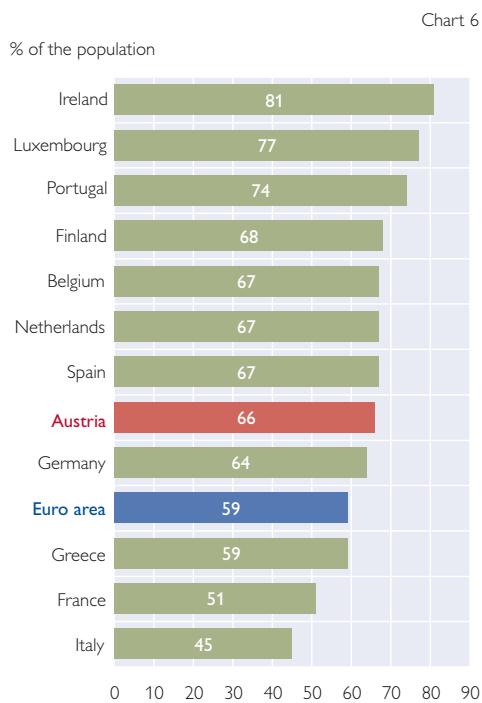
were comfortable handling the euro had augmented noticeably; the share of people with a few difficulties had diminished. The percentage of people who still have many problems remained constant.

In 10 out of 12 euro area countries the population has become noticeably more comfortable using the euro (charts 6 and 7). The share of persons who have fully adjusted to the euro grew most in Finland and second-most in Austria. Italian and Greek respondents cited more problems than during earlier surveys. Respondents from Ireland and Luxembourg were most at ease with the euro in 2006; Austrians ranked somewhat above the euro area average.

4.5.2 People Are Well Informed about Security Features

The success of the OeNB's information campaign is reflected by how

No Difficulties Using the Euro in 2006



well informed Austrians were about the security features of the new banknotes. At the beginning of 2002, more than 80% of Austrian respondents felt that they were well informed (47%) or rather well informed (38%) about the security features. The share of well or rather well informed respondents ranged between 69% and 85% over the five-year period and came to 75% in 2006. Broken down by sociodemographic criteria, the largest share of least informed people was to be found among persons with compulsory schooling only (43%) and among people over 60 years of age (37%). Asked about what security features the euro banknotes had, 62% of the respondents cited the watermark, 53% named the security thread, and nearly 50% had heard of the hologram feature. What is striking but not unexpected is that above

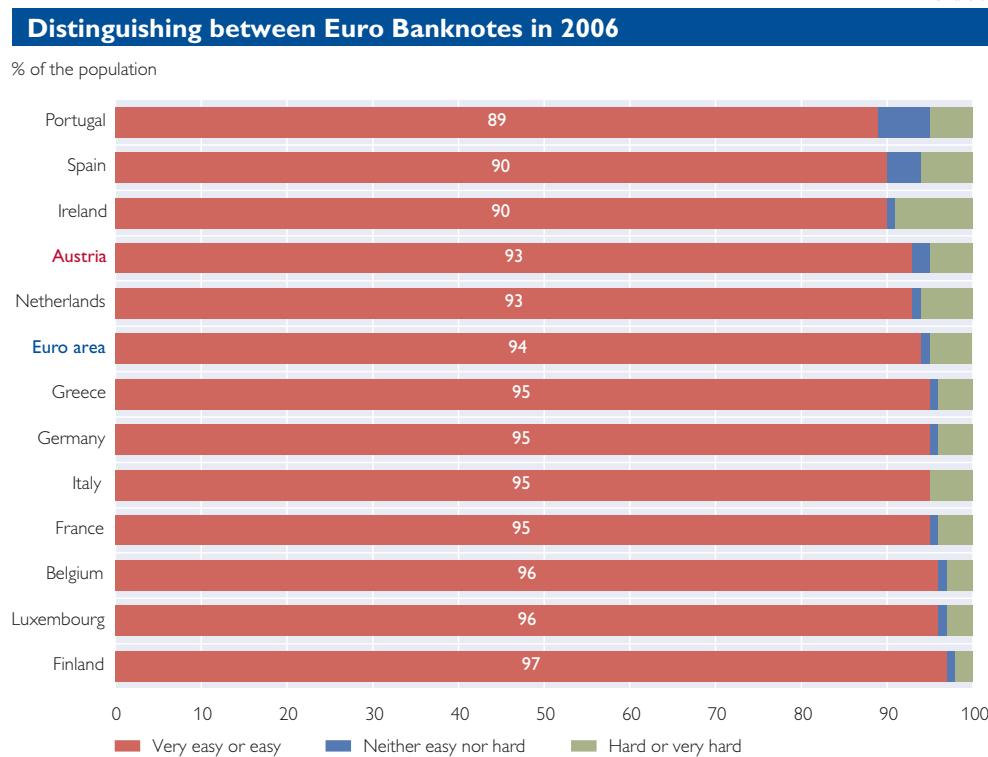
all older people know less about the security features: Whereas nearly 76% of the respondents in the category of up to 29-year-olds knew about the watermark, only 47% of those above 60 did. Moreover, watermark recognition differed markedly among occupations (jobholders 68%, unemployed respondents 53%).

4.5.3 Euro Banknotes are Easier to Tell Apart than Euro Coins

According to the results of the Eurobarometer survey, almost 90% of all Austrians considered themselves adept at handling the new banknotes at the end of 2002 and were able to tell the denominations apart; this share had risen to 93% in 2006 (very easy: 65.1%; rather easy: 27.5%).

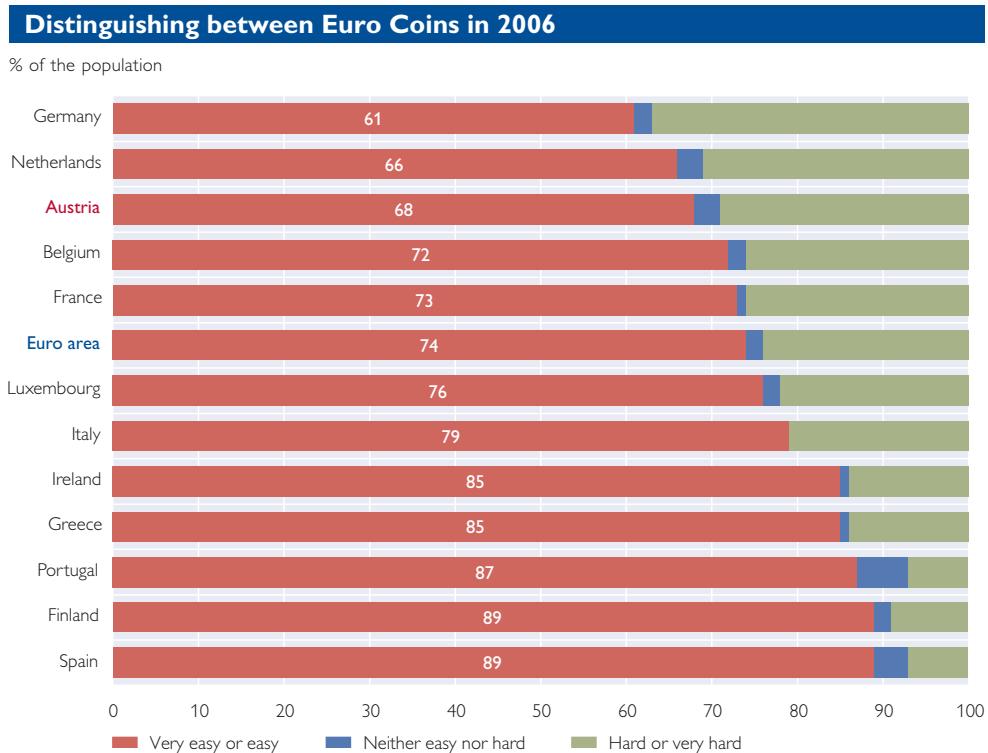
By contrast, they had some difficulties handling the euro coins. While two-thirds of Austrians found it very

Chart 8



Source: Flash Eurobarometer.

Chart 9



Source: Flash Eurobarometer.

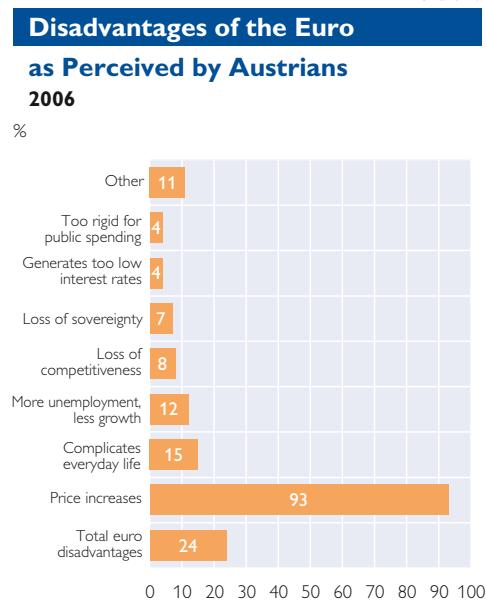
easy or easy to use euro coins at the end of the first year following the introduction of euro cash, this percentage edged up in the following years; it came to 32% (very easy) and 36% (easy) in 2006. On the other hand, 29% of respondents still had difficulties recognizing and handling euro coins, especially older people.

Within the euro area as a whole, most people also find it easy to distinguish between and use the different euro notes and coins. Above all euro banknotes represent no difficulty, with over 90% of respondents in all countries saying they found it very easy or rather easy to distinguish between and handle euro banknotes (chart 8). Only 70% of the euro area population, however, found it easy to recognize and use euro coins (chart 9).

4.5.4 People Associate the Euro with Price Increases

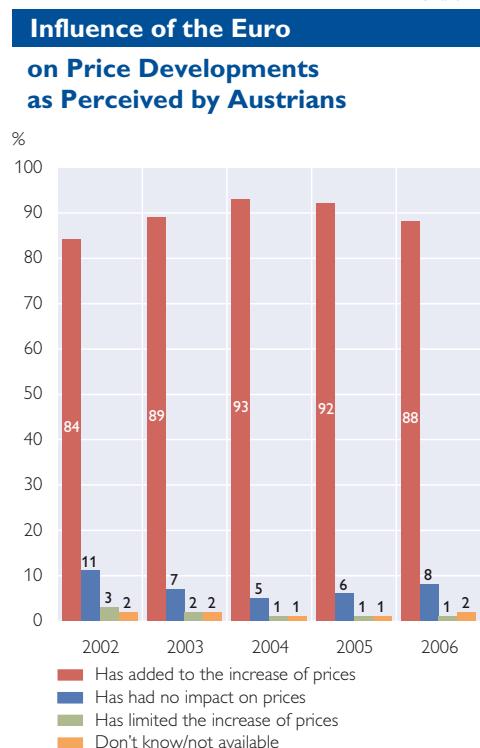
In Austrian respondents' perception, rising prices are by far the biggest

Chart 10



Source: Flash Eurobarometer.

Chart 11



Source: Flash Eurobarometer.

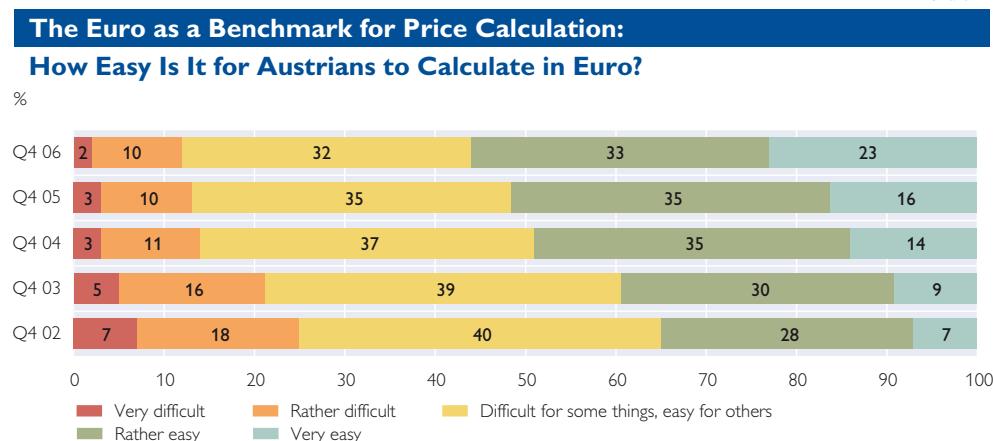
disadvantage of the euro (chart 10). By comparison, other disadvantages – such as complicating everyday life, the fear of more unemployment, a loss of competitiveness or the loss of

national sovereignty – play only a subordinate role.

Although a number of legal and institutional measures (Federal Ministry of Finance, 1997; Dirschmid et al., 2001) were designed to keep prices from rising in Austria upon the introduction of euro cash, all population groups were decidedly convinced long before the changeover that the euro would cause prices to rise (see quarterly results of the European Commission's Eurobarometer and the OeNB Barometer survey results from about 1997). This perception was reinforced by the actual introduction of euro notes and coins. Whereas in 2002, 84% of respondents claimed that the euro had contributed to price rises, the percentage had risen to 93% by 2004 (chart 11).

The prejudice that the euro contributed to price increases could not even be shaken by the decline in energy prices between 2001 and 2003. Nor could the domestic inflation rates published monthly by Statistics Austria – generally below 2% – change this perception.⁷ Not until 2005 and

Chart 12



Source: OeNB Barometer survey.

⁷ See Fluch and Stix (2005, 2007) for information about problems and discrepancies involved in perceived and actual inflation and their causes.

2006 could a change in sentiment be observed; the share of people who blamed price increases on the euro shrank especially in 2006 (chart 11). It will probably take years until the population no longer automatically associates the euro with rising prices.

4.5.5 People Have Developed a Much Better Feel for the Value of the Euro

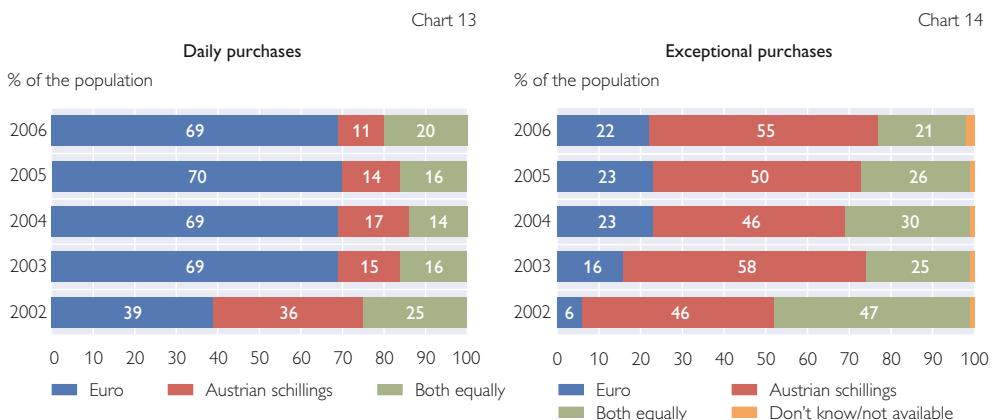
Austrians' feel for the value of the euro has improved markedly in the course of the five-year period. People convert euro to schillings more and more rarely, especially for day-to-day purchases. In 2006, 56% of all Austrians found it easy to judge euro prices or gauge the value of euro amounts. Only 12% of all respondents had major difficulties using the euro value scale; the share was almost twice as high for older people. While the comparison with 2002 also shows that a feel for a currency's value does not develop quickly, the share of those who had a hard time using the euro value scale more than halved from 2002 to 2006 (chart 12).

People pursue very individual strategies to develop a feel for the

euro. The degree to which people draw on former schilling prices for comparison as well as the type of purchases and the size of expenditures (daily purchases or big-ticket items) play an important role in their thinking in terms of euro. People were successful using individual mnemonic techniques (Kirchler, 2002; FESSEL-GfK, 2004; Kamleitner et al., 2006) to develop a feel for the euro for small euro amounts. However, many people still calculate large amounts in schillings.

In 2006, roughly 70% of respondents had already switched to calculating daily purchases in euro (chart 13). One out of five people thinks as often in one currency as in the other, whereas one out of nine persons still calculates in schillings. In 2002, the percentage shares had still been noticeably less favorable for the euro at 39% (euro only), 25% (both) and 36% (schilling only). The shift toward euro thinking was supported by people gradually becoming accustomed to euro pricing and the reappearance of signal prices and psychological price points in 2002 and 2003, which had been lacking initially for

Which Currency Do You Generally Use as a Mental Benchmark for Price Calculations?



Source: Flash Eurobarometer.

the euro on account of the exact conversion of prices and dual pricing (Glatzer and Rumler, 2007).

However, major purchases presented a different picture (chart 14). These are rarer and are usually not paid for in cash. Therefore, unlike in the case of small purchases, many people still use the schilling rather than the euro as their mental benchmark for exceptional purchases. After notable initial progress in the mental switch to the euro for expensive items, not much progress has been observed since 2004. In 2006, no more than one-fifth of respondents used the euro as their benchmark for big-ticket purchases. Another one-fifth calculated in both euro and schilling, and over half continued to calculate in schilling only. The fact that consumers' schilling reference prices are of course unchanged from five

years ago is a key reason why people may find current purchases in euro comparatively expensive (Fluch and Stix, 2005, 2007). Hence, Austrians' feel for the euro price of exceptional items is still fairly weak, and it is likely to take a few more years for people to develop a more accurate perception of the euro prices of major items as well.

In a euro area comparison, Austria ranks fourth in terms of the use of the euro as a unit of value for daily purchases (chart 15), but also exhibits the largest gains among euro area countries. Regarding exceptional purchases, the Austrian share of respondents who still calculate in the old national currency is remarkably high in a European comparison – only France and Belgium top Austria on this score (chart 16). In 2002, Austria had still been one of the euro area

The Euro as a Benchmark for Price Calculation: International Comparison

Chart 15

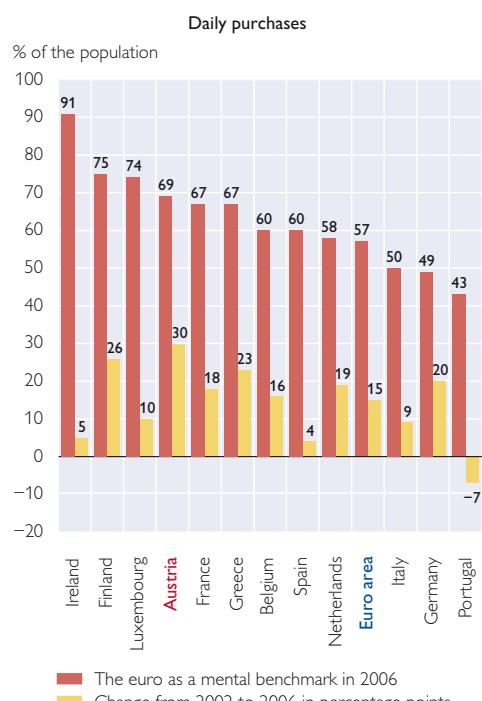
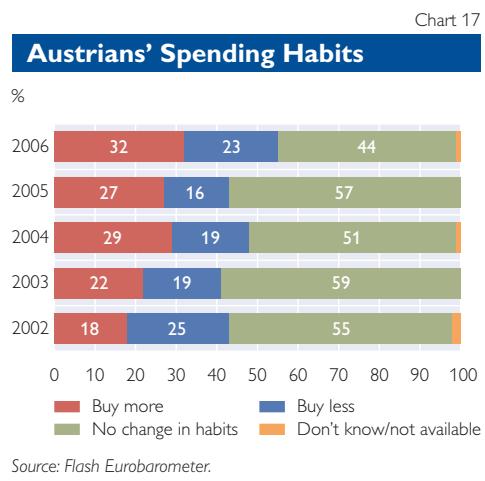


Chart 16



Source: Flash Eurobarometer.



countries with the smallest share of people thinking in terms of their old currency.

4.5.6 The Influence of the Euro on Spending Habits

In 2002, one-quarter of Austrian respondents had stated that they would exercise caution and spend less because of the introduction of the euro. By contrast, 18% stated that they were spending more than they intended to because they were not fully familiar with the new currency yet. However, for the majority, the euro had hardly any influence on Austrians' spending habits. Interestingly, five years after the introduction of the euro, the share of people who noted that they were overspending has expanded to 32%. The share of consumers who buy less for fear of spending too much has diminished marginally to 23% (chart 17).

Especially respondents aged up to 24 and over 55 belong to the latter category. It is debatable how much of this influence of spending habits is indeed related to the euro, as this information is not consistent with the

above-mentioned evidence of the much improved use of the euro as a mental benchmark. The very favorable economic conditions in 2006, for example, are likely to have prompted people to spend more. Consumer confidence surveys confirm this assessment: All indicators in the survey – e.g. respondents' financial situation, general economic conditions, the time being good for purchases, and unemployment figures – signal more optimism among consumers in the course of 2006 than in the years before.⁸

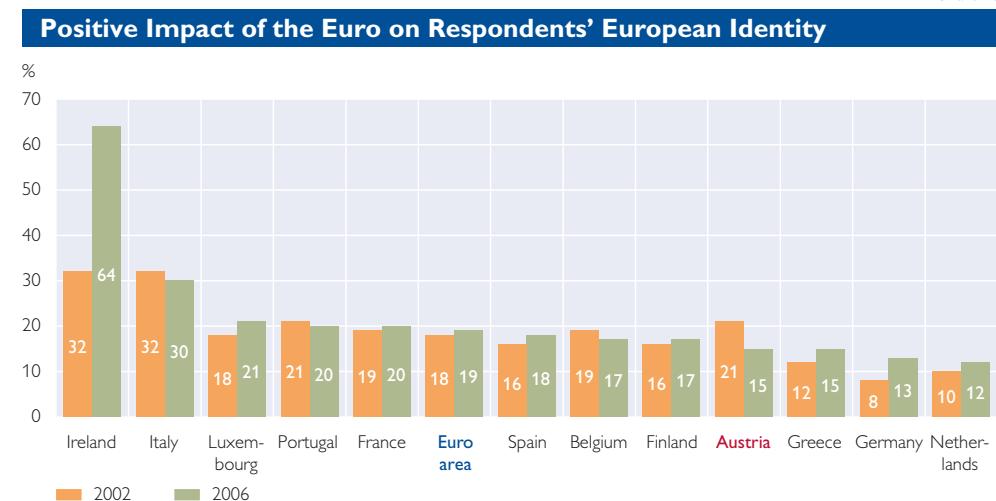
4.6 The Euro as a Symbol of European Identity

The European Commission's Flash Eurobarometer explicitly asked respondents about the impact of the euro on their sense of being European. In Austria, the euro directly stimulated the interest in Europe, a momentum which has slowed considerably over the years. Over one-fifth of respondents stated in 2002 that the euro had made them feel "a little more European." For three-quarters of the population, though, the euro changed nothing. In 2006, a mere 15% of those surveyed declared that the euro had strengthened their European identity. By contrast, according to IFES (2006), one-third of Austrians (this figure has remained stable over the years) feels a loss of national identity now that the schilling has been replaced by the euro.

Overall, the effect of the euro on the development of a European identity has remained subdued in Austria, whereas it was much stronger – or much weaker – in other countries (chart 18). On the other hand, 52%

⁸ For details, see www.oenb.at/isaweb/report.do?report=7.15

Chart 18



Source: Flash Eurobarometer.

of Austrian respondents associated the European Union most of all with the euro in 2006, by a good margin ahead of other connotations

(European Commission, 2006), which demonstrates the importance of the euro as part of the European identity.

The Effect of the Euro on Price Convergence

Chart 19

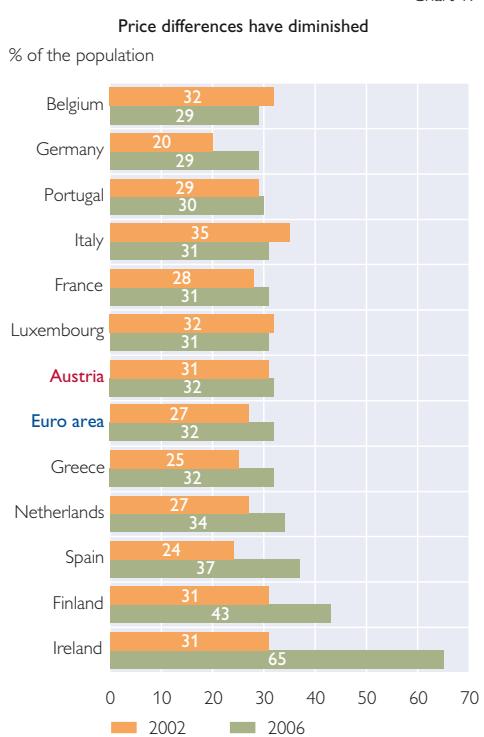
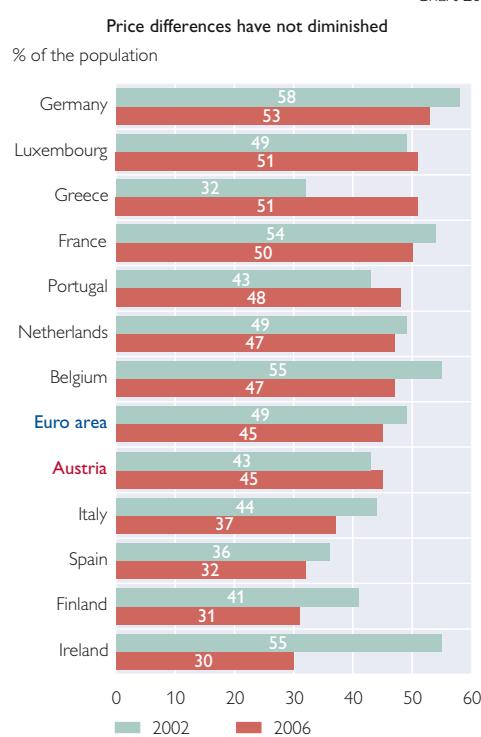


Chart 20



Source: Flash Eurobarometer.

4.7 Cautious Assessment of the Euro's Role in Progress with Price Convergence

Euro area respondents are very cautious in their assessment of the euro's role in speeding up price convergence. Over time, this opinion improved somewhat in the euro area and remained virtually unchanged in Austria. In 2006, the euro area and Austrian average of respondents who believed that the euro had reduced price differences (chart 19) came to 32% each (2002: 27% in the euro area, 31% in Austria). However, 45% of respondents in the euro area and in Austria thought the opposite in 2006 (chart 20). The share of respondents who noted more price convergence and of respondents who did not, has edged up since 2002 in Austria. The reason for these higher shares at both ends is that people have formed a view on this issue over the years. Throughout the euro area, price convergence

effects are perceived more distinctly: The share of people who did not notice progress with price harmonization declined, that of people who did rose.

4.8 High Recognition of the International Role of the Euro

The euro area has a population of over 300 million (5% of the world population) and accounts for about 15% of world GDP. The euro area's share of world external trade is twice as high at 30%. The euro is a major player in the international financial markets. In 2006, 25% of global currency reserves were denominated in euro, as were 40% of all foreign exchange transactions. Moreover, numerous countries outside the euro area use the euro as an anchor or reserve currency (Liebscher, 2006). The euro is a stable world currency with a firm role in the world economy.

Table 5

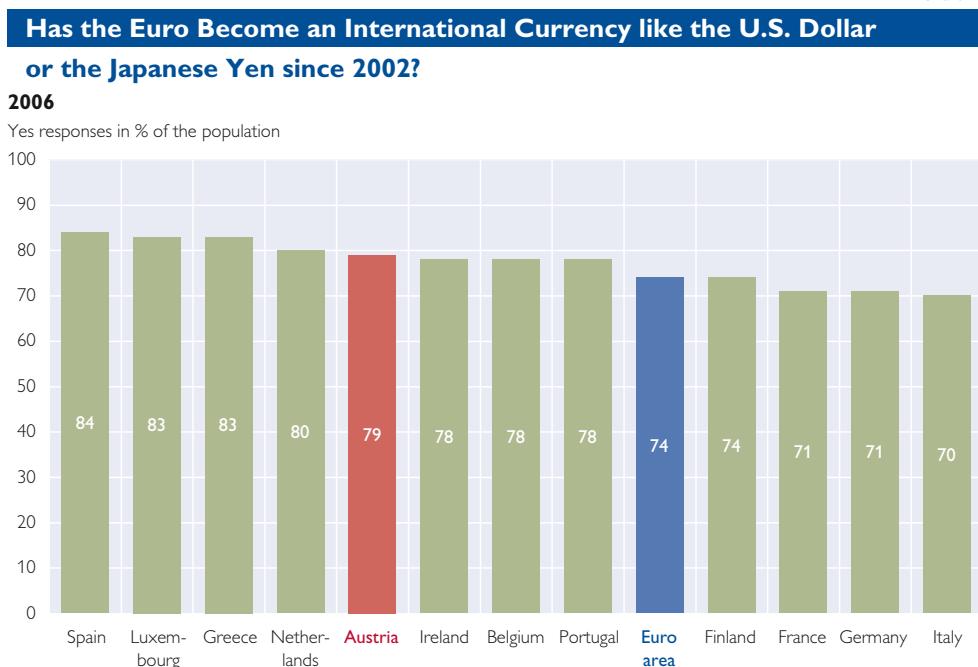
Criteria for the Status of the Euro as an International Currency in 2006			
	% of the population	Austria	Euro area
Has the euro become an international currency like the U.S. dollar or the Japanese yen since 2002?	Yes	79	74
Is EUR 1 worth ... than USD 1?	more less the same	57 18 13	48 21 17
Does the value of the euro against the U.S. dollar concern you?	a lot a little not at all	7 18 70	9 23 61
Will the euro be introduced in the new EU Member States?	yes, certainly yes, probably no, probably not no, certainly not	26 54 11 1	26 47 10 2
The adoption of the euro ²	makes it easier to compare prices weakens the euro	56 32	59 33

Source: Flash Eurobarometer.

¹ The survey was conducted in September 2006. The EUR/USD exchange rate at the time was EUR 1 = USD 1.27.

² Information from the Flash Eurobarometer 2005.

Chart 21



Source: Flash Eurobarometer.

Nearly 80% of all Austrians viewed the euro as an international currency in 2006 and saw it as being roughly as important a currency as the U.S. dollar or the Japanese yen (table 5). By contrast, 74% of euro area respondents held this view. As early as 2002, a large share of respondents (67%) in all 12 euro area countries had recognized the euro an international currency. In most countries, this view stabilized further in 2006 from an initially high level, ranging from 70% (Italy) to 84% (Spain). Austria ranked somewhat above the euro area average (chart 21).

Only 25% of the surveyed Austrians regularly or frequently inform themselves about the EUR/USD exchange rate. Considering this low percentage, it is all the more surprising that in 2006 57% of the respondents (Austria exhibiting the largest share among euro area countries) correctly stated that the value of the euro

was higher than that of the U.S. dollar. The share of those who thought EUR 1 was worth less than USD 1 came to 18%.

A great majority is convinced that the status of the euro as an international currency will strengthen further in the future. 80% of respondents in Austria (73% in the euro area) think it certain or probable that the euro will be introduced in the new Member States (table 5); the share of advocates of this step is 70% in Austria and 66% in the euro area. Respondents believe that the introduction of the euro in the new EU Member States provides for more transparent prices. One-third, however, fear that EU enlargement will weaken the euro. Therefore, the Austrians polled feel that the fulfillment of economic and legal convergence by candidate countries is an important prerequisite for them to ultimately become euro area members.

5 Conclusions: The Positive Effects of Euro Introduction Prevail

Austrians perceive price stability as a key priority: 94% of respondents deem low inflation to be very important. The fact that the young people who have never experienced high inflation are somewhat less intent on price stability shows how important it is for the OeNB to inform the public about the advantages of price stability. Three-quarters of Austrians currently perceive the euro as a stable currency. Almost the same share expect the euro to remain stable in the short run (one year), and about 70% expect it to remain so in the next five years. Austrians attribute the Euro-system and especially the OeNB high competence in securing the stability of the euro.

The survey results on which this study is based signal that Austrians – and the citizens of the euro area – generally have little difficulty with the euro today. Most people are aware of the opportunities created by the single European currency and are increasingly able to cope with its challenges. After initial problems, people have found the euro increasingly easy to use, especially since 2004. Through their information activities, the OeNB and its partner institutions were able to contribute substantially to this progress.

Today, most Austrians are convinced that they have benefited from the euro. The difficulties people encountered in day-to-day use of the euro – for purchases or in becoming familiar with euro cash and its various denominations – declined sharply during the five years from 2002 to 2006. Austrians recognize the economic and practical benefits of the euro, in particular as it has made trav-

eling easier, has made prices more transparent and has had positive effects on the European economy. Austrians have become accustomed to thinking in euro when making daily purchases.

Yet despite the positive overall development of public sentiment toward the euro in Austria, this study also finds that the process of adjusting to the euro is not complete.

- People still widely use the Austrian schilling as a unit of value when buying large items. This may come as somewhat of a surprise, as the prices of cars or real estate, for example, have been stated exclusively in euro for some time. On the other hand, experience in other countries shows that it may take decades for people to adjust their thinking to a new currency for such big-ticket items.
- Many people still hold the euro responsible for price rises. While this view gained ground during the first few years following the introduction of the euro, it lost importance in 2005 and 2006. Continued information activities by the OeNB and like institutions about the origins of inflation can help prevent inflation from being blindly attributed to the euro. In the long run, it is up to the Euro-system to guarantee public trust in the stability of the euro and thus maintain public acceptance of the euro by pursuing a price stability-oriented monetary policy.
- Only a minority is aware of the perceptible reduction of the cost of cross-border cashless payments within the euro area since 2003. The SEPA initiative, which will make all retail payments within the euro area “domestic” with the

- creation of the Single Euro Payments Area on January 1, 2008, can be expected to make more people aware of the euro's benefits. Nonetheless, it will take intensive information efforts to effectively familiarize the general public with the advantages of SEPA.
- Respondents are not very convinced that the euro supports price convergence within the euro area. This perception is in line with studies that have indeed identified only marginal price convergence on account of the euro (Crespo Cuaresma et al., 2007). Measures to intensify cross-border competition in the euro area should step up price convergence. The lowering of transaction costs by SEPA will contribute to price convergence.
 - Respondents view the euro as having only a limited ability to help develop a European identity. At the same time, however, over half of respondents associate the European Union first and foremost with the euro. Therefore, it may well be possible that people's negative association with the EU also affects their view of the euro. Consequently, promoting a more positive attitude toward the European Union would be an important basis for encouraging acceptance of the euro. To be successful, euro information activities should therefore be part of a broad external communications plan to inform Austrians about the EU and its advantages for Austria.

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The Development of Euro Prices – Subjective Perception and Empirical Facts

This study compares consumers' subjective price perceptions with official inflation data for the period from the euro cash changeover in 2002 to 2006. At an annual average of 1.7%, the overall rate of inflation has remained low over the past five years despite adverse effects exerted by external factors such as the marked increase in oil prices. In contrast, the prices of frequently purchased consumer goods and services, which people commonly use as price benchmarks, experienced an upward drift. This effect has been potentiated by psychological factors, e.g. price increases tend to fix themselves more firmly in people's minds than price reductions (of which there have also been a considerable number). In addition, some groups within the population have yet to develop sufficiently firm value perceptions in euro and stop converting euro prices into schilling. Mentally comparing current euro prices with schilling prices that are more than five years old simply distorts the perception of inflation. Yet survey data show that consumers' value perception is continually improving. The subjective impression of euro-induced inflation has therefore tended to lessen, and by the end of 2006, it was considerably lower than when euro cash was initially introduced. These developments give rise to the hope that people have largely overcome their impression of a "euro price shock" and that headline inflation and perceived inflation will again develop largely in concert in the future. This trend could be encouraged by increasing efforts to communicate price developments to the public.

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Helmut Stix¹

JEL classification: E31

Keywords: Austria, euro prices, inflation, perceived inflation

1 Introduction

Although inflation rates in Austria have been very low since the euro cash changeover, the population is under the general impression that prices are increasing more sharply than before. This article investigates how these contradictory observations can be reconciled.

In section 2 of this paper, the actual changes in euro prices are discussed using different price statistics and compared with former schilling prices. Subsequently, actual inflationary developments are contrasted with the population's perception of inflation.² It is well established that in the first few years after 2002, people's perception of inflation and the statis-

tically measured rate of inflation diverged markedly. Section 3 of this paper therefore evaluates the perception of inflation and examines several specific factors: (1) the extent to which the public actually knows about inflationary developments, (2) what influence the population's level of knowledge has on the perception of inflation, (3) whether perceived inflation varies with sociodemographic criteria, and (4) what factors can explain the increase in perceived inflation following the introduction of the euro banknotes and coins. As will be shown, the gap between measured and perceived inflation is – in addition to distortions caused by using outdated schilling reference prices

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² In this study, several inflation-related terms are used. For definitions of these terms and an outline of the terminology used within this area of research, see Fluch and Stix (2005), particularly the glossary (p. 23).

when assessing prices in euro – mostly influenced by the development of prices for certain individual goods and services. For this reason, section 4 uses disaggregated price data to analyze the movement of prices across sectors and industries. This section also presents data on particularly noticeable changes in the prices for individual goods and services and discusses whether these can be regarded as a consequence of the changeover to the euro. Section 5 summarizes the main findings of the study and discusses future challenges.

2 Rate of Inflation Remains Low after Euro Cash Changeover – Level of Perceived Inflation Rises

2.1 Inflation Low in Historical Comparison

Between 1995 and 2006, Austria's price and inflation development has been significantly influenced by several factors, notably EU entry in 1995, accession to the euro area in 1999 and the euro cash changeover in

2002 as well as rising oil prices since 2002. At the same time, the confluence of the Eurosystem's stability-oriented monetary policy and various institutional factors – moderate wage settlements, the pressure to become fit for the euro, liberalization measures in several network industries – provided for very low inflation levels in Austria.

The aggregated indices of the price statistics for individual levels of production and trade do not reflect any notable price hikes since the introduction of the euro banknotes and coins. In the run-up to the changeover, a number of in-depth analyses (e.g. Pollan, 2001; Dirschnid et al., 2001) attempted to assess the potential effects of the euro currency on prices and the rate of inflation in Austria, with the essential conclusion that the overall economic impacts were likely to remain very limited. This principal finding was derived from the combined analysis of individual factors, which when taken separately, might yield quite different results (see table 1).

Anticipated Price Effects of the Euro Cash Changeover by Influencing Factors

Influencing factor	Anticipated price effects of the euro		
	Tends to dampen inflation	Tends to have a neutral effect	Tends to fuel inflation
Strong competition on product markets within the EU and the euro area	✓		
Greater price transparency	✓		
Intense competition, particularly in the (food) trade sector	✓		
Lower transaction costs	✓		
Pricing strategies to boost sales (rounding down)	✓		
Statutory and voluntary measures to curb price rises (dual price display)		✓	
Strict monitoring of pricing movements		✓	
Psychological pricing		✓	
Limited competition in service markets (high share of GDP and CPI)			✓
Development of medium-term price structure			✓
Strong psychological expectation of price hikes among consumers			✓

Source: OeNB.

Table 1

Table 2

Development of Selected Price Indices before and after the Euro Cash Changeover

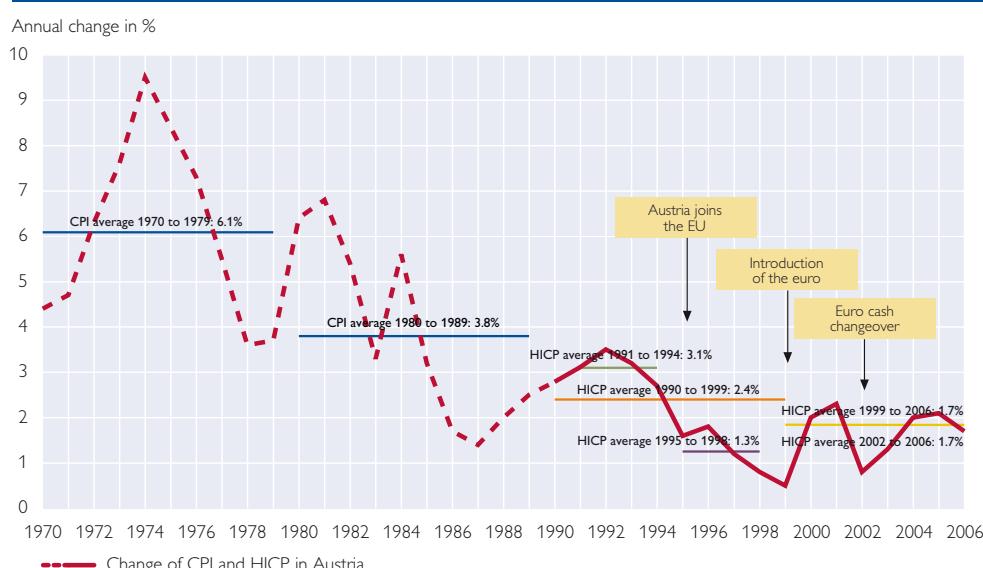
	1999 to 2006	2002 to 2006	1997 to 2001
	Annual change in %		
Producer Price Index (PPI)	1.0	1.1	0.4
Wholesale Price Index (WPI)	2.0	2.2	0.9
Consumer Price Index (CPI)	1.8	1.8	1.5
Harmonised Index of Consumer Price (HICP)	1.7	1.7	1.3
HICP at constant tax rates (HICP-CT) ¹	..	1.8	..
CPI for pensioners	..	2.0	..
Negotiated Standard Wage Rate Index (SWI)	2.4	2.3	2.2

Source: Statistics Austria, OeNB.

¹ 2004 bis 2006.

Chart 1

CPI and HICP Inflation Rates in Austria from 1970 to 2006¹



Source: Statistics Austria, OeNB.

¹ CPI up to and including 1989, HICP from 1990.

In the period under observation (1999 to 2006), producer prices showed the lowest increase, while wholesale price levels rose more sharply each year, partly reflecting the surge in crude oil prices between 2004 and 2006, as petroleum products carry strong weight in the index. On the consumer side, inflation remained moderate, with the average rate of inflation as measured by the Consumer Price Index (CPI) standing at 1.8% between 1999 and 2006 (table 2). With the exception of the

period immediately after Austria's accession to the EU, the general upward drift in prices was clearly at a lower level than in the 1990s (+2.4% per annum), the 1980s (+3.8% per annum) and the 1970s (+6.1% per annum; see chart 1).

Since the changeover to euro banknotes and coins in 2002, the average CPI inflation rate and the average rate of inflation as measured by the Harmonised Index of Consumer Prices (HICP), which is relevant for monetary policy, have remained mod-

erate at 1.8% and 1.7%, respectively (see table 1). The HICP inflation rate was thus in line with the Eurosystem's target rate of "below but close to 2%" for the entire euro area.³

Statistics Austria also calculates and publishes special inflation parameters on an ongoing basis. As these parameters were brought into the discussion during the course of the euro cash changeover, they will be discussed briefly below in order to draw a clear distinction between them and the commonly used inflation data derived from the HICP and the CPI.

Not taking into account tax adjustments, which bear no connection to the euro cash changeover, inflation as measured by the HICP increased by 1.8% between 2004 and 2006 (table 2). This means that the HICP was somewhat above the CPI at constant taxes in those years. The difference between the two measures

was largest in 2004 at 0.3 percentage point, due to increases in petroleum tax (on motor fuels and heating oil), energy taxes (on electricity and natural gas) and tobacco tax (on cigarettes) (see Beisteiner and Böttcher, 2006).

An index calculated especially for retired households stood at an average of 2.0% per year between 2002 and 2006, which is somewhat above the general CPI or HICP inflation rates. The reason for this divergence can be attributed to the specific consumption pattern of pensioners, which slightly differs from that of the average household across all groups of the population. The CPI for pensioners gives greater weight to goods that are purchased on a daily basis, and the resulting higher rate of inflation is one of the reasons why retirees tend to view the introduction of the euro banknotes and coins with some skepticism.

Box 1

Supply Shocks Cause Slight Uptick in Inflation since Euro Cash Changeover

The different price indices only show a mild upward trend in prices since 2002. Between 2002 and 2006, euro prices increased by 1.7% per annum (HICP) relative to schilling prices, which rose 1.3% per annum between 1997 and 2001 (the period that immediately preceded the introduction of euro cash).

The slight uptick since 2002, however, is far less attributable to the euro cash changeover than to a series of macroeconomic shocks. During the most recent period of investigation, for example, the economy was hit by several supply shocks (see the illustration below) that increased the cost burden and accelerated the upward price momentum, while the schilling period immediately prior to the introduction of the euro was dominated by numerous factors that had a dampening effect on inflation. These developments also contributed to the fact that in 1999, Austria's inflation stood at only 0.5% – the lowest level since 1945. The inflation rates of the five-year periods before and after the introduction of the euro banknotes and coins are therefore only comparable to a limited extent.

³ Statistics Austria prefers the national CPI for its monthly analysis of inflation development and publishes information regarding upward or downward price movements on a very detailed level (around 800 items or individual indices). Therefore, this study uses the national CPI for all analyses relating to individual goods. The authors received part of the data required for this purpose from the Austrian Federal Economic Chamber. In contrast, Eurostat and ECB only use 120 items (indices) for HICP calculation. The OeNB mainly relies on HICP data that are relevant for monetary policy.

Factors Influencing Inflation Development in Austria	
1997 to 2001 (pre-euro changeover)	2002 to 2006 (post-euro changeover)
<i>Cumulative price increase: 6.9%</i> <i>Annual inflation rate: 1.3%</i>	<i>Cumulative price increase: 9.0%</i> <i>Annual inflation rate: 1.7%</i>
Factors causing inflationary pressure	Factors causing inflationary pressure
<ul style="list-style-type: none"> ▶ <i>Rise in public service charges and tax burdens (increase in energy tax)</i> ▶ <i>Robust economic growth (2000)</i> 	<ul style="list-style-type: none"> ▶ <i>Supply shocks</i> <ul style="list-style-type: none"> ▷ <i>Weather-related failure of the harvest in 2001/2002 in Southern Europe => higher food prices (fruit, vegetables)</i> ▷ <i>Livestock epidemics (BSE, FMD) => higher food prices (meat, milk)</i> ▷ <i>Crude oil price boom (January 1, 2002: USD 19.71 per barrel; August 8, 2006: USD 78.74 per barrel, February 2007: approximately USD 55.00 per barrel) => higher energy prices, clear contribution to inflation</i> ▶ <i>Dampening effects of market deregulation diminished temporarily (telecom prices stopped going down for a while), boom in crude oil prices more than compensated deregulation effects on energy markets</i> ▶ <i>Remaining obstacles to free movement of services</i> ▶ <i>Taxation measures (increase in energy tax, petroleum tax, tobacco tax)</i>
Factors dampening inflationary pressure	Factors dampening inflationary pressure
<ul style="list-style-type: none"> ▶ <i>Euro convergence process leads to lowest inflation rate since 1945 posted in 1999 (+0.5%)</i> ▶ <i>Deregulation of markets (electricity, natural gas, telecommunications)</i> ▶ <i>Stronger competition (insurance, retail sector)</i> ▶ <i>Weak economic growth in 2001</i> 	<ul style="list-style-type: none"> ▶ <i>Weak economic growth (especially from 2002 to 2003)</i> ▶ <i>Interest rate hikes</i>

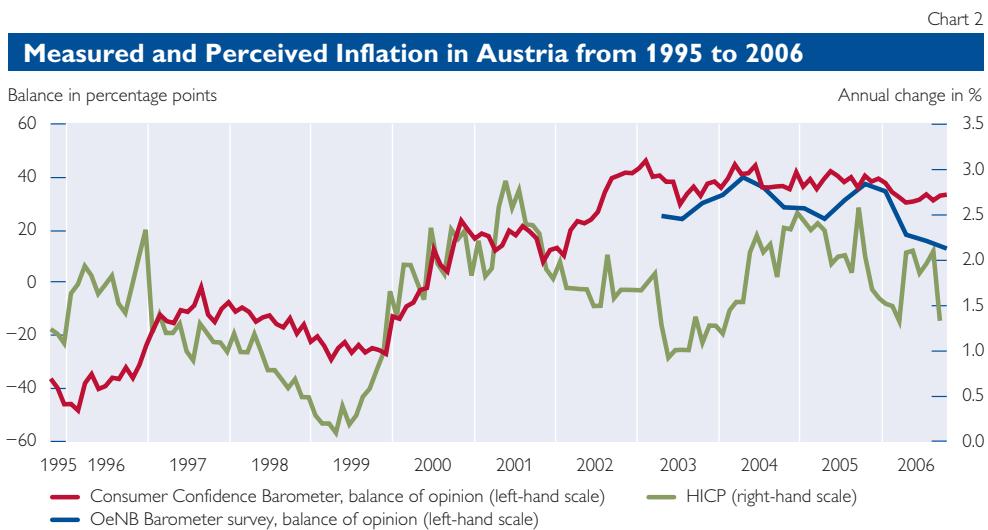
2.2 Increase in Perceived Inflation

Despite generally low inflation rates, most Austrians believe that inflation has risen since euro banknotes and coins have come into circulation. Chart 2 compares actual HICP changes with the development of perceived inflation.

As a measure to quantify perceived inflation, we use the balance

of opinion among survey respondents.⁴ A balance of opinion of 20, for example, indicates that the proportion of respondents perceiving an increase in price levels is 20 percentage points higher than the share of those perceiving a decrease. A close alignment between the balance of opinion and the official inflation rate would imply that perceived inflation is

⁴ The concept of balance statistics is discussed in more detail in Fluch and Stix (2005, p. 27).



broadly in line with measured inflation, whereas diverging paths are generally interpreted as a discrepancy between inflation perception and measured inflation. In this context, it must be pointed out that balance statistics and HICP statistics are scaled differently – the balance of opinion is measured in percentage points of respondents, while the HICP reflects annual changes in percent.

To add statistical power, chart 2 uses the balance of opinion of two different surveys: the European Commission's monthly Consumer Confidence Barometer (CCB) and the quarterly OeNB Barometer survey, which differ in terms of questions asked and sampling methods.⁵

Chart 2 shows that the CCB balance of opinion developed largely in parallel with the HICP inflation rate between 1997 and 1999 and that the two measures were broadly aligned between 1999 and 2001. After the euro cash changeover, however, the

two paths started to diverge, with the following three trends emerging:

- At the beginning of 2002, when the euro banknotes and coins were introduced, perceived inflation rose sharply. This is somewhat surprising given the fact that HICP inflation rates were dropping at this time. The survey results obviously reflect the population's widely-held perception that prices were increasing in the wake of the euro cash changeover.
- Despite HICP inflation rates remaining subdued, perceived inflation persisted at a high level for a long period of time. It was not until late 2004 that the two indicators started to converge again, largely due to the fact that Austria's HICP inflation rate had increased.
- Both measures of perceived inflation depicted in chart 2 have shown a clear downward trend over the past two years – the CCB

⁵ The CCB survey reflects telephone interviews with 1,500 people in Austria, while the OeNB Barometer survey is based on 2,000 face-to-face interviews across Austria. A direct comparison of the question and answer categories in the two surveys is not possible, and therefore their results differ as well. For this reason, the subsequent analyses will focus on the trend in the balance of opinion that emerged over time rather than the absolute figures. The balance of opinion is available from 1995 onward for the CCB, and from 2003 for the OeNB Barometer.

balance of opinion fell from 46% (January 2003) to 32% (October 2006), that of the OeNB Barometer survey dropped from 40% (April 2004) to 13% (October 2006).

3 A Closer Look at Subjective Perceptions of Price Movements since the Euro Cash Changeover

This section takes a closer look at factors that determine perceived inflation. First, we will discuss how well informed Austrians are about the inflation rate. Subsequently, we will demonstrate that the population generally overstates the inflation rate and there are considerable differences in perceived inflation across different societal groups.

These factors have a general effect and are thus relatively independent of the introduction of the euro banknotes and coins. In view of the pronounced rise in perceived inflation since the euro cash changeover, this section will discuss the reasons for this asymmetry with inflation measures and assess the future development of inflation perceptions.

3.1 Some Facts on the Subjective Perception of Price Developments

3.1.1 How Well Informed are Austrians about the Inflation Rate?

In light of the gap between perceived inflation and officially measured inflation rates, the question arises as to how well Austrians are informed about the inflation rate in general. For this reason, respondents of the OeNB Barometer survey were asked in the third quarter of 2006 if they knew how high the inflation rate was

at that time – a question that related more to their knowledge of the regularly published official inflation rate than to their perception of inflation.

The results of this survey are mixed (table 3). On the one hand, Austrians, to the extent they answered the question, were relatively well informed about the approximate level of inflation (which according to Statistics Austria was 1.8% as measured by the HICP and 1.6% as measured by the CPI in the third quarter of 2006): Approximately 46% of the respondents gave a fairly correct estimate (i.e. between 1.5% and 2%) and only 12% believed that the inflation rate was higher than 2%. On the other hand, it is noticeable that 39% of the Austrian population did not know how high the inflation rate was, or claimed not to know (or gave no answer).

Closer examination shows that knowledge about the rate of inflation is mainly dependent on two important sociodemographic aspects: First, there appears to be a significant lack of information among younger people. 58% of the respondents aged less than 30 years were unable to provide an answer to the question of how high the inflation rate was, compared with only 32% among those aged over 30. Among the group of students over 15 years of age, more than two-thirds were overwhelmed by the question, which suggests a need to put a bigger emphasis on teaching economic literacy in school. Second, there was a marked difference in answers between the two genders: the share of female respondents who did not answer the question was 50% as compared to only 27% of their male counterparts.

Table 3

Do You Happen to Know by Roughly How Many Percent the Inflation Rate (CPI) Has Risen in the Past 12 Months?		
	Frequency (%)	Balance of opinion
By less than 1%	3	-7
By approximately 1.5%	27	0
By approximately 2%	19	4
By approximately 2.5%	7	13
By approximately 3%	3	29
By more than 3%	2	40
Don't know	39	25

Source: OeNB Barometer survey, third quarter 2006.

Note: Column 2 shows the percentage of answers to the question about the level of inflation. Column 3 indicates the balance of opinion per group. Example: In the group of respondents who thought that the inflation rate rose by less than 1%, the balance of opinion is -7. This means that in this group the proportion of Austrians who believe that prices were falling is 7% higher than the share of those who believe that prices were increasing.

Box 2

Difficulties in Calculating Perceived Inflation

Every consumer perceives price changes differently, developing a subjective “feel” for price movements in response to individual price signals. One initial problem is that sound research findings about how price signals are processed to create an individual’s perception of inflation are limited. It can be assumed, for example, that personal perceptions are influenced by information other than prices (media reports, advertisements, preconceptions etc.). In addition, the perception of price increases is unlikely to be formed in isolation, but rather in line with people’s income situation and thus their purchasing power. Moreover, it has been argued in the literature that individual price perceptions are biased as people will pay more attention to some reference products than others, or will be influenced more strongly by regularly purchased goods than by less commonly purchased goods (Brachinger, 2006).

If individual price perceptions are difficult to measure, even greater problems arise when we try to pin down the inflation perception of the entire population. For this purpose, individual price perceptions must be aggregated, which raises the question as to what criteria should be used to determine measures that are representative of the entire population. Should individual perceptions of inflation be weighted on the basis of consumer spending, income or other measures?

These reflections show that the term “perceived inflation” is difficult to conceptualize and may represent rather different aspects, depending on the method of calculation used. In principle, the problems of measuring perceived inflation are quite similar to those associated with the calculation of well-established price indices, such as the CPI. While the latter is, however, calculated on a methodologically sound basis and consistently over time, this is definitively not the case with perceived inflation. We therefore always need to keep this caveat in mind.

Perceived inflation is generally calculated using survey data. Different organizations (the European Commission, the OeNB, etc.) conduct surveys at regular intervals in which the population is questioned about their perception of inflation. The survey questions are both qualitative (Have price increases been high, lower etc.?) and quantitative (By what percentage have prices increased?). Answers to questions of this nature can be evaluated relatively easily and therefore deliver a current picture of the population’s feelings about inflation. Survey data are, however, known to be afflicted with a range of problems. These problems are associated with both technical aspects (sample quality, interview method, interviewer skills, etc.) and, as already mentioned, with the scope of the survey – particularly the way in which questions are worded. Moreover, survey data are typically

aggregated to derive representative results with regard to respondents' age, gender and the federal province in which they reside, whereas personal expenditure or income are generally not taken into account.

As an alternative to this simple method, Brachinger (2006) suggests calculating an index of perceived inflation which explicitly incorporates individual responses to price signals and their impact on consumers' perception of inflation. This concept takes into account the fact that consumers tend to attach greater weight to price fluctuations of goods they buy more frequently than of items they buy less frequently. This method, which to date has only been used in Germany and whose results show clear differences to other measures of perceived inflation, is rather complex and subject to controversy (Hoffmann et al., 2005).

3.1.2 Poorly Informed Consumers Tend to Overstate Inflation

It is not apparent from the outset how closely the balance of opinion correlates with other inflation estimates. To shed light on this question, table 3 shows both the frequency of answers and the balance of opinion for each group.

First, these figures reveal that there is a clear correlation between the balance of opinion and the estimated level of inflation: the greater the estimated rate of inflation, the higher the balance of opinion. This means that the balance of opinion can serve as a measure of perceived price developments.

Second, it is also evident that the group of respondents who do not know the current inflation rate (almost 40% of the respondents) tends to believe that prices have increased (with a balance of opinion of 25). In contrast, this figure is markedly lower for the group who is aware of the inflation rate (a balance of opinion of 5). This means that when the population's inflation perception is measured using balance statistics, it is distorted upward by those with little

knowledge or who do not wish to become informed.

This finding, namely that a lack of information as regards the rate of inflation is linked with a high perceived inflation rate, shows a need to improve communication on this point.

3.1.3 Marked Sociodemographic Differences in Inflation Perception

Balance statistics measure inflation perception across the population as a whole. On further consideration, the question arises whether the perception of inflation, apart from the accuracy of price recall, is homogenous throughout the population or whether further differences exist across societal groups.

Chart 3 shows the course of perceived inflation for selected sociodemographic groups. Two significant points stand out. First, the decrease in perceived inflation that has been observed since 2003 is not only evident within the population as a whole but also across all subgroups. Second, inflation perception varies considerably between different sociodemographic groups.⁶

⁶ The interpretation of chart 3 is explained using the gender-specific differences in perceived inflation as an example: In the first quarter of 2003, the proportion of women who perceived upward price movements was 33 percentage points higher than the share of women who perceived reductions in prices. Among the male respondents, the difference was 17 percentage points. Compared over time, two peaks stand out: one in the first quarter of 2004 and one in the third quarter of 2005. Both may be attributable to oil price surges.

On average, women hold higher inflation perceptions than men. An important reason for this phenomenon lies in the fact that women, as has been argued previously, appear to be less well informed about inflation than men. Even if we adjust for the level of knowledge, however, the gap in inflation perceptions between men and women still remains robust. Although not discussed in detail here, this discrepancy is also not attributable to gender-specific differences in income, educational attainment or differing levels of satisfaction with the respondents' personal financial situation.⁷

One possible explanation might be that women respond to more or different price signals than men and therefore hold a higher inflation perception. Frequency of purchase does not appear to be a major factor.⁸ Another explanation might lie in the fact that women are still responsible for a large share of purchases to satisfy their households' daily and weekly needs. As the prices of such items have tended to rise disproportionately with the overall rate of inflation since the introduction of the euro banknotes and coins (a fact that will be explored in more detail in section 4), women perceive inflation to be higher. However, this is a very specific explanation that is primarily related to circumstances following the euro cash changeover and cannot account for the fact that women also hold higher

inflation perceptions at other times and in other countries.

Compared across age groups, perceived inflation was at its lowest level among older people at the beginning of 2003, while in more recent years, primarily younger people tended to hold lower inflation perceptions. Beyond this, age-related differences are not strongly evident. More often than not, the level of perceived inflation barely differs between young and old. To a certain extent, this is surprising, as it has always been assumed that older members of the population are particularly sensitive to prices due to their more critical attitude toward the euro. It is also evident that the oil price-related increase in perceived inflation in the third quarter of 2003 is particularly pronounced in the group aged 29 and over, which is, in statistical terms, the group that is most heavily affected by fuel price fluctuations (and reacts accordingly).⁹

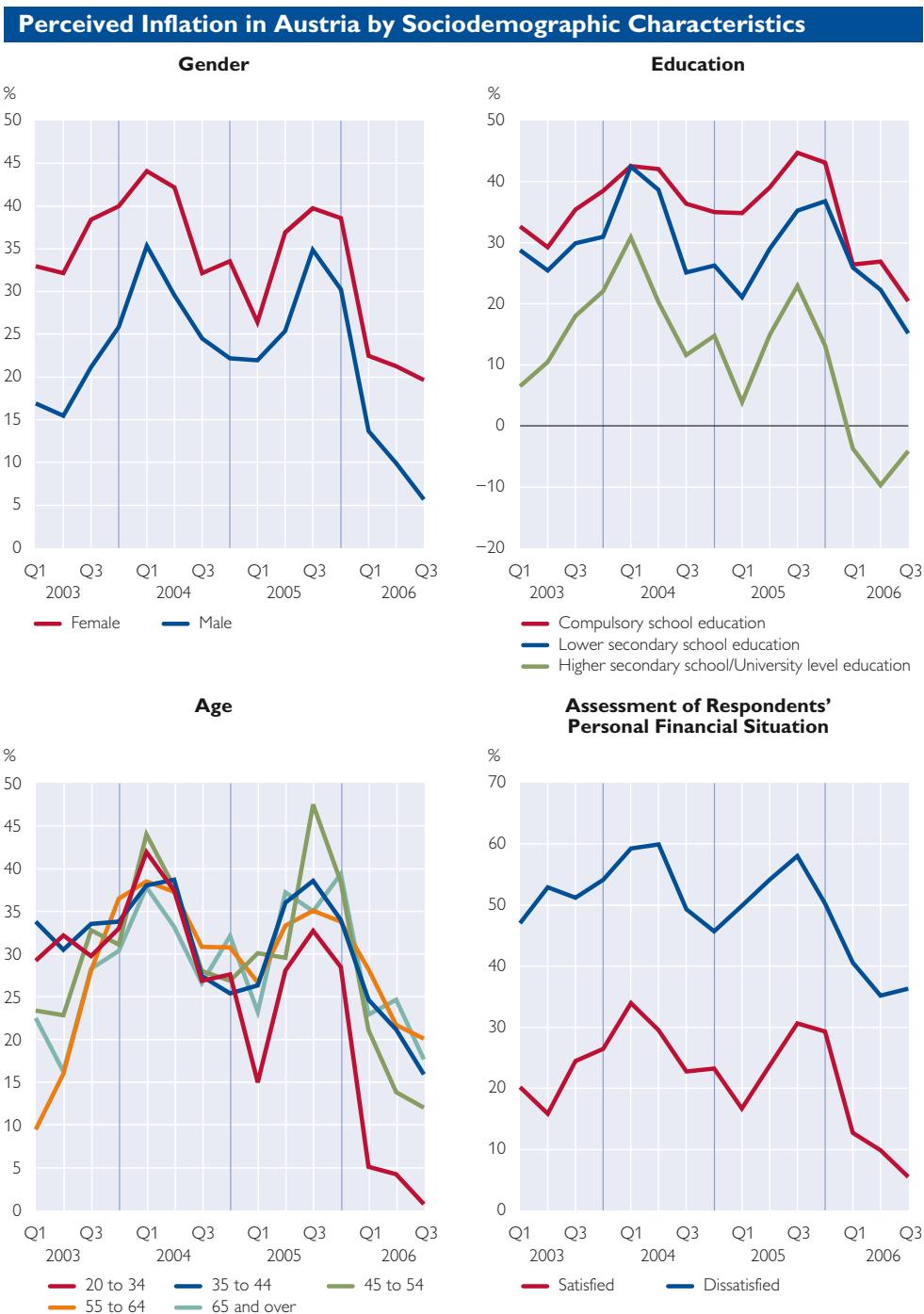
Furthermore, it can be observed that greater educational attainment, which is generally linked to higher income, correlates with decreasing perceived inflation. This is also reflected by the difference between respondents stating that they were satisfied with their personal financial situation and those who were not. This subgroup shows the most profound difference in inflation perception, with respondents who were dissatisfied with their financial situation perceiving a markedly higher increase in

⁷ These gender-specific differences can also be observed using a multivariate regression model, as is demonstrated by Stix (2006). Similar results have also been found for the U.S.A. and Sweden (Bryan and Venkata, 2001; Jonung, 1981).

⁸ It might be assumed that women shop more than men (given that they are typically responsible for a higher proportion of purchases). Bryan and Venkata (2001), who address this question in greater detail, find this argument unconvincing: "While someone with more shopping experience may have more accurate perceptions of price behavior, there is no obvious reason why they would be systematically higher (...) than those who do less shopping." (*ibid.*, p. 2)

⁹ See the expenditure on transport from Statistics Austria's consumer survey (www.statistik.at/konsumerhebung/struktur2.shtml) as at February 15, 2007.

Chart 3



prices. One reason for this finding might be that low-income households usually spend a larger part of their budget on basic commodities. If the prices of such items increase disproportionately with other goods, as has

been the case in recent years, these households “suffer” more from price increases than those with higher incomes. This leads to the conclusion that the weak growth in real income experienced by a relatively large part

of the population contributed to a higher perception of inflation among this subgroup.¹⁰

3.2 The Euro Cash Changeover and Perceived Inflation

The increase in perceived inflation is closely linked to the introduction of euro banknotes and coins – a phenomenon experienced by almost all countries within the euro area.¹¹ This section discusses the reasons for this development.

3.2.1 Why Did Perceived Inflation Increase after the Euro Cash Changeover?

Fluch and Stix (2005) and Stix (2006) argue that one reason for the high level of perceived inflation among the

population as a whole lies in the fact that between 2001 and 2005, the prices of frequently purchased goods rose more sharply than those of less frequently purchased goods. Therefore, the impression of price increases was justified when frequently purchased products and services were taken into consideration, which would be expected as consumers' perception of prices tends to be focused on these goods (see Brachinger, 2006). As is shown in box 3, according to calculations by Statistics Austria, the prices of some high-demand goods and the index of daily and weekly purchases rose more steeply than the CPI between 2001 and 2004 (see Beisteiner and Schimper, 2006).

Box 3

Steeper Price Hikes in Goods with a Strong Signaling Effect

for the Population

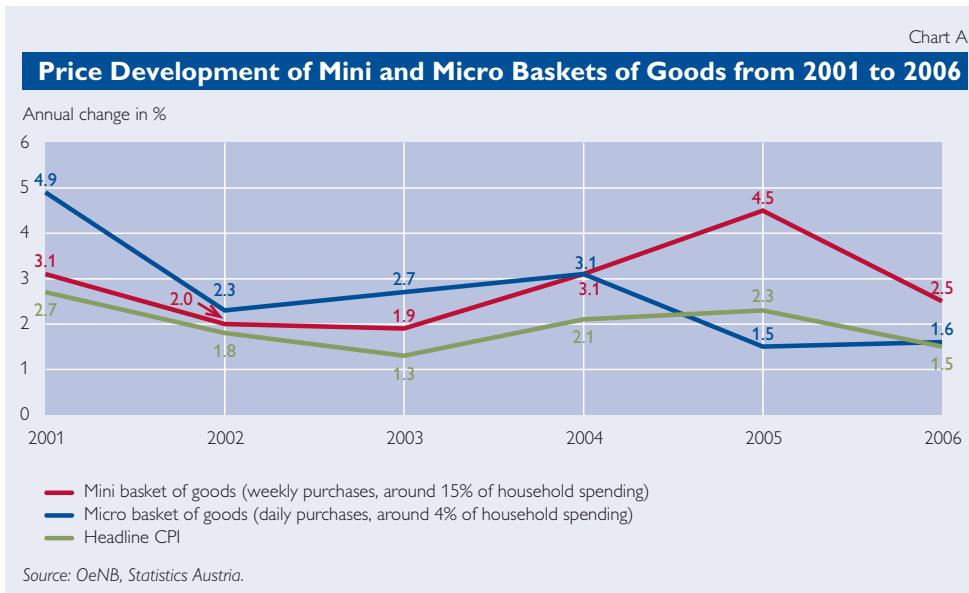
As a general rule, the population's perception of prices in relation to the value of purchased goods is based on frequently consumed products whose price levels are closely monitored and which are commonly used as price benchmarks. Characteristic products in Austria are bread, milk, a cup of Melange (half espresso, half milk) bought in a coffee shop, and a glass of beer and the set meal of the day purchased at a restaurant. Following the introduction of euro banknotes and coins, the prices of such goods and services most likely served as important benchmarks for a subjective assessment of price changes.

The price data reflected in the national CPI (for which disaggregated data are available for individual goods) support the population's impression of price increases – in some cases of considerable magnitude – that occurred for these products in the wake of the euro cash changeover.

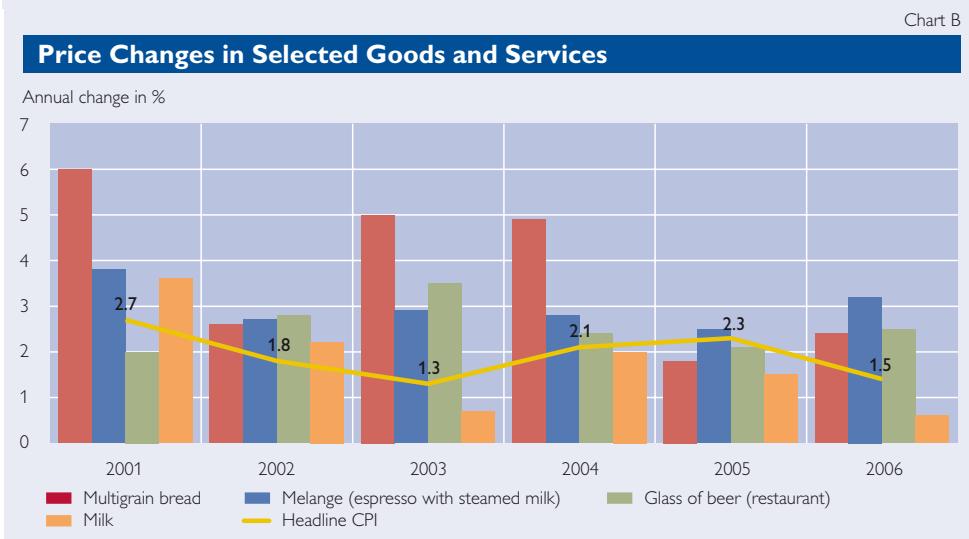
For almost all reference goods and for every year since the introduction of euro banknotes and coins, price rises were above the overall CPI inflation rate. In 2001 and 2003 specifically, price hikes were quite noticeable, while in 2002, when the public paid especially close attention to price movements and private consumption in Austria underwent a period of stagnation, they tended to be somewhat lower. The more pronounced price hikes before and after 2002 appear to reflect anticipatory effects in 2001, and catching-up effects thereafter in 2003, when dual pricing had been phased out, consumer demand improved gradually and more and more companies were switching back to psychological pricing (chart B). Beer prices, for instance, increased somewhat more strongly, while the cost of a set meal in a restaurant developed in line with the general rate of inflation.

¹⁰ See also Gugger and Marterbauer (2005).

¹¹ See also the discussion in Fluch and Stix (2005).



Specially calculated “baskets of goods”¹ typically purchased on a daily or weekly basis (chart A) show above-average price increases. Between 2002 and 2006, the prices for the goods contained in the mini basket² and the micro basket³ experienced an annual increase by 2.8% and 2.2% respectively, which exceeds the rise in the overall CPI of 1.8% per annum.⁴ The population’s perception of rising prices for basic commodities is corroborated by the empirical data.



¹ These baskets of goods, which have been calculated by Statistics Austria since 2001, contain products and services that represent consumers’ characteristic daily and weekly buying patterns.

² Including 55 goods and services that are typical for a week’s worth of shopping and represent 15% of the money spent on the entire basket used for measuring CPI inflation.

³ Including 19 goods purchased on a daily basis (although some products were selected at random), which account for 4% of the amount spent on the entire basket used for measuring CPI inflation.

⁴ The cumulative price changes for the period between 2002 and 2006 are as follows: mini basket: +14.7%, micro basket: +11.7%, headline CPI: +9.3%.

Another reason is that consumers' perceptions are also influenced by psychological factors. People who expected the euro cash changeover to increase prices were also more likely to notice them when they actually occurred.¹² These two factors may help to explain why a large part of the population perceived price increases despite the low level of officially measured inflation rates. However, can these factors also explain why perceived inflation proved to be remarkably persistent and only began to slowly decline after some years?

In this regard, Stix (2006) demonstrates that the widespread use of schilling reference prices also plays an important role in inflation perception, since these reference prices, which are already outdated by several years, have been "frozen" at their pre-changeover levels, while schilling prices would of course also have increased in line with normal inflation developments.

Survey data from the European Commission underscore the profound impact of the conversion to schilling. In fall 2006, around 30% of Austrians did not count mentally in euro when making purchases (European Commission, 2006; Fluch et al., 2007). For large purchases, as many as three quarters of those surveyed still converted prices into schilling, which is a considerable proportion five years after the euro cash changeover. Viewed over time, it is evident that the percentage of Austrians who convert prices into schilling is decreasing, but that this process is taking longer than expected.

At this point, it must be noted that the task of determining the proportion of Austrians who still convert into schilling is not easy to accomplish. As studies by Kirchler (2002) and Kamleitner et al. (2006) illustrate, consumers employ many different strategies to get a feel for the "new" currency. The strategy of conversion individuals apply may therefore be difficult to determine on the basis of just one question. In the survey mentioned above, for example, respondents were asked whether they primarily calculated prices in euro, in schilling, or as often in euro as in schilling.¹³ If 55% of Austrian consumers state that for larger purchases they primarily convert into schilling, this does not mean that 55% always convert into schilling and that the euro does not play any role at all. It is quite possible that a proportion of these people already calculate in euro, but then "work back" into schilling to make sure that their euro calculations were correct.

In view of these considerations, it seems more appropriate to directly focus on consumers' perception of value. The OeNB Barometer survey provides information on this subject. Specifically, respondents are asked the following question: "How difficult or easy do you find it at present to calculate in euro or assess the value of euro prices?" The results for 2006 confirm a clear connection between the perception of prices and the perception of value (table 4).

Of those respondents who stated that they found it hard or very hard to evaluate euro prices, 94% also an-

¹² The effects of expectations on perceived inflation were first demonstrated in psychological experiments (Traut-Mattausch et al., 2004). Stix (2006) confirmed these effects for Austria using survey data.

¹³ The precise question in the original survey reads: "Today, when purchasing, do you count mentally: most often in euro, most often in schilling, or as often in euro as in schilling when it concerns common (exceptional) purchases (...)?" (European Commission, 2006).

Table 4

Connection between Perceived Inflation and Value Perception (Survey Results)		How difficult or easy do you find it at present to calculate in euro or assess the value of euro prices?		
			Very difficult or difficult	Very easy or quite easy
As to prices: In your opinion, have the price increases over the past 12 months been very high or high? ... moderate or quite low?			
	Total	(% of the respective group)		
			94	70
			6	30
			100	100

Source: OeNB Barometer survey.

Note: This table shows, for example, that 94% of those respondents who found it either very difficult or difficult to calculate in euro or assess the value of euro prices also thought that price increases over the past 12 months were either very high or high. Only 6% of this group thought that price rises had been moderate or quite low. The figures cited represent the average of the surveys conducted from the first to the third quarter of 2006 and are based on 5,888 respondents.

swered that price increases in the last twelve months had been very high or high, while the proportion of those who found it easy or very easy to assess the value of euro prices was “only” 70%. This implies that consumers who find it difficult to get a feel for the euro are more likely to use schilling reference prices and will tend to harbor higher inflation perceptions.¹⁴

3.2.2 Improved Perception of Value Leads to Further Decreases in Perceived Inflation

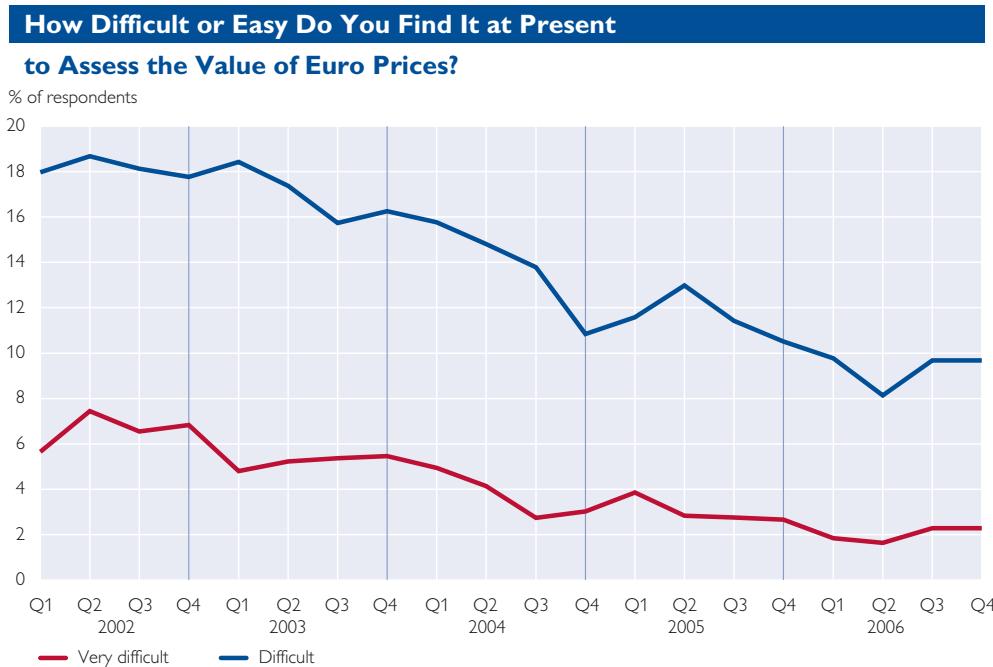
Since a connection between the perception of value and the perception of price increases has been established, it is to be expected that improved value perceptions will bring perceived inflation closer to the headline rate. We therefore need to look at how consumers’ value perceptions have developed over the past years.

Chart 4 shows how the proportion of Austrians who found it difficult or very difficult to work with euro prices developed over time. In 2002, around 7% fell into the latter category (very difficult) and 19% into the former (difficult). Both percentages have gradually declined over time, and in the fourth quarter of 2006, only 2% found it very difficult and around 10% difficult to assess the value of euro prices.

The proportion of Austrians using schilling reference prices or having difficulties developing a good feel for the euro thus declined largely in parallel with the pronounced decrease in perceived inflation. As the number of consumers who find it difficult to deal with euro prices is expected to drop further, the proportion of people who overstate the level of inflation can also be anticipated to decrease in the near future.

¹⁴ Theoretically, the causal link illustrated in table 4 might also work in the opposite direction: If they perceive price increases, people’s attitude toward the euro worsens and they are thus more likely to calculate in schilling.

Chart 4



Source: OeNB Barometer survey.

Note: The chart shows the proportion of respondents who answered that they either found it very difficult or difficult to calculate in euro or assess the value of euro prices.

4 Price Development of Groups of Goods and Individual Products

On a macroeconomic level, price increases have remained moderate. It is therefore reasonable to suspect that the public's strong feeling of accelerated inflation and the widely-shared impression that "everything is more expensive" can be ascribed to the increase in prices of individual products and services. Based on data collected by Statistics Austria and the OeNB, the following section attempts to determine which sectors were affected by noticeable price changes and which goods and services only experienced slight price increases. In a further step, we will try to identify the key factors accounting for these findings. The results of this analysis will show that in individual branches of the economy the population's perception of price increases is supported

by empirical facts. The reasons for price increases are, however, not primarily attributable to the euro cash changeover but rather to market-related or other special factors. Market- and competition-related price reductions occurring at the same time had little impact on people's perception and therefore reinforced the asymmetry in price rises.

4.1 CPI Inflation Based on 39,000 Individual Prices Representing 770 Goods and Services

The following analysis is based on the monthly price data collected by Statistics Austria. Around 39,000 individual prices are recorded from about 4,200 outlets in the 20 largest cities in Austria (and some of the adjacent shopping centers). From the price series obtained, indices are computed for approximately 800 goods and services (reduced to 770

items in 2006; see Beisteiner, 2006).¹⁵ Aggregated information is published on a regular basis and includes, in addition to headline HICP/CPI, the indices for the 12 most important expenditure groups.¹⁶ This collection of consumer price data differs from many other sources (such as random samples taken by polling agencies or ad-hoc surveys conducted by miscellaneous media) in that it is sufficiently large in quantity and highly representative in quality. In particular, it allows the prices of comparable products to be measured (“measuring like with like”) and also provides an excellent basis for longitudinal and cross-section analyses.

The following sections first investigate price changes of the category of industrial goods (excluding energy), then analyze the food sector and finally consider the development of prices within the very heterogeneous service sector.

4.2 Prices of Industrial Goods Increase Minimally; Clear Downward Price Trend in Durable Consumer Goods

Highly competitive product markets experienced a very moderate rise in prices both before and after the euro cash changeover. This indicates that the level of prices in this segment is primarily governed by market factors

and the introduction of the euro banknotes and coins seems to have made a minimal impact.

At an annual increase of 0.2%, the prices of industrial goods (excluding energy) remained almost unchanged over the last five years and therefore helped to lower the level of inflation.¹⁷ The individual products included in this group, however, experienced more or less significant price fluctuations between 2002 and 2006, with increases reaching more than 20% in some cases (see chart 6).¹⁸ At the same time, prices for electronic devices (personal computers) dropped by over 60% and the prices of durable consumer household and leisure goods also declined (see chart 5). As such (major) purchases are usually made at longer intervals, consumers’ perception of price levels, and, to a greater extent, of price changes, is much lower in this category.¹⁹ Particularly reductions in the prices of individual consumer goods and the associated dampening effect on the inflation rate are only noticed to a very limited degree. There is also, in part, a lack of understanding as to why the prices of goods purchased so infrequently (as is the case with durable consumer goods) are included in the calculation of the inflation rate. In accordance with the conventions for defining particular baskets

¹⁵ For each product or service, around 50 individual prices are collected throughout Austria. In actuality, the number of individual prices collected varies considerably. In some industries, significantly more individual prices per product are recorded, in others less (in some cases, this means only one price if there are no variations throughout Austria, e.g. passport fees).

¹⁶ See also www.statistik.gv.at and Statistics Austria’s monthly publication “Statistische Nachrichten.”

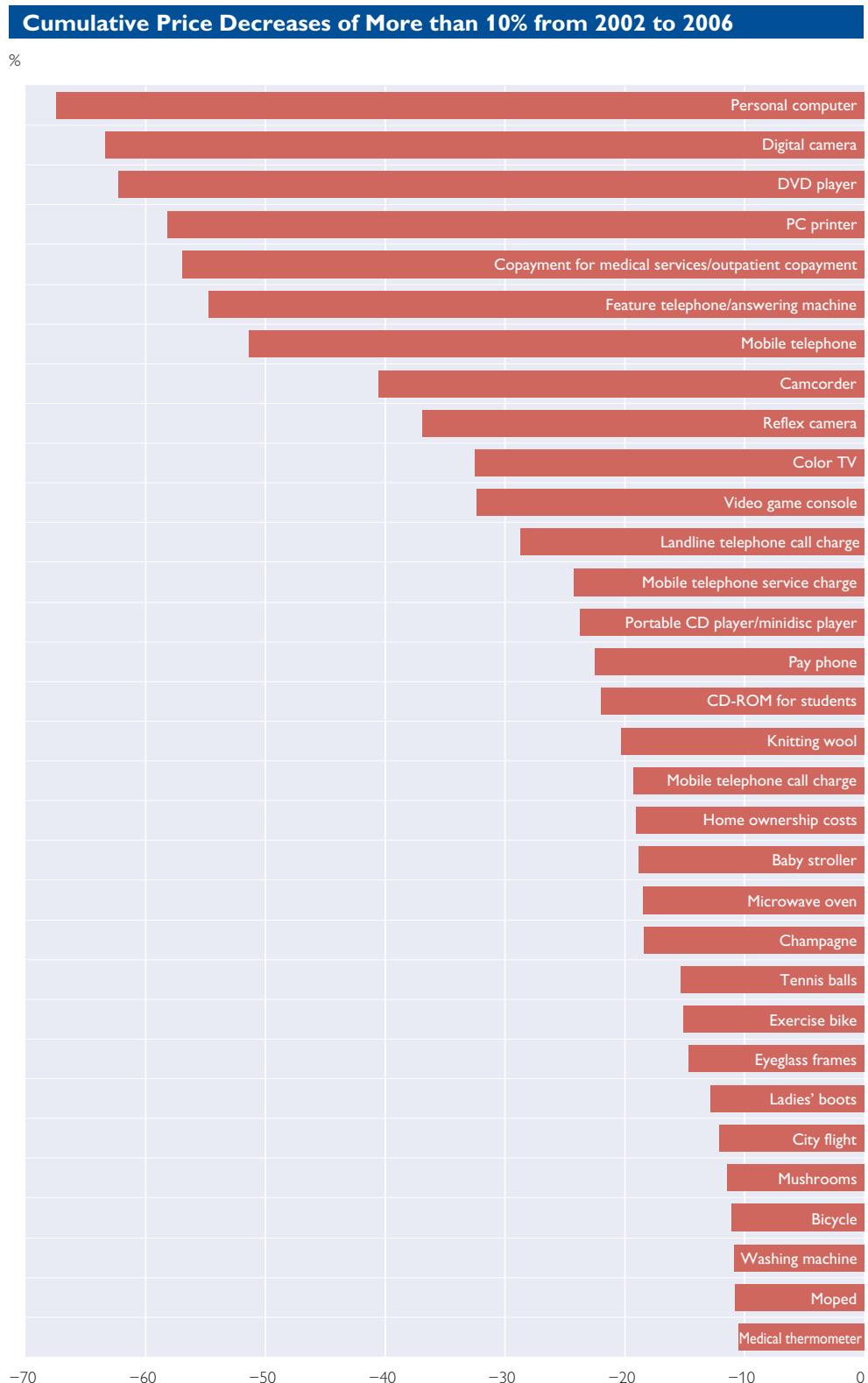
¹⁷ Industrial goods (excluding energy) account for around 30% of households’ total consumer spending.

¹⁸ The mapping of price movements on the level of individual goods over longer periods of time is only possible to a limited extent because the composition of the baskets of goods changes over time. To illustrate extreme price movements (charts 5 and 6), two baskets of goods were used, namely the basket of goods for the period from 2000 to 2005 and the reviewed basket of goods applicable from 2006 onward. The comparison is based on products and services contained in both baskets.

¹⁹ Surveys conducted by GfK Panelmarkt as well as Beisteiner and Schimak (2006) show, for example, that on average a new piece of electronic equipment (TV set, DVD recorder) is purchased only every six to seven years.

THE DEVELOPMENT OF EURO PRICES –
SUBJECTIVE PERCEPTION AND EMPIRICAL FACTS

Chart 5



Source: OeNB, Statistics Austria, Austrian Federal Economic Chamber.

Table 5

Price Reductions in Clothing and Footwear since the Euro Cash Changeover

%

	2006 HICP weight	Price change		
		2002 to 2006 per annum	2002 to 2006 cumulative	1997 to 2001 cumulative
Headline HICP	100.00	1.75	9.05	6.92
Clothing and footwear	5.69	-0.35	-1.74	-1.55
Clothing	4.59	-0.27	-1.33	-2.69
Clothing materials	0.02	-0.24	-1.21	-5.08
Garments	4.21	-0.28	-1.37	-3.58
Other articles of clothing and clothing accessories	0.22	-0.93	-4.57	1.74
Cleaning and repair of clothing	0.15	1.32	6.77	9.38
Footwear including repair	1.10	-0.71	-3.48	3.61

Source: Statistics Austria, OeNB.

of goods, such products represent expense items in household budgets and must therefore be factored proportionately into the weighting and regular price compilation.²⁰ Their share of total household outlays is – as illustrated in table 6 – quite small. Because individuals do not “offset” price rises against price falls in the same manner as official statistical measurements and because consumers attach more importance to price increases than to price reductions in products they do not purchase on a regular basis, the impression of upward price pressures prevails, although in actuality, the prices within the group of industrial goods (excluding energy) have hardly changed at all.

At this point, we will take a closer look at selected goods that displayed substantial price movements which were, however, less commonly noted than price changes in other products. The clothing and footwear market, for example, has been characterized by price falls that were stronger in the last five years than in the final five

years of the schilling era (table 5). This might be explained by the greater price transparency created by the euro, but also by the influx of cheap imports from China and Eastern Europe, as well as the intense competition within Austria.

The markets for electronic goods in the leisure and entertainment sector are characterized – as has already been mentioned – by a serious price slump. In almost all areas, price levels dropped by half within only a few years (table 6). This phenomenon must be taken into account when measuring prices. Given the fast-paced nature of this particular market, it is nearly impossible to accurately compare product prices over longer periods of time. Goods in this segment only remain on the market for a short period of time and, once sold out, are replaced by other products of better quality. To arrive at meaningful price comparisons, quality adjustments must be made to separate the change in a product’s price due to quality improvements from

²⁰ This means that the annual total for household expenditure on, say, TV sets as measured by consumer survey and cross-checked for plausibility against data provided by national accounts is averaged across all households to calculate the proportion of TV sets in the overall budget of all households. This figure represents the weight assigned to TV sets (0.16% since 2006) in the ongoing calculation of inflation.

Table 6

Price Reductions in Electronic Goods since the Euro Cash Changeover					
%	2006 HICP weight	Price change			1997 to 2001 cumulative
		2002 to 2006 per annum	2002 to 2006 cumulative	1997 to 2001 cumulative	
Headline HICP	100.00	1.75	9.05	6.92	
Audiovisual, photographic and data processing equipment	1.67	-9.36	-38.84	-22.59	
Equipment for the reception, recording and reproduction of sound and pictures	0.52	-7.73	-33.12	-12.92	
Photographic and cinematographic equipment and optical instruments	0.21	-11.10	-44.49	-31.01	
Data processing equipment	0.49	-18.18	-63.32	-60.86	
Recording media	0.42	-2.62	-12.44	-6.62	
Repair of audiovisual, photographic and data processing equipment and accessories	0.05	1.42	7.33	15.90	

Source: Statistics Austria, OeNB.

the change that truly represents inflation. If, however, prices and quality move in different directions, for example when price reductions go hand in hand with quality improvements (and vice versa), price movements, by convention, will be fully reflected in the index.

The consumer primarily focuses on the price of a product. Price changes attributable to improvements in quality – which are taken into account in the construction of price indices and, in some cases, may be associated with considerable inflation-dampening effects – go largely unregarded. Consequently, subjective price perceptions and price measurements diverge once more and interfere with the consumer's ability to correctly assess price movements.

4.3 Less Pronounced Rise in Food Prices since Euro Cash Changeover

The food sector, which is undoubtedly the most significant sector in terms of individual price perception, was observed very closely during and

after the euro cash changeover, both by consumers and public monitoring bodies, in an effort to prevent significant price increases. Nevertheless, the population had a strong feeling that “everything was getting more expensive” when purchasing their daily necessities. The following analysis shows that in this sector, special factors and supply shocks (see further below) were the most influential factors determining price level developments while the introduction of euro banknotes and coins only played a minor role.

Between 2002 and 2006, price increases in the food sector averaged 1.4% per year and thus remained below headline inflation. This is broadly in line with the price trend recorded for the period from 1997 to 2001, which leads to the conclusion that, on aggregate, a visible “euro effect” does not exist. Individual goods only experienced significant price hikes in some isolated instances, particularly for bread and cereal products (see box 2), but also for oils and fats. Fruit prices remained stable (table 7).²¹

²¹ This is partly attributable to the high initial price level in 2001, caused by harvest failures in Southern Europe, and also explains the drastic increase in fruit prices of almost 46% in the period from 1997 to 2001.

Table 7

%	2006 HICP weight	Price change		
		2002 to 2006 per annum	2002 to 2006 cumulative	1997 to 2001 cumulative
		100.00	1.75	9.05
Headline HICP	100.00	1.75	9.05	6.92
Food and nonalcoholic beverages	12.36	1.40	7.20	7.49
Food	11.05	1.44	7.41	8.46
Bread and cereals	2.18	2.07	10.79	7.92
Meat	2.82	1.33	6.84	6.70
Fish and seafood	0.34	1.28	6.57	15.34
Milk, cheese and eggs	1.83	1.35	6.93	4.32
Oils and fats	0.38	1.62	8.39	5.02
Fruit	0.93	0.08	0.38	45.84
Vegetables	1.19	1.40	7.20	2.56
Sugar, jam, honey, chocolates and confectionery	1.01	1.53	7.88	3.14
Food products n.e.c.	0.36	1.43	7.37	10.34
Nonalcoholic beverages	1.31	1.10	5.62	-0.73
Coffee, tea and cocoa	0.45	0.21	1.05	1.21
Mineral waters, soft drinks, fruit and vegetable juices	0.86	1.61	8.31	-1.90
Alcoholic beverages and tobacco	3.02	3.09	16.44	8.38
Alcoholic beverages	1.16	0.75	3.82	0.12
Spirits	0.14	1.12	5.72	2.77
Wine	0.50	0.52	2.62	-1.67
Beer	0.52	0.86	4.37	2.06
Tobacco	1.86	4.02	21.77	16.05

Source: Statistics Austria, OeNB.

Table 8

Change in %	2001	2002	2003	2004	2005	2006	2001 to 2006
Beef, loin	0.6	1.9	4.5	1.1	5.1	1.5	15.7
Beef, hind shank	2.8	0.8	15.2	7.4	7.6	..	37.8 ¹
Beef, fore shank	2.2	2.2	1.4	3.1	3.5	..	13.0 ¹
Beef, sirloin	4.0	1.3	4.6	2.8	2.4	3.1	16.1
Veal cutlet	1.5	1.7	2.2	3.0	2.3	4.2	11.2
Belly	13.7	-3.3	-0.7	5.8	5.5	0.0	21.7
Pork neck	10.6	-0.2	-0.4	3.9	3.0	-0.4	17.7
Pork cutlet	11.1	-0.4	-1.2	3.1	3.8	-1.6	17.1
Loin	5.3	0.3	1.6	2.4	3.3	1.3	13.5
Roast chicken	6.1	0.9	0.3	3.0	1.9	-1.6	12.7
Turkey breast	5.2	0.4	0.3	0.8	0.2	-2.2	7.0
Chicken, frozen	5.0	0.9	2.8	6.1	-1.2	-0.5	14.1
Smoked meat	6.3	1.2	-0.4	0.5	2.5	-2.4	10.4
Bacon	9.3	0.0	2.7	3.4	2.2	1.3	18.6
Headline CPI	2.7	1.8	1.3	2.1	2.3	1.4	12.3

Source: Austrian Federal Economic Chamber, Statistics Austria.

¹ 2001 to 2005.

Rises in the cost of drinks were moderate. The strong surge in the price of tobacco products can be attributed to the numerous occasions in the past five years when the tobacco tax was increased.

The livestock epidemics that struck Europe in 2001 and early 2002 were another special factor that led to a slump in demand and price reductions, in particular for beef. As consumers switched to alternative prod-

Table 9

Price Rises in the Service Sector since the Euro Cash Changeover				
%	2006 HICP weight	Price change		
		2002 to 2006 per annum	2002 to 2006 cumulative	1997 to 2001 cumulative
Headline HICP	100.00	1.75	9.05	6.92
Services	47.33	2.50	13.16	6.03
Accommodation	8.84	3.77	20.31	13.01
Transport	6.65	1.96	10.18	13.76
Telecommunications	2.47	-3.26	-15.26	-8.80
Recreational and personal services	22.10	2.13	11.13	10.44
<i>Package holidays and accommodation</i>	6.93	1.48	7.63	13.44
<i>Other recreational services</i>	15.17	2.43	12.73	9.41
Education, tuition, health, social services	7.19	3.15	16.78	13.79
Other services ¹	7.28	2.27	11.85	43.19

Source: Statistics Austria, OeNB.

¹ Financial services, insurance premiums, funeral costs, cemetery fees, lawyers' charges, passport fees etc.

ucts, the prices of other meats increased strongly (table 8). This trend also affected secondary products such as sausage, milk and cheese, which showed above-average price increases in this period. After the livestock epidemic was successfully combated, beef prices went up in 2002 and 2003, while the price levels of pork and poultry remained largely constant. From 2004 onward, the upward trend in the prices of meat products accelerated markedly. With only a few exceptions, the prices of individual meat products increased more strongly (some significantly so) than those of the basket components overall. As consumers frequently purchase meat, this development reinforced the public's perception of higher inflation.

4.4 Services Driving up Prices?

Over the past five years, the increase in the prices for energy and services clearly exceeded that of headline inflation. While the surge in energy

prices may be explained by persistently tight crude oil markets, tax increases, the remnant effects of deregulation and considerable increases in the standing charges for gas and electricity meters,²² it is not immediately clear which factors stand behind the disproportionate price increases recorded in the service sector. This makes it even more difficult to pinpoint any potential euro-related price effects.

Between 2002 and 2006, prices in the service sector increased by 13% – more strongly than in the economy as a whole and about twice as much as between 1997 and 2001 (table 9). The following factors played a part:

- stronger price adjustments implemented or influenced by the government;
- continuing weak competitive position of various industries; and
- cost factors that may also be related to the introduction of euro banknotes and coins.

²² Between 2002 and 2006, these amount to +87% for the electricity metering service charge and +61% for the gas service charge.

4.4.1 Notable Increases in Fees and Charges

In recent years, pronounced price hikes have been recorded in the housing sector, transport, education, and in the health sector – areas where price changes are influenced to a greater or lesser degree by the government. In many cases, public rates, charges and fees were raised in an effort to finance the tight budgets of federal, regional and municipal authorities, and to improve cost efficiency measures implemented to maximize cost savings. Therefore, increases are not or only marginally associated with the introduction of the euro banknotes and coins (because new euro prices were set for these services as well). A considerable proportion of the rise in rent prices can be explained by increases in day-to-day running costs, such as fees for garbage collection, sewer and water services, which are levied by the municipalities.²³ Another noticeable change was the increase in the prices of parking labels, which was also implemented by the municipalities (see chart 6). Rises in charges for health-care (hospital system), childcare and nursery facilities, welfare and public transport services (rail travel, road tolls, etc.) or for publicly administered cultural facilities (higher entry prices for museums and exhibitions) all have a similar background. As far as health is concerned, higher charges for prescription medications and a reduction in the scope of medical services covered by public health insurance (e.g. dental services) placed a significant additional financial burden on households. Moreover, in October 2001, university tuition fees were in-

troduced in Austria, which raised the inflation rate for services in the schooling and education sector. The ranking of goods and services experiencing strong upward price movements between 2002 and 2006 therefore includes many services from the sectors mentioned above (chart 6).

4.4.2 Pronounced Increase in Cost of Private Services Along with Strong Decrease in Prices for Telecommunications Services

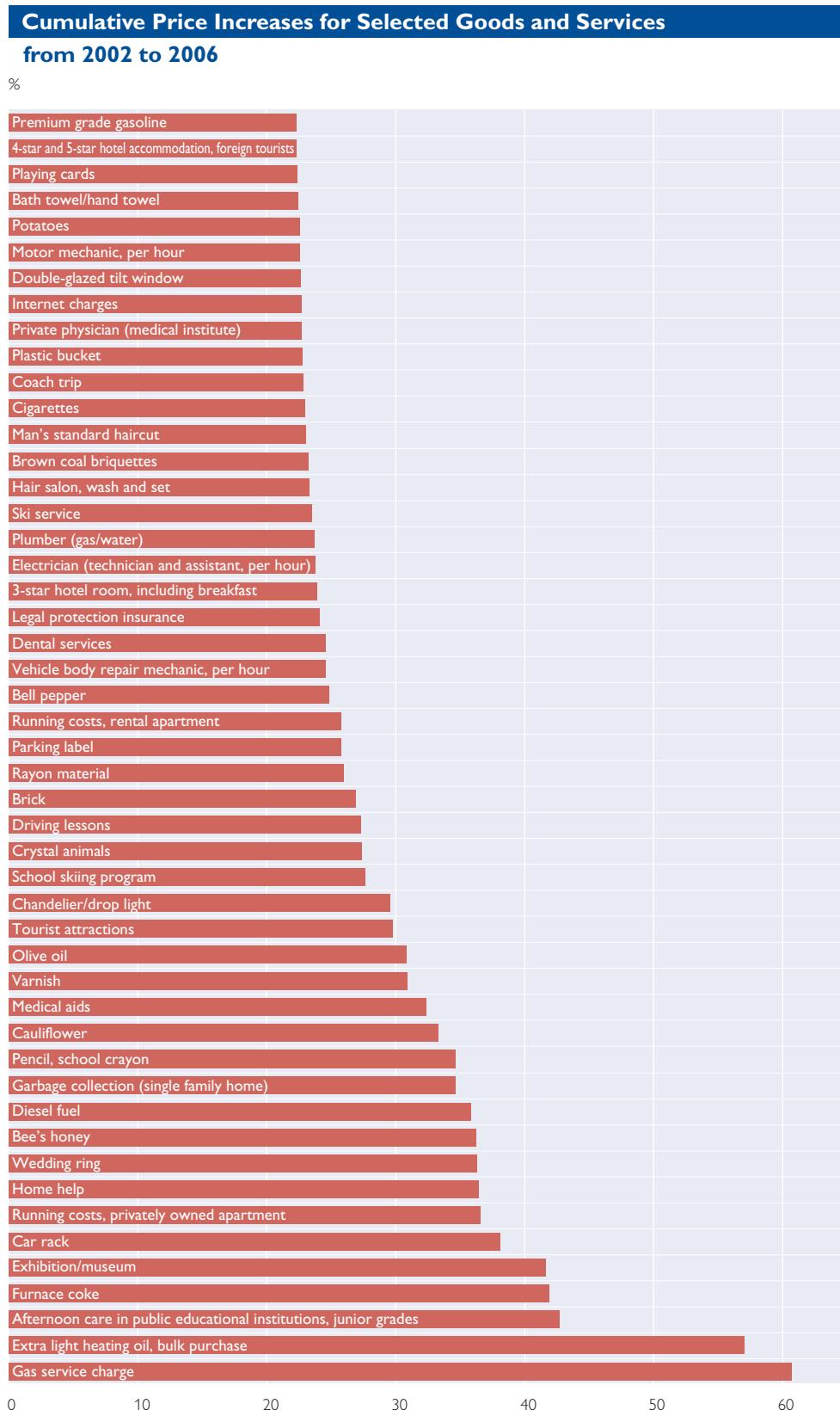
The sectors that experienced price surges of 20% to 30% since the euro cash changeover include mechanical and plumbing services, driving lessons, liability insurance and hairdressing services (chart 6). In some of these sectors, competition can be expected to grow as a result of the EU Directive on Services. In the highly competitive building trade, on the other hand, the price rises on services either progressed in line with headline inflation (painting services) or even remained below it (bricklaying and masonry services).

Upward price trends were not characteristic of all services, however. One sector that had a continuing downward effect on inflation in recent years is the telecommunications industry (table 10). Since the deregulation of the market in 1997, prices almost universally trended down, with the smallest decreases being registered between 2002 and 2003, when the introduction of a new generation of mobile telephones put a temporary brake on the cycle of deterioration. In the last five years alone, the prices for telecommunications services fell by around 15%, which is nearly twice as much as in the comparable

²³ Moreover, the sampling basis for recording residential rents was reset in January 2004 (see Haschka, 2004). From mid-2004 to mid-2005, rental prices in Austria saw a particularly steep hike.

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Chart 6



Source: OeNB, Statistics Austria, Austrian Federal Economic Chamber.

Table 10

Price Reductions in the Telecommunications Sector since the Euro Cash Changeover				
%	2006 HICP weight	Price change		
		2002 to 2006 per annum	2002 to 2006 cumulative	1997 to 2001 cumulative
Headline HICP Communications	100.00	1.75	9.05	6.92
Telephone and telefax equipment, telephone and telefax services	2.47	−3.27	−15.33	−8.81
Telephone and telefax equipment	2.29	−3.58	−16.64	−11.11
Telephone and telefax services	0.08	−15.31	−56.43	−59.49
Postal services	2.21	−3.01	−14.15	−8.42
	0.18	2.16	11.27	24.41

Source: Statistics Austria, OeNB.

schilling period. For consumers, however, these decreases as depicted in the CPI are not immediately apparent.²⁴ The complex tariff structure of telecommunications services is difficult to grasp and therefore makes price comparisons more complicated, and the aggressive advertising strategies employed by the industry tempt many consumers into extensive use. Despite cheaper tariffs, the phone bill still runs higher in many cases, which means that declining telecom prices, notwithstanding their palpable impact on CPI inflation, are not or only peripherally perceived by individual households.

4.4.3 Above-Average Price Increases Throughout the Restaurant and Catering Sector

As with daily necessities, price increases in the hotel, hospitality and bar industry attract a high level of public notice. On average, 15%²⁵ of household outgoings are spent on goods and services from this sector,

which, in the opinion of most consumers, was affected by particularly strong upward price adjustments in the course of the euro cash changeover. Official price data substantiate this impression, as price increases were, at 2.4% per year, higher than in other areas of the economy, although not extremely so. The upward price trend was only slightly stronger than during the equivalent schilling period prior to the euro cash changeover (see table 11) and is, in part, attributable to higher energy costs and increasing rents for business premises, as well as one-off costs resulting from the introduction of the euro (e. g. new menus expressed in euro). However, a closer look at individual products and services reveals price increases that were two or three times higher than the overall CPI average. According to Statistics Austria (2007), for example, the price of a typical Austrian meal, the “Wiener Schnitzel,” rose by 11% since 2001, Wiener sausages cost 21% more, and

²⁴ In addition, it is also an extremely complex task to map the heterogeneous tariff structure for telecommunications services in a price index.

²⁵ The expenditure weights for the category of “restaurants and hotels” differ greatly between the national CPI (7.3%) and the HICP (14.7%) because the two indices employ different expenditure concepts. The CPI adheres to the resident concept (and includes all such spending by Austrian households), whereas the HICP applies the domestic concept (which also includes spending by foreign tourists visiting Austria).

Table 11

Price Rises in the Restaurant and Catering Sector since the Euro Cash Changeover				
%	2006 HICP weight	Price change		
		2002 to 2006 per annum	2002 to 2006 cumulative	1997 to 2001 cumulative
Headline HICP	100.00	1.75	9.04	6.92
Restaurants and hotels	14.65	2.44	12.82	10.32
Catering services	10.44	2.29	12.01	9.36
Restaurants, cafés and the like	10.06	2.30	12.06	9.29
Canteens	0.38	2.33	12.23	10.78
Accommodation services	4.21	2.75	14.52	13.01

Source: Statistics Austria, OeNB.

for drinks purchased at a snack stand, consumers now pay 19% more. Between 2002 and 2006, the price for a glass of apple juice or a small glass of wine ordered in a restaurant increased by 17%, and the cost of mineral water went up by 16%, while the cumulative price increase for catering services as measured by the CPI only amounted to 9.3%. For these services, which frequently serve as price barometers for the general public, subjective perceptions and empirical facts were largely in line.

Price trends in the tourist industry were also affected by increasing demand (mostly for winter vacations and city breaks) and good capacity utilization, which may have contributed to the fact that, at 2.7% per year, prices in the accommodation sector increased slightly more substantially between 2002 and 2006 than in other areas of the tourist industry (table 11).

4.5 Above-Average Price Increases in Hairdressing and Restaurant Services throughout the Euro Area

The following section compares the price movements of several commonly purchased goods and services, which experienced sharp increases in Austria relative to other euro area

countries according to public perception and statistical measurements. Some non-euro area countries – Switzerland, Sweden and the United Kingdom – are also included in the comparison.

Movements in the prices of bread and cereal products, hair styling and beauty services as well as services rendered by hotels, cafés and restaurants are put in contrast with the general rate of inflation (table 12). This comparison reveals the following results:

In the period between 2002 and 2006, HICP inflation rates in the euro area were generally moderate and ranged between 1.1% per year (Finland) and 3.4% per year (Greece), with Austria ranking in third place. Compared to the period from 1997 to 2001, inflation rates – barring a few exceptions – thus tended to run slightly higher after the euro cash changeover, which is attributable to similar economic factors as those discussed above with respect to Austria (box 1).

Between 2002 and 2006, the prices for nearly all of the goods and services selected for this comparison accelerated more strongly – in some cases significantly so – than headline inflation across almost all euro area countries. The same holds true for

Table 12

Inflation Development in the Euro Area and Selected Non-Euro Area Countries

% per annum

	Headline HICP		Bread and cereal products		Hairdressing services		Restaurants, cafes etc.	
	2002 to 2006	1997 to 2001	2002 to 2006	1997 to 2001	2002 to 2006	1997 to 2001	2002 to 2006	1997 to 2001
Euro area	2.2	1.7	1.9	1.5	2.6	2.3	3.3	2.3
Austria	1.7	1.3	2.1	1.5	3.5	1.9	2.3	1.8
Belgium	2.0	1.7	3.0	1.8	3.2	2.0	3.0	1.8
Germany	1.6	1.2	1.0	0.9	1.2	2.2	1.4	1.3
Spain	3.3	2.4	3.9	1.7	4.1	2.7	4.6	3.5
Finland	1.1	1.9	1.1	1.4	3.0	2.4	2.0	2.4
France	2.1	1.2	1.6	1.8	2.3	1.5	2.9	1.7
Greece	3.4	3.7	3.7	3.5	6.2	7.2	4.2	6.0
Ireland	3.2	3.0	1.4	3.5	7.2	7.9	4.7	4.4
Italy	2.4	2.1	1.5	1.4	2.6	2.3	3.4	2.5
Luxembourg	2.9	1.9	2.9	2.0	3.1	1.9	3.4	2.1
Netherlands	2.1	2.6	0.6	1.8	3.8	3.5	3.0	3.3
Portugal	2.9	2.7	3.4	2.5	4.8	5.5	4.0	3.2
Switzerland	0.9	0.8	0.4	-1.1 ¹	1.5	1.4	1.4	1.3
Switzerland			1.5	0.8 ²				
Sweden	1.5	1.5	0.3	1.4	3.7	3.8	2.7	1.7
United Kingdom	1.7	1.3	1.4	0.1	4.6	5.4	3.0	3.3

Source: ECB, Eurostat, OeNB, Swiss Federal Statistical Office.

¹ Bread.

² Small breads and bakery products.

the equivalent pre-euro period from 1997 to 2001. This trend is most clearly visible in the prices for restaurant and café services (2.4% per year from 1997 to 2001; 3.3% per year from 2002 to 2006 throughout the euro area) and also, to a lesser extent, in the cost of bread products and hairdressing services.

By comparison with the euro area average, bread products saw striking price increases in Austria. This may partly be explained by the fact that, in contrast to other countries, the Austrian market offers a greater variety of bakery items and organic products. The same may also apply to Switzerland where small baked goods, unlike bread, posted above-average increases in price. The most sizeable upward price adjustments for bread products relative to headline inflation

were experienced in Belgium, while in some other euro area countries, most notably the Netherlands, price pressures remained quite moderate.

Hairdressing services in all countries (excepting Germany²⁶) saw price increases that not only considerably exceeded headline inflation, but also occurred over a much greater range (around 6 percentage points). Relative to overall inflation performance, Austria experienced a highly dynamic price development in this segment.

Prices in the hospitality and bar industry also (excepting Germany) advanced more sharply than the rest of the economy, with Austria, alongside Finland and Germany, recording the lowest increases. Across the euro area, the services provided by this industry posted average price adjustments of 3.3% per year, which is

²⁶ According to the German Federal Statistical Office and the German hair stylists' trade association (www.friseurhandwerk.de/daten-fakten_umsaetze,20_26.html), this might be the result of a sustained decline in sales figures from 2001 to 2005.

1 percentage point above the average inflation recorded for the economy as a whole.

Interestingly, with the exception of bread products, the price developments for the selected goods and services followed roughly the same course in both euro area and non-euro area countries. While price hikes for bread products remained significantly below the national headline inflation rate in Switzerland (bread only), Sweden and the United Kingdom, the two service components (hair salons and restaurants) posted considerable increases in price, which were in part even more pronounced than those recorded by some euro area countries.

Overall, it becomes evident that, since the euro cash changeover, noticeable price increases occurred in selected goods and services throughout the euro area. However, a comparison with non-euro area countries shows that they did not outpace the price developments experienced there, but, on the contrary, in some segments even rose at a more moderate rate than in non-euro area countries.

5 Conclusion: Perceived Inflation Must Be Brought Closer in Line with Price Developments

Between 2002 and 2006, the overall rate of inflation in Austria as measured by the HICP stood at an average of 1.7% per year – one of the lowest levels throughout the euro area. An examination of macroeconomic developments therefore does not provide evidence of significant price increases. Upon detailed analysis, however, it turns out that the prices of some frequently purchased goods and services, which have a strong signal-

ing effect on consumers' perception of price trends, showed above-average increases and therefore had a sustained impact on the population's subjective inflation perceptions. The measured price development of these products thus explains the widespread feeling that "the euro makes everything more expensive." Consumers' expectations that the euro would drive up prices, as well as the use of outdated schilling reference prices when assessing prices in euro, further fueled this perception. In contrast, the price-driving effect of a series of economic market factors (such as supply shocks in the food sector, energy price booms, tax increases, the lingering effects of deregulation, partially disproportionate hikes in the fees for public services, etc.) went largely unnoticed. Moreover, the above-average price adjustments experienced in some individual service sectors were predominantly caused by special factors and only in part by any effects resulting from the euro cash changeover. This contributed to the fact that the upward price pressures experienced throughout the entire service industry remained above those of the economy as a whole. The public's subjective perception of more pronounced price hikes occurring in individual segments, for example in hotel and catering services, can also be substantiated by empirical findings.

Although market forces boosted the rate of inflation, they also had a dampening effect on prices, particularly in industries characterized by strong competition. As a result, euro price levels in the clothing sector, but above all in the electronics and telecommunications sectors, fell clearly below the old schilling prices. This empirical fact, however, only plays a

subordinate role in shaping people's perception of inflation because consumers take much more note of price increases than price decreases.

It also must be noted that the indicators used to evaluate public price perceptions are based on survey results. Consequently, the respondents' level of knowledge is an additional factor that comes into play. Upon closer analysis, it becomes evident that the degree of knowledge about inflation correlates with the perception of inflation. Poorly informed people hold higher inflation perceptions, and the same holds true for consumers who are still having difficulties in getting a feel for the euro. Yet recent survey data also show that the perception of a high rate of inflation declines as people's perception of value improves.

How can this trend be supported in the future? To get a better feel for the euro, people must be encouraged to think and calculate in euro terms, even when making larger purchases. Referring to outdated schilling prices is of little practical benefit. The public must also be made more aware of

the fact that inflation is not primarily driven by the euro, but rather the global economic environment, changes in the marketplace, pricing mechanisms, supranational and national economic policy measures, and institutional changes.

It is therefore essential to raise the general level of knowledge about price developments, with particular emphasis on providing consumers with comprehensive information about price developments and the key factors that determine inflation, as well as the difference between perceived and officially measured inflation. As a result, perceived inflation and inflation measures should once again move broadly in line. This is of great importance for the monetary policy of the Eurosystem, which is firmly committed to the primary objective of price stability, as it will facilitate its task to anchor medium- and long-term inflation expectations at a level consistent with price stability (i.e. to maintain an inflation rate of close to but below 2% throughout the euro area).

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Price Setting in Austria before and after the Euro Cash Changeover: Has Anything Changed in the Last Five Years?

This study addresses the question of whether the price adjustment process in Austria has changed since the changeover to euro notes and coins at the beginning of 2002. For this purpose, we analyze the frequency and size of price adjustments, sectoral and seasonal differences as well as the structure of prices (notably the share of attractive prices) on the basis of micro price observations underlying the Austrian Consumer Price Index (CPI). A data set spanning the period from 1996 to mid-2006 was used for the analysis. In addition to confirming known results from previous studies – i.e. that price adjustments occur roughly once per year on average, but with strong sectoral differences – our study reveals an unchanged seasonal pattern of price adjustments, with major peaks in January, also after the cash changeover.

At the time of the changeover itself, the observed price changes were more frequent but smaller than usual. As upward and downward price adjustments were also roughly balanced, the cash changeover appears to have had no significant overall inflationary effects, confirming previous studies.

The share of attractive prices (i.e. prices ending in 9 or 90, and even prices), which was over 60% before the cash changeover, plummeted to just over 20% in early 2002. In the course of the ensuing three to four years, however, this share again approached the level observed prior to the transition. From these results we conclude that price-setting habits as well as the structure of Austrian consumer prices has not changed significantly since the cash changeover.

JEL classification: E31, D40, D21

Keywords: Consumer prices, frequency and size of price changes, attractive prices.

1 Introduction

In recent years, a number of central banks in the euro area – including the Oesterreichische Nationalbank (OeNB) – have increasingly examined price setting at the micro level, that is, using large data sets on individual prices. In each country, those studies have yielded empirical insights on the price adjustment process in general and on the extent of and reasons for price rigidities in particular.¹ These insights are of great importance to central banks, as the extent of price rigidities determines the strength with which monetary policy affects the real economy, among other things. Due to the lack of more re-

cent data, those studies usually did not focus on the euro cash changeover and the period thereafter. Therefore, this study takes a closer look at that period.

The launch of euro notes and coins in January 2002 changed the reference points against which businesses set their prices and against which consumers compare prices. According to economic theory, after a certain transition period such a change in the numeraire should not have any effects on the price-setting process.

According to an earlier study by the OeNB on price setting in Austria, the euro cash changeover brought about a temporary increase in the fre-

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¹ For a summary of the results of those studies, see Dhyne et al. (2006).

quency of price adjustments.² However, the data set of micro prices used in that study ended in 2003. In this study, we investigate price setting in Austria after the euro cash changeover more closely, using the same data set but extended to mid-2006. In this context, we address the issue of whether the extent and determining factors of price rigidities changed after the launch of euro banknotes and coins – an issue which is certainly relevant to monetary policy.

Specifically, this study examines whether the stylized facts on price-setting in Austria derived from the previous study are still valid, or whether new empirical regularities can be detected. For this purpose, the variables used to characterize the price adjustment process (frequency of price changes, duration of price spells, average size of price changes) are depicted over time.

The euro cash changeover also had an impact on the structure of prices in Austria. We know from previous studies that a large share of prices in the Austrian retail industry is set as attractive prices (psychological, even or fractional prices).³ Upon exact conversion into euro, however, these pricing effects were lost, meaning that a large number of euro prices did not appear “attractive” immediately after the changeover. The second part of our analysis is devoted to the question of whether the price structure prevailing before the changeover has been restored in the last five years, or whether attractive prices

have come to play a less important role after the cash changeover. This question is also interesting from an economic policy perspective, as attractive prices are regarded as a reason for price rigidities.⁴

This study is structured as follows: Chapter 2 summarizes the most important facts on micro-level price setting in Austria from a previous OeNB study. In chapter 3, we use the extended data set to examine price setting in Austria since the euro cash changeover more closely and to establish whether or not the regularities identified in earlier studies have changed over time. Chapter 4 provides an analysis of the new price structure in euro and a comparison of the price structures before and after the cash changeover in Austria. Finally, in chapter 5 we summarize the most important results and draw some conclusions from the evidence compiled.

2 Stylized Facts on Price Setting in Austria: Evidence from Individual Price Data

This analysis is based on monthly prices recorded for nearly all of the goods and services included in the Austrian CPI basket.⁵ The data set used was made available to the OeNB by Statistics Austria for an earlier research project and contains a total of 3.6 million prices recorded for some 700 products in the period from January 1996 to December 2003.⁶ For each price recorded in the data set for a specific product in a given month,

² Kwapil and Rumler (2005), Baumgartner et al. (2005).

³ Fluch and Stix (2005).

⁴ Baumgartner et al. (2005) and Dhyne et al. (2006).

⁵ Several products, such as cigarettes, daily newspapers and automobiles, were excluded from the data set by Statistics Austria for reasons of confidentiality. In total, the available products covered 90% of the overall CPI basket.

⁶ For further information on the data set, please refer to Baumgartner et al. (2005).

Table 1

Average Frequency and Size of Price Changes					
	Frequency of price changes	Average duration of price spells	Frequency of price increases	Frequency of price decreases	Average price increase
	per month in %	months	per month in %	per month in %	%
Main CPI components					
Unprocessed food	24.1	7.5	12.6	11.1	19.6
Processed food	12.8	7.9	6.8	5.8	14.8
Energy	40.1	4.8	20.7	19.3	5.1
Industrial goods (excluding energy)	10.2	11.5	5.4	4.3	13.2
Services	12.3	18.5	7.5	4.6	8.4
Market-based services	16.9	15.5	10.0	6.7	7.7
Services subject to regulation	5.2	22.2	3.6	1.5	9.4
Total	15.0	11.3	8.2	6.4	11.4
					14.1

Source: OeNB, Statistics Austria.

Note: Observation period = January 1996–December 2003.

additional information on the outlet (in anonymized form), the product's characteristics and the unit (number or weight) is also available. Using this information, it is possible to observe the frequency and size of price changes for a specific product (e.g. a certain brand of bananas at a certain shop) over time. The most important results of our analysis are presented below.

2.1 On Average 15% of All Prices Are Adjusted Each Month

The average frequency of price changes (i.e. the average share of price changes per month for a product over the observation period) is used as a measure to describe the price adjustment process. In order to analyze the frequency of price changes in the various sectors of the Austrian economy, we summarize the frequency of price changes for individual products at the level of the five main CPI components defined by the European Central Bank (ECB)⁷ as well as at the aggregate CPI level (table 1).

The last line in table 1 reveals that across all products an average of 15% of all prices are changed each month, which implies that consumer prices in Austria are adjusted every 11 months on average. This frequency of price changes places Austria in the middle range compared with other euro area countries.⁸

2.2 Strong Sectoral Differences in Price Adjustment Frequency

As table 1 also shows, the average frequency of price changes is relatively high in the case of unprocessed food (24%) and energy (40%). This can be explained by the strong influence of supply factors on the prices of these goods, for example due to seasonal fluctuations in the prices of fresh foods or the dependency of energy prices on the volatility of international oil markets. In contrast, the prices of industrial goods and services are adjusted relatively infrequently on average (with price adjustment frequencies of 10% and 12%, respectively). In the case of services, mainly

⁷ Unprocessed food, processed food, industrial goods (excluding energy), energy, and services.

⁸ Cf. Dhyne et al. (2006).

services subject to price regulation (5%), such as local and regional governments' taxes and fees included in the basket, contribute to this low frequency of price adjustments, while the services traded on markets (e.g. services in the leisure industry and the hotel/restaurant industry) show far more flexible prices with an adjustment frequency of 17%.⁹

2.3 45% of All Price Changes are Decreases

If we examine price increases and decreases separately, it becomes clear that, at the aggregate CPI level, prices were increased (8.2%) somewhat more often on average than they were decreased (6.4%; see table 1). Therefore, 45% of all price changes are reductions, which contradicts the common misconception that prices are generally adjusted upward and hardly ever move downward. The exception to this pattern is the services component (especially services subject to price regulation), where price increases (7.5%) were substantially more common than decreases (4.6%).

2.4 Average Size of Price Changes Exceeds 10%

The last two columns of table 1 show that the size of the observed price changes can be substantial in comparison to the rate of inflation, and that price decreases are somewhat larger than increases: The average size of all price increases came to 11.4%, while price decreases amounted to 14.1% on average. This asymmetry can be explained mainly by the fact that a

large number of price decreases are price cuts in the context of special offers and clearance sales, which are usually more pronounced than regular price decreases.

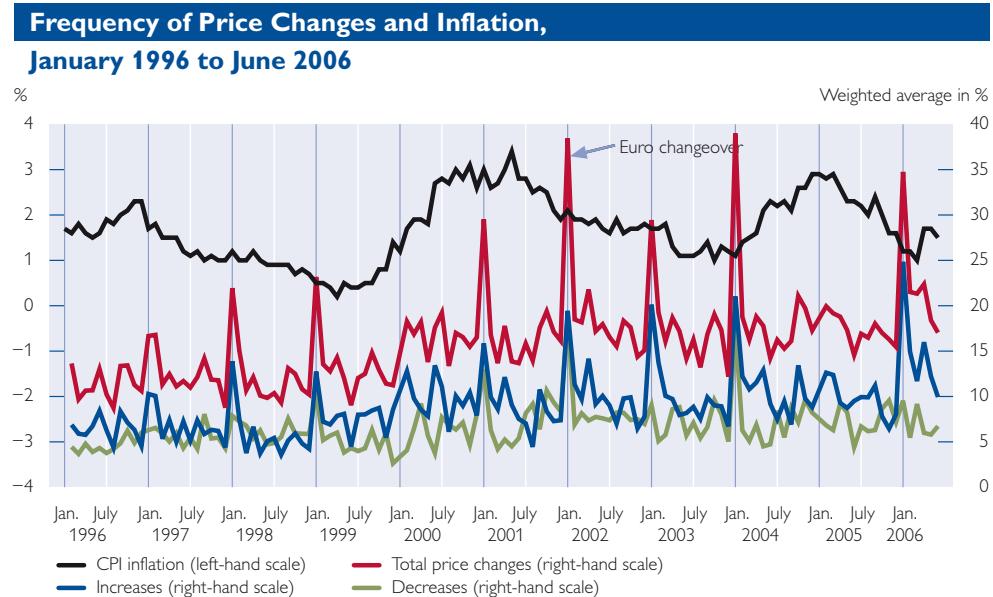
2.5 Pronounced Seasonal Pattern in Frequency and Size of Price Changes

Chart 1 shows the frequency of price changes for each individual month and reveals a clear seasonal pattern with annual peaks each January. This provides an indication that many companies adjust their prices at the turn of the year. Regarding the trend development, chart 1 moreover reveals that the frequency of price changes began increasing in 2000, which (at least graphically) coincides with the rise in the aggregate rate of inflation that year. Moreover, the two lower lines in chart 1 show that price increases and decreases demonstrate roughly similar seasonal patterns (with peaks in January) as well as the same trend development – also with an increase in 2000.

Chart 2 illustrates the average size of all price changes for each individual month, both in absolute terms of overall price changes and separately for price increases and decreases. Here it becomes visible that the size of price changes also shows seasonal fluctuations. If we consider price increases and decreases separately, it becomes clear that the peaks can be attributed to especially large price reductions in July and in part also in August. This mainly reflects the substantial price reductions in the clothing sector during the summer sales.

⁹ A comparison of the price adjustment frequencies in the first column of table 1 with the average price spells derived from those frequencies in the second column reveals a high degree of heterogeneity, even among individual products within each component. For example, the far longer average price spells for services (18 months) compared to industrial goods excluding energy (13 months) – despite their similar average frequencies – can be attributed to several products with extremely long price durations within the services component.

Chart 1



A similar effect can be observed in January during the winter sales. However, as price increases are below average each January, the winter sales do not have as strong an effect on the (red) line depicting the overall size of price changes.

3 Price Setting after the Euro Cash Changeover: Empirical Regularities over Time

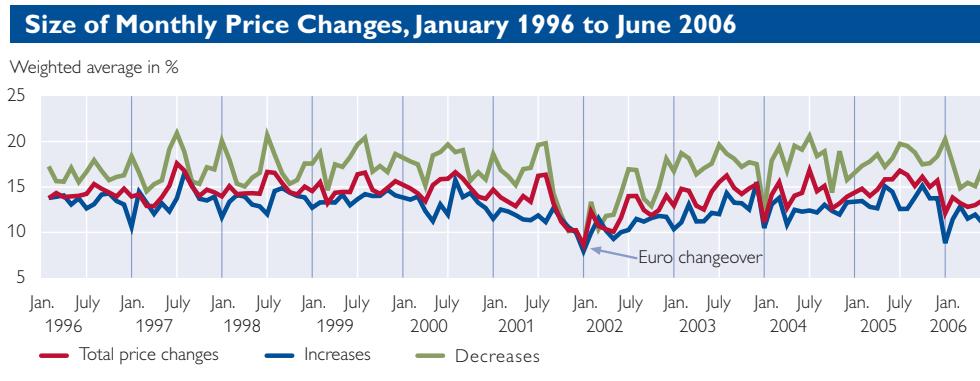
The data set used in the previous study (1996 to 2003) did include the time of the changeover to euro cash, but the period was too short for an in-depth assessment of whether the empirical characteristics of price setting (i.e. frequency and size of price changes, seasonal patterns) differed before and after the changeover. For this reason, the old data set was updated by acquiring also the monthly price data for the Austrian CPI for the

period from January 2004 to June 2006 from Statistics Austria. Given that the new data set contains exactly the same information (prices, quantities, outlet codes, etc.) as the previous set, the former can be merged smoothly with the latter.

Chart 1 shows the average frequency of price changes per month for all of the products included in the CPI for the extended data set, which spans the period from January 1996 to June 2006. Chart 2 shows the average size of all price changes and for price increases and decreases separately, likewise based on the extended data set. In both charts, the depiction until the end of 2003 is based on calculations from the old data set; after that point, the calculations are based on the new data.¹⁰ Based on the two charts, we can now examine the characteristics of price setting during the cash changeover

¹⁰ The weights used in the calculation of weighted averages are the CPI weights applicable to the respective baskets of goods and services. Specifically, this means that the weights differ slightly between the periods 1996 to 1999, 2000 to 2005, and 2006 but remain constant within those periods.

Chart 2



Source: OeNB, Statistics Austria.

period and also compare these characteristics in the periods before and after the changeover.

3.1 More Frequent but Smaller Price Changes during the Euro Cash Changeover

In January 2002, a sharp increase in the monthly frequency of price changes to nearly 40% can be observed, which was also more pronounced than in the first month of each previous year (chart 1).¹¹ It is therefore clear that the introduction of euro cash brought about more price adjustments than usual. Yet the fact that 40% of all prices in the data set in question were adjusted at the time of the changeover also means that approximately 60% of all prices were converted exactly into the new currency.

In addition, an interesting question in this context is whether prices were predominantly increased at that time, which would have exerted upward inflationary pressure. Chart 1 shows that the price changes from December 2001 to January 2002 are almost exactly half increases (blue

line) and half decreases (green line), thus balancing each other out in terms of inflationary effects. In the months immediately after the cash change-over, we can observe a majority of price increases, but this does not differ substantially from the seasonal patterns observed in other years (like the first halves of 2001 and 2004); thus it cannot be attributed to the cash changeover.

Another striking development can be observed in the size of price changes (chart 2) during the cash changeover: Roughly from mid-2001 onward, the average size of price changes dropped noticeably (for price increases and decreases alike), bottoming out at below 10% in January 2002 and only returning to its previous levels toward the end of 2002. This indicates that the cash changeover had an influence on price setting in Austria not only in January 2002 but also in the six months before and after the conversion. In that period, consumer prices were adjusted more often but to a smaller extent than usual. This can probably be attributed to the price monitoring by the Euro

¹¹ Due to two changes in the composition of the basket (each at the beginning of 2000 and 2005) and the resulting changes in definitions for many products, all price changes from January 2000 and January 2005 have been excluded from the analysis, thus they are not reflected in charts 1 and 2; see Baumgartner et al. (2005).

Price Commission before, during and after the cash changeover. In light of these strict monitoring measures, the handling of complaints and the possibility of initiating proceedings against unjustified price hikes by this commission – in combination with the monitoring activities of other institutions, such as the Austrian Chamber of Labor – the majority of price setters appear to have refrained from drastic price increases in the course of the cash changeover.¹²

In addition, it appears that prices were increased and decreased by roughly the same average extent during the changeover period. This confirms the findings of previous OeNB studies, which also concluded that the euro cash changeover had had no noticeable effect on the inflation rate in Austria,¹³ also on the basis of micro CPI data.

3.2 More Frequent Price Adjustments after the Euro Changeover than before

If we look at the pattern in the monthly frequency of price adjustments in chart 1, then no conspicuous differences can be detected between the period immediately preceding the cash changeover (2000 to 2001) and the ensuing period (2002 to 2006): The frequency fluctuates – with few exceptions, notably in January – between 13% and 20%, and no clear trend can be recognized over that period.

However, a trend shift is certainly visible in the average frequency of price adjustments from 2000 onward: For this period, the frequency of price adjustments was an average of 5 percentage points higher than the values observed before 2000 (see also table 2 for a breakdown by period and main CPI components). What caused this trend shift in the year 2000? First, as mentioned above, it could be linked to the increase in the inflation rate in 2000 and the higher values recorded since that time, as the inflation rate is roughly the product of the frequency and size of price adjustments. If the size of price adjustments remained fairly stable over time (as is visible in chart 2), an increasing rate of inflation (given constant weights) can only be explained by an increase in the frequency of price adjustments.

Moreover, a number of liberalization and deregulation measures in the network industries were taken around the year 2000, and those measures probably affected the frequency of price adjustments as well. In 1998, the market for telecommunications services in Austria was completely liberalized, and in 2001 the Austrian electricity market was opened up to private vendors, as was the natural gas market in the following year.¹⁴ The new competition structure on these markets brought about more frequent price adjustments on the part of new providers as well as the former monopolists. One example in

¹² This commission, which was set up at the Austrian Federal Ministry of Economics and Labor, closely monitored the pricing policies of businesses while the Euro-Related Pricing Act (EWAG; Federal Law Gazette I No. 110/1999) was in effect (from 2000 to the end of 2002). In addition to the requirement of dual pricing, the Act also prohibited unjustified price increases in the wake of the cash changeover on pain of substantial administrative penalties.

¹³ Fluch and Rumler (2005), Kwapil and Rumler (2005).

¹⁴ Fluch and Rumler (2005).

Table 2

Average Frequency of Price Changes for Various Observation Periods ¹					
Per month in %	Before the cash changeover	After the cash changeover	Old basket of goods and services	New basket of goods and services	Overall period
	January 1996 to December 2001	January 2002 to June 2006	January 1996 to December 1999	January 2000 to June 2006	January 1996 to June 2006
Main CPI components					
Unprocessed food	22.0	28.9	20.4	28.1	25.0
Processed food	12.3	14.4	11.2	14.6	13.2
Energy	38.8	47.4	35.6	47.8	42.2
Industrial goods (excluding energy)	9.2	12.1	8.5	11.8	10.6
Services	10.9	15.9	9.3	15.7	13.4
Market-based services	15.0	22.3	12.6	22.0	18.4
Services subject to regulation	4.7	5.5	4.1	5.9	5.4
Total	13.8	18.2	12.4	18.0	15.8

Source: OeNB, Statistics Austria.

¹ In the calculations for observation periods ending in June 2006, the month of January and its frequent price changes are represented above average. This could imply that the frequency of price changes is biased slightly upward compared to the other observation periods, which only include full years. However, this bias is likely to be rather small, as an alternative calculation for the period from the cash changeover to the end of 2005 only yields a slightly lower price adjustment frequency (17.8%) than the period ending in mid-2006 (18.2%).

this context is the COICOP¹⁵ group “communication”: On average over the period from 1996 to 1999, 5.8% of all prices in this group were adjusted each month, while the corresponding figure for 2000 to 2006 was roughly twice as high at 11.5%. As the frequency of price reductions (8.2%) was far larger than that of price increases (2.9%) after the year 2000, the liberalization in the communications sector had a dampening effect on overall inflation. A similar but not quite as pronounced pattern can be observed in the “energy” component before and after the year 2000 (table 2).

Finally, there is one more explanatory factor for the trend shift in the frequency of price adjustments in 2000: Starting that year, the inflation rate was calculated on the basis of a new basket of goods and services using a new weighting scheme and including several new products. In addition, according to Statistics Aus-

tria the introduction of the new basket was accompanied by innovations in data collection, which may have had an impact on the frequency of price adjustments as well: The number of outlets and the number of prices surveyed were increased; more supermarkets – probably with more flexible price setting – and fewer corner shops were surveyed to account for changes in consumption habits; and the quality of price surveys and statistics was generally improved. If these measures had a significant impact on the data collected, then the increase in price adjustment frequency would at least in part be a statistical artifact due to the transition to the new CPI basket. Therefore, it may be possible to attribute the increase in 2000 to partly economic and partly statistical factors.

The seasonal patterns in price adjustments, especially the conspicuous peaks each January, did not change after the euro cash changeover; after

¹⁵ Classification Of Individual Consumption According to Purpose; this is an international classification of CPI components in 12 subgroups according to the purpose of consumption.

2002, the peaks in January were even more pronounced than before (chart 1). The values for January 2004 and January 2006 are especially remarkable, as they are nearly as high as the value recorded during the changeover in January 2002. This, indeed, qualifies the earlier statement that the euro cash changeover led to an unprecedented increase in price adjustments.¹⁶ Based on the new data set, therefore, we conclude that in recent years the phenomenon of price adjustments occurring predominantly at the start of the year has increased independently of the euro cash changeover.

However, the changeover period remains unique in terms of the average size of price changes: Chart 2 shows that the substantial drop during the time around the changeover (as mentioned in chapter 3.1) was only temporary. In the course of 2003, the size of price adjustments returned to its previously recorded level of approximately 15% and has fluctuated around that mark ever since. Therefore, the euro cash changeover influenced price setting in Austria for approximately one-and-a-half years, specifically from mid-2001 to early 2003. Unusual but short declines in the extent of price adjustments were again observed in January 2004 and in January 2006; this is linked to the aforementioned phenomenon of price adjustments occurring more frequently in January but by smaller amounts.¹⁷

4 Price Structure before and after the Euro Cash Changeover

Attractive pricing plays an important role in the Austrian retail sector. These prices have a signaling effect, are intended to encourage impulse purchases, and provide consumers with a point of reference in the structure of prices.¹⁸ The most common form of attractive pricing is known as psychological pricing, that is, using prices which end in 9 (or 90). These prices are intended to give the impression that a product is priced especially reasonably, as consumers tend to ignore the digits after the decimal point or the final digits in multi-digit prices.¹⁹ Other commonly used attractive prices are even prices (multiples of 10 or 100) and what are known as fractional prices (prices ending in 25, 50 or 75). A previous OeNB study²⁰ revealed that approximately 90% of all prices in retail food shops were psychological or even prices before the cash changeover. In contrast, attractive prices play a less important role in the energy sector and in services. The data set used in this study now allows us to analyze the incidence of attractive prices using a broad basis of some 40,000 prices recorded each month over an observation period of approximately ten years. In particular, we will scrutinize the price structures before and after the euro cash changeover.

¹⁶ However, the frequency of price decreases (green line in chart 1) in January 2002 was still not exceeded by the values for January in any other year.

¹⁷ As mentioned earlier, the values for January 2000 and January 2005 were excluded from the analysis due to the transition to new baskets of goods and services.

¹⁸ Fluch and Stix (2005).

¹⁹ This psychological phenomenon is referred to as „rational inattention“ in the literature and has been analyzed by authors such as Basu (1997) and Bergen et al. (2006).

²⁰ Fluch and Stix (2005).

4.1 Definition of Attractive Prices

For our examination of the price structure and the incidence of attractive prices in Austria, it is necessary to provide a precise definition of this term. There is no generally accepted definition of attractive prices, as they often depend on specific pricing conventions on each market as well as the relevant currency units. Therefore, we have chosen a pragmatic solution for the purposes of this study: All prices which are frequently used by price setters to make their products appear attractively priced are qualified as such. Given the currency changeover in 2002, it is necessary to develop two definitions of attractive prices – one for prices in schillings and another for prices in euro. In addition, it is important to note that different price patterns are used for attractive pricing in different price categories. For example, we would consider ATS 9.90 to be an attractive price, while ATS 1,023.90 would probably not qualify. This means that attractive prices should be defined differently in each price category in order to ensure that the percentage interval between two attractive prices remains constant. Specifically, in the category up to ATS 10, all prices in the sample which end in x.00, x.50 and x.90 are defined as attractive prices for the schilling era. In the price category from ATS 10 to ATS 100, this applies to all prices which end in x0.00, x5.00 and xx.90; and in the category from ATS 100 to ATS

1,000, attractive prices are all those which end in xx0.00, xx5.00, xx9.00 and xxx.90. Above that category, the corresponding multiples of those prices are considered attractive. For prices in euro, an equivalent definition was used, but the categories were reduced in size by a factor of 10.

This definition comprises all psychological and even prices up to the higher price categories, but only those fractional prices which end in 50 – i. e. not prices ending in 25 and 75, as the latter are not typically used as attractive prices on the Austrian retail market. The subjective content of our definition is therefore evident; the definition should be regarded as an “upper limit” for the number of attractive prices actually intended as such by the sellers. We consider the disadvantage that too many prices might be classified as attractive in this way to be less problematic than omitting important attractive prices.²¹

4.2 Temporary Collapse in the Share of Attractive Prices after Euro Cash Changeover, Large Differences between Goods Groups

Using the definition discussed above, we computed the share of attractive prices among all prices for all goods over all months. The figures shown in table 3 and chart 3 are unweighted averages for the main CPI components.²² The figures confirm the findings of previous studies, which were based on a smaller data set and re-

²¹ For a sensitivity analysis, the investigation was also carried out using an alternative, somewhat narrower definition of attractive prices which excluded prices ending in xx5.00 and in xxx.90 above the ATS 100 level. The results with regard to the share of attractive prices in various goods groups (table 3) and over time (chart 3) do not change in qualitative terms; only the level of these figures is on average 7 percentage points lower.

²² In this case, weighting in the aggregation would have a distorting effect, as mainly services (which bear relatively few attractive prices) are assigned a higher weight in the basket, which would bias the results downward. The mere addition of the attractive prices recorded across all goods would also distort the results in favor of locally surveyed products (with many recorded prices) compared to centrally surveyed products and services. For further information on the problem of central versus local collection of prices, please refer to Baumgartner et al. (2005).

Table 3

Share of Attractive Prices before and after the Euro Cash Changeover		
Unweighted average in %		
	Before the cash changeover	After the cash changeover
	January 1996 to December 2001	January 2002 to June 2006
Main CPI components		
Unprocessed food	85.7	68.8
Processed food	88.5	66.7
Energy	18.1	25.9
Industrial goods (excluding energy)	60.7	55.9
Services	51.1	40.1
Total	62.7	52.5

Source: OeNB, Statistics Austria.

vealed that the relative share of attractive prices was highest in the food sector and lowest in the energy and service sectors. On average, more than 85% of all schilling prices for processed and unprocessed food in this sample were attractive prices (1996 to 2001). In the case of industrial goods (excluding energy), the share was only 60%, for services approximately 50%, and in the energy sector only 18%.

In the period after the changeover, the shares of attractive prices were substantially lower for most CPI components, which indicates that the changeover had a substantial impact on the structure of Austrian consumer prices. The exception to this pattern is the energy sector, where the share of attractive prices rose to some 26% after the changeover. In addition to other factors, this might be attributed to the liberalization measures on the Austrian electricity and natural gas markets in 2001 and 2002, which apparently led to the increased use of attractive prices in that sector. Overall, the results give the impression that attractive prices play a less important role in euro than they did in schillings. The question of whether this represents a permanent change in the Austrian retail price

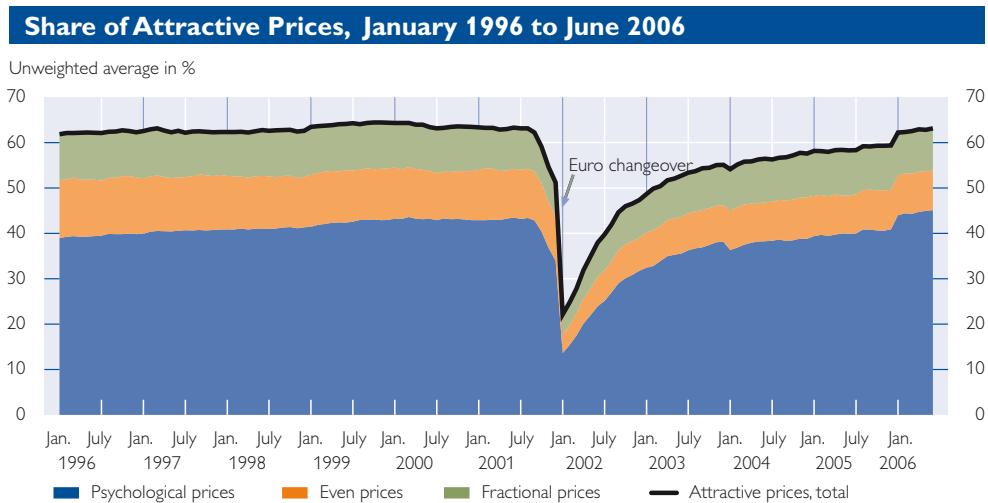
structure or merely came about in the transition phase can be answered looking at the shares of attractive prices over time as depicted in chart 3.

For each month from the beginning of 1996 until the end of 2006, chart 3 shows the share of attractive prices broken down into psychological, even and fractional prices. Here it becomes visible that psychological prices account for the largest proportion of attractive prices (blue area; approximately 40% of all prices on average, or two thirds of the attractive prices), followed by even prices (orange area; 17% of attractive prices) and fractional prices ending in 5 or 50 (green area; 16% of attractive prices). These relative shares have also hardly changed over time, with only the share of psychological prices increasing slightly at the expense of even prices.

The overall share of attractive prices remained fairly constant between 62% and 64% from January 1996 to Q3 2001. Starting in October 2001, this figure dropped sharply, reaching a low of 22% in the changeover month of January 2002. Over the year 2002, the share of attractive prices recovered, already reaching 40% by mid-year and nearly 50% by

PRICE SETTING IN AUSTRIA BEFORE AND AFTER THE EURO CASH CHANGEOVER:
HAS ANYTHING CHANGED IN THE LAST FIVE YEARS?

Chart 3



Source: OeNB, Statistics Austria.

the end of 2002. In 2004 and 2005, the share of attractive prices slowly approached the 60% mark once again. However, it was not until early 2006 that the share of attractive prices returned to the approximate level recorded before the euro cash changeover (about 62%).

This development clearly reflects the conversion of prices during the euro changeover. Due to the changeover, attractive prices in schillings were lost when converted exactly into euro. The Euro-Related Pricing Act required Austrian businesses to indicate prices in schillings as well as euro from October 2001 to the end of February 2002. Some stores obviously began to price products in line with the future euro framework already in October 2001, as the share of attractive schilling prices began to decrease in that month. At the same time, the share of prices which were set attractively in euro terms (not shown in chart 3) rose considerably in the months leading up to the changeover. However, most businesses continued to base their pricing on the schilling framework well into the first months of 2002. This is con-

firmed by the relatively large share of prices which remained unchanged between December 2001 and January 2002 (60%; see chart 1). All prices that had been attractive in December 2001 but were not changed in January 2002 were not attractive any longer in euro. Many retailers evidently did not adjust their prices to the euro framework until later in 2002, as is reflected by the substantial increase in the share of attractive euro coupled with the sharp decrease in the share of prices which would have been attractive in schilling terms in the months after the cash changeover. The analysis in chapter 3 demonstrated that – contrary to popular conjecture – prices were not predominantly rounded up in the course of conversion, but that upward and downward price adjustments roughly balanced each other out.

Until the end of 2005, the use of attractive prices was still less common than it had been before the changeover. Only in early 2006 did attractive prices once again play a similar role in Austria's price structure as in the years prior to the changeover. The price structure there-

fore did not undergo any lasting changes due to the currency conversion. Ultimately, the price setting conventions specific to the Austrian consumer market appear to have resurfaced, albeit after a relatively long transition period.

A study conducted by the Deutsche Bundesbank also indicates comparable figures for the share of attractive prices in Germany before and after the euro changeover. In its monthly report for January 2004, the Deutsche Bundesbank reported that the share of attractive prices for a selection of 25 products had fallen from 80% in September 2001 to around 40% in January 2002 and then risen again to some 70% by September 2003.²³ Therefore, the price structure prevailing in Germany before the changeover had not yet been restored two years after the transition.

5 Summary and Conclusions

An analysis of CPI micro data for the period from 1996 to 2003 indicates that consumer prices in Austria are adjusted approximately once per year on average, and that significant sectoral differences exist in this regard. The prices of food and energy products are changed relatively often, while prices for services are adjusted less frequently. Except in the service sector, some 45% of all price changes are reductions, meaning that prices are not increased substantially more often than they are decreased. At more than 10%, the average size of price adjustments is considerable for both increases and decreases.

Using micro data, it is also possible to examine a question which has been discussed extensively in the media: whether the changeover to euro cash has brought about inflationary effects in Austria. Like other studies on this topic, this study does not identify any effect on the aggregate rate of inflation, at least not for the changeover month of January 2002. The frequency of price adjustments did increase during the changeover period, but the upward and downward adjustments were roughly balanced. The size of price changes likewise showed a high degree of symmetry between price increases and decreases in January 2002. However, these results refer to the aggregate, which therefore does not rule out the possibility that specific products may have seen unusual price increases.

Overall, the available calculations indicate that the legal (Euro-Related Pricing Act) and institutional (Euro Price Commission) measures to prevent unjustified price hikes during the changeover period were successful, thereby preventing any noticeable euro price effects such as those witnessed in other countries.²⁴

An analysis of the extended data set, which includes prices up to mid-2006, shows that seasonal patterns in price adjustment frequency and in the size of price changes have hardly changed since the changeover, but that the frequency of price changes has increased over time. More precisely, the frequency of price adjustments already began climbing in the year 2000. This coincided with the

²³ In light of the limited quantity of data (25 products) on which the Deutsche Bundesbank's study is based, any direct comparison of the share of attractive prices with the results of this study (641 products) would not be very meaningful; see also Deutsche Bundesbank (2002).

²⁴ Ercolani and Dutta (2006).

increase in the aggregate rate of inflation and (roughly) with the liberalization measures in network industries (telecommunications, electricity and natural gas).

In addition to the economic reasons mentioned above, a statistical effect probably also contributed to the increase in the frequency of price adjustments. In 2000, a new basket of goods and services was introduced for the Austrian CPI, and Statistics Austria also made several improvements to its price surveys. These measures were intended to minimize missing and erroneous survey data, which often cause prices to appear unchanged in the statistics, and to reflect the structural changes in Austria's consumer markets (more supermarkets, fewer corner shops). It is possible that these improvements in data collection are reflected in these calculations as a rising price adjustment frequency over time.

The price structure in Austria was also influenced by the euro changeover. Before the conversion, the Austrian retail market (and to a lesser extent the services market) was characterized by a large share of attractive prices. However, those prices lost their signaling effect when converted precisely at ATS 13.7603 = EUR 1. After the changeover, this was reflected in a temporary collapse in the share of attractive prices among all the prices included in the data set. In the ensuing months, especially after the dual pricing requirement lapsed in February 2002, the share of attractive prices gradually recovered. This indicates that after a certain transi-

tion period, the structure of euro prices largely returned to the price structure observed prior to the changeover. Therefore, the use of attractive prices in the Austrian retail sector has regained the considerable importance it enjoyed before the changeover.

If we assume that attractive prices have a signaling effect and provide consumers with a point of reference in the price structure, a different structure involving less attractive prices will confront consumers temporarily with higher costs – in the form of search costs. In this respect, it was advantageous that dual pricing was only required for a relatively short period of time after the changeover, as this enabled the structure of euro prices to consolidate quickly and thus offered consumers a better frame of reference for their purchasing decisions.

The question of the incidence of attractive prices is also relevant from a monetary policy perspective, as a number of country studies on price setting in euro area countries have identified attractive prices as a factor inducing price rigidities.²⁵ Accordingly, it appears to make sense for many firms to avoid small price changes and to delay price adjustments in order to set new prices at a more attractive level later. This delayed price adjustment can manifest itself at the macro level as increased inflation persistence. The extent of inflation persistence in turn determines the speed at which an economy adjusts to various macroeconomic shocks and is also partly

²⁵ Dhyne et al. (2006).

responsible for the transmission of monetary policy to the real economy.

As any change in the price setting process exerts considerable influence on the transmission of monetary policy, the OeNB will continue to

examine questions on the frequency and size of price adjustments and on the structure of prices. In this context, new data sources which are also based on individual prices (such as producer prices or import prices) should be included in the analysis.²⁶

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²⁶ For example, Lünnemann and Wintr (2006) examine the frequency of price changes on the Internet and observe that Internet prices – at least in euro area countries – are more flexible than prices in retail shops. The distribution channel can thus also have an influence on the flexibility of prices.

Price Level Convergence in Europe: Did the Introduction of the Euro Matter?¹

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Balázs Égert,³
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Silgoner⁴

Several theoretical arguments suggest that price level divergence across EU countries has diminished in the course of the European integration process as a result of both product market integration and the introduction of the common currency. In this paper, we empirically assess this hypothesis for the euro area countries and a group of control countries since 1990, using price level data on over 160 products and services in 27 European cities. Our conclusions confirm that price convergence took place at the beginning of the 1990s. There is, however, not much evidence that the introduction of the single currency has led to a further narrowing of price differentials. In fact, price dispersion has remained remarkably stable in recent years, whereas it has increased slightly since 2003 in the control group.

JEL classification: F31

Keywords: price level convergence, euro area, euro.

1 Economic Integration Fosters Price Level Convergence

Several processes, such as globalization, trade liberalization or stronger product standardization, imply that price level convergence is a global phenomenon. Within Europe, price level convergence is likely to have been speeded up additionally by the process of European integration, including product market integration and the introduction of the common currency in 1999/2002.⁵ A number of arguments would support this proposition:

First, removing trade barriers facilitates access to products across national borders, and enhances arbitrage that helps eliminate price differences.⁶ A number of European

countries agreed to abolish internal tariff barriers already in 1968.⁷ Further barriers to trade were removed with the adoption of the Single European Act in 1986 and the Single Market Programme in 1992, which among other things led to a partial harmonization of sales taxes within the European Union (EU). But it is only with the physical introduction of the euro in 2002 that price differences became clearly visible, enhancing both competition and goods arbitrage.

Second, the harmonization of regulation and taxation has gradually reduced the cost of doing business in other EU member countries. The common European currency further contributes to lowering such costs by eliminating exchange rate uncertainty

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⁵ As a matter of fact, Engel and Rogers (2004) actually interpret the level of price convergence as an indicator of market integration.

⁶ Arbitrage is when consumers or retailers buy products at the cheapest price and sell them in other locations at a higher price.

⁷ According to the factor price equalization theorem, free trade helps achieve price equalization of homogeneous goods, leading to factor price equalization which, in turn, brings even greater price equalization.

and related risk premiums as well as currency conversion costs. Clearly, this enhances goods arbitrage.

Third, flexible nominal exchange rates can generate or reduce price differences if local currency prices are sticky in the short run. If goods and services are priced in each country's national currency (local currency pricing), a nominal depreciation in the country with the lower price implies widening price differences. In turn, an appreciation leads to convergence of prices expressed in the same currency unit. Within the euro area, the impact of the nominal exchange rate on price differences across countries was eliminated when the exchange rates of the euro's legacy currencies were irrevocably fixed in 1999.

Finally, firms outside the euro area may increasingly tend to set common prices for the entire euro area, so that monetary unification itself eliminates pricing-to-market practices across different member states (Devereux et al., 2003).

Moreover, as Engel and Rogers (2004) suggest, the effects of the common currency on European integration could go beyond those direct effects. The commitment to a common currency may signal even broader integration on issues such as nontariff trade barriers, labor policy or property rights. This may increase producers' and retailers' willingness to assume the fixed costs of opening foreign sales offices or training foreign representatives.

All these arguments would imply an initial wave of price level convergence after the creation of the Single Market and potentially a second wave when the common currency was implemented and reinforced the path towards integrated markets.

On the empirical side, the question of whether prices equalize across countries over time – defined in the literature as the question of whether purchasing power parity (PPP) holds – has long been haunting the economic profession and has generated one of the most hotly debated areas in international economics. Since Rogoff drew attention to the puzzlingly slow reduction in differences in price levels (Rogoff, 1996), much research has been done, without, however, offering a universally accepted view for the causes of this puzzle. For instance, Engel (2000) shows that the correction of the relative price level occurs more quickly for items such as fruits, fuel and energy than for other types of goods in a number of European economies. Imbs et al. (2005), who use very disaggregated price categories, find an average half-life of price differentials of close to one year. This so-called aggregation bias has drawn strong objections from e.g. Chen and Engel (2004). Others, like Taylor and Taylor (2004), argue that price differences may persist because of transportation costs and that price differences beyond transportation costs narrow quickly.

One of the major weaknesses of the conventional PPP literature is that it does not use price level data but cumulated inflation rates. While this allows researchers to investigate whether the price level of goods and services move in sync in different countries, it does not permit them to assess whether or not the prices of goods equalize across countries. The first researchers who tried to tackle this problem were looking at the absolute price of small sets of well-identified goods. For instance, Gosh and Wolf (1994) analyzed the price of the "The Economist" magazine and found

that the absolute version of PPP⁸ is violated. Crucini and Shintani (2002) enlarged the coverage of goods and services, using the absolute price level data provided by the CityData database of the Economist Intelligence Unit (EIU). They detected very large differences in the prices of individual goods and found evidence of very quick mean reversion to these large deviations. Hence, differences in prices are large in absolute terms and stay stable over time. The authors also show that it does not matter whether data for single goods or aggregated data are used. This casts doubt on the aggregation bias hypothesis put forth by Imbs et al. (2005). Goldberg and Verboven (2005) and Lutz (2000) could not find much evidence in favor of absolute PPP for car prices, either.

The EIU CityData database has been extensively used to study the extent to which price levels have converged in the euro area over time. Indeed, the implementation of the Single Market and the introduction of the euro are both expected to stimulate price level convergence. The general finding of the literature seems to support the effect of the first factor, but not of the second one. Most of the price level convergence occurred during the early 1990s mainly due to convergence in tradable price levels as a result of tax harmonization and a decline in income dispersion (Rogers, 2001, 2007). The introduction of the euro, however, failed to produce the much expected further price convergence-enhancing effect (Engel and Rogers, 2004; Lutz, 2002; European Commission, 2004). This is not sur-

prising, as price discrimination is still an important feature of price setting in the euro area (Fabiani et al., 2006).⁹ Baye et al. (2002) point out that price dispersion even increased after 1999 for goods sold on the Internet. Still, the dispersion of price levels today is found not to be much larger than in the U.S.A., which could be viewed as a natural benchmark (Rogers, 2007). Allington et al. (2005), who show the positive impact of the euro on price level dispersion using disaggregated price data obtained from Eurostat, are an exception.

Now, five years after the introduction of the euro as a cash currency, we revisit the question of price convergence, using EIU CityData price level data from 1990 to 2006 for the euro area countries (excluding Slovenia). We also use a set of developed European countries that are not members of the euro area as a control group. It is not absolutely clear whether enhanced price level convergence related to monetary integration would be triggered by the introduction of the euro as an accounting unit in 1999 or only by the use of the euro as cash currency three years later. In our benchmark investigation we assume that the euro cash changeover was more relevant, but also perform robustness checks based on the year 1999. We investigate this question for a large number of goods and services sold in conventional shops and hypermarkets in the capital cities of the countries under study. Our results broadly confirm the findings of earlier studies, suggesting that most of

⁸ Absolute PPP means that the price of the same good sold in two countries is the same if expressed in the same currency unit. Relative PPP indicates that the domestic-to-foreign price ratio remains stable over time.

⁹ For instance, a large majority of Dutch companies operating abroad report that their pricing policies have not changed since the start of the Economic and Monetary Union (Hoerichts and Stokman, 2006).

price level convergence took place in the early 1990s. There is not much evidence, however, that the introduction of the single currency has systematically led to a further narrowing of price differentials.¹⁰ Price convergence took place only for a limited number of goods and services.

The outline of the paper is as follows: Section 2 describes the dataset and the methodology of the paper. Section 3 sketches out some stylized facts emerging from eyeball econometrics and presents the results of the convergence analysis. Section 4 concludes.

2 EIU CityData – A Unique Database

We use data obtained from the EIU CityData database. This is a remarkable database that contains observations for the price levels of over 160 products and services in 140 cities in 91 countries worldwide from 1990 to 2006. Table 1 provides insight into the range of goods and services covered. The original purpose of the data collection was not to provide data for research but rather to calculate a cost-of-living index for multinational corporations that move employees around the world.

We use data for euro area members (excluding Slovenia) and a control group including developed non-euro area countries from Western Europe: Denmark, the United Kingdom, Iceland, Norway, Sweden and Switzerland. While the dataset reports data for more than one city for

some of the countries,¹¹ we focus our empirical study on the capital cities only. As a robustness check, we alternatively use the average of the available cities for the country. For the non-euro area countries, the price data are converted from national currency units to euro using the dollar/euro and the dollar/national currency unit exchange rates drawn from CityData.

The data provided by the EIU is collected by EIU correspondents operating in the cities considered. The price data refer to prices in supermarkets and medium-priced retail outlets. While efforts are made to gather price data for goods and services of internationally comparable quality, full comparability is not always warranted due to differences in quality and the range of the goods available. Furthermore, items such as residential properties for monthly rent or clothing are hard to compare across countries, given differences in preferences, local taste and the wide variety of choice.

We evaluate the existence and degree of price convergence in the euro area by studying the changes in price dispersion across euro area countries for the individual items in our dataset. A reduction in price level dispersion (measured in terms of the variation coefficient of the price of a given product across cities) indicates price convergence, while an increase indicates price divergence. This concept of convergence has been labeled “sigma convergence” in the literature

¹⁰ Parsley and Wei (2001) and Faber and Stokman (2004) show that a stabilization of the exchange rate reflected in diminishing exchange rate risk promotes goods market integration and price level convergence. A decrease in foreign exchange rate risk is indeed a prominent feature of the run-up to the euro and could partly explain why the benefits of the euro were “cashed in” before the introduction of the euro.

¹¹ The EIU CityData contains data for five cities in Germany and for two cities in Spain, France, Italy, Switzerland and the U.K.

Table 1

Goods and Services Included in the Dataset	
Goods	Clothing: dress, business shirt, business suit, women's sweater; raincoat and shoes, men's raincoat and shoes, girl's dress, boy's jacket and trousers, child's jeans and shoes, socks, tights Cars: compact, deluxe, family, low price Other durable goods: electric toaster, frying pan, CD, color TV, PC, Kodak film, batteries Semidurable goods: Toilet tissue, toothpaste, shampoo, soap, razor blade, light bulb, hand lotion, laundry detergent, dishwashing liquid, lipstick, insect repellent, facial tissues, Aspirin Tobacco products: local cigarettes, Marlboro cigarettes, pipe tobacco
Food	Fruits: apples, bananas, lemons, oranges Vegetables: carrots, lettuce, mushrooms, onions, potatoes, tomatoes Canned fruits and vegetables: peas, peaches, pineapples, tomatoes Meat: beef, lamb, veal and pork (various types), fresh and frozen chicken and fish, ham, bacon Dairy products and eggs: milk, butter, margarine, natural yogurt, imported cheese, eggs Semidurable food: bread, cornflakes, corn oil, olive oil, flour, rice, spaghetti, sugar Nonalcoholic beverages: chocolate milk, cocoa, Coca-Cola, mineral water, tonic water, orange juice Coffee and tea: ground coffee, instant coffee, tea bags Beer and wine: local and top quality beer; wine of superior, fine and table quality Hard liquor: cognac, gin, cointreau, scotch, vermouth
Services	Household-related services: babysitter, domestic cleaning help, dry cleaning, laundry, man's and woman's haircut, telephone and line, telephone charge Car and transport-related services: car repair, car insurance, taxi charges, road tax Recreation services: cinema and theater seats, drink in a bar, Hilton-type hotel, moderate hotel, development of a film, local or foreign newspaper, weekly magazine, paperback book, three-course dinner, different quality lunches Household energy: water, electricity, heating oil, gasoline, gas Rents: car rental, office and industrial space rent, rents for a range of furnished and unfurnished apartments and houses

Source: ElU-CityData.

on economic growth (see for example Barro and Sala-i-Martin, 1992).

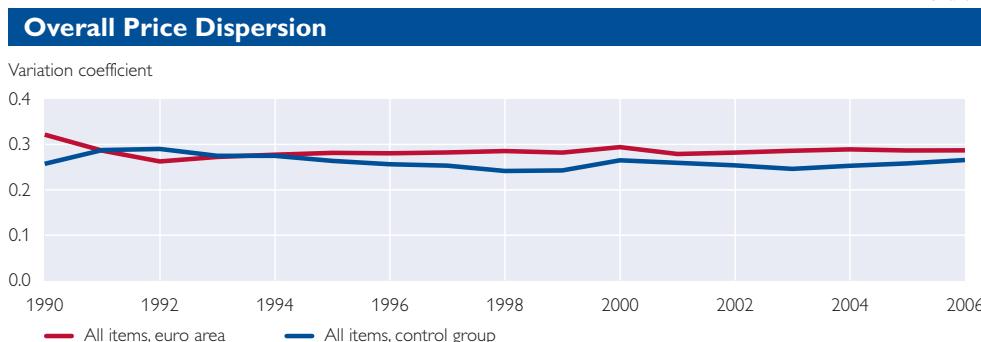
Following this approach, we investigate whether the prices for individual items in our sample show convergence or divergence trends throughout the whole sample. We then also explicitly investigate these trends in the pre- and post-euro period. In our benchmark exercise we assume that the cash changeover was the relevant event enhancing price level convergence. It was only with the euro as a cash currency that price differences became clearly visible to consumers, enhancing both competition and goods arbitrage. We therefore compute for all products the change in dispersion in the period preceding the euro cash changeover (1990 until 2002) and afterwards (2002 to 2006). As we cannot exclude that the bulk of the effect – if

any – happened already with the irrevocable fixing of the exchange rates and the introduction of the euro as an accounting unit, we also generate alternative subperiods by splitting the sample in 1999, as a check for robustness. To distinguish the potential effects of monetary unification from general Europe-wide trends, we also perform the exercise for the set of European control countries.

3 Little Empirical Evidence for Euro Effects, but Large Differences at a Disaggregate Level

A preliminary look at the data provides a rough idea of the extent of possible price convergence effects of the euro. Chart 1 depicts the evolution over time of the cross-country dispersion of the overall price level for the euro area and the group of

Chart 1



Source: Authors' calculation using EIU CityData prices.

control countries, measured in terms of the variation coefficient. These figures for the overall price level are only very rough measures, calculated simply as the unweighted average of the dispersion measures for each good and service item. To calculate the variation coefficient of a proper price index would require the weights for each item in the consumer basket for each city/country, information that EIU CityData does not provide.

According to the plotted series from 1990 to 2006, price dispersion decreased mostly during the early 1990s and remained flat afterward. This result is in line with the earlier literature that allocates the major convergence wave to the first half of the 1990s. Around 2000, we observe a pickup in price dispersion that appears to be unrelated to the euro, given that the same peak shows up also in the data for the control group. While price dispersion in the euro area is persistently at a higher level in the euro area than in the group of control countries, it remained flat in recent years, whereas the variation coefficient showed a slight increase since 2003 in the control group.

Overall, notwithstanding progress in price level convergence, prices still show substantial differences across cities going beyond levels ex-

plained by factors such as taxation. For instance, in 2006, one kilogram of apples cost EUR 2.68 in a supermarket in the German city of Mannheim but only EUR 0.85 in Vienna.

Looking at more disaggregated data grouped according to the classification given in table 1, the overall picture becomes much more heterogeneous. The series plotted on charts 2 to 5 reveal that in several cases, the level of price dispersion is substantially higher in the euro area than in the control group. Moreover, in some cases it showed an increasing trend over recent years, particularly for vegetables, nonalcoholic beverages and for dairy products and eggs. For other items, it is difficult to discern tangible and systematic differences in price dispersion between the euro area and the control group. For instance, meat and durable goods show similarities both in levels and in evolution. Furthermore, we can observe initial price convergence for clothing, followed by a rise in price dispersion both for the euro area and the control group. This could indicate that some international factors, such as globalization or product standardization, are at play.

We also note that – in line with international trade theory – the price

dispersion of goods that are easily tradable, such as canned fruits and vegetables, durable household goods and cars, tend to be below the levels shown for other items. The lower and/or decreasing dispersion of prices for alcohol and tobacco in the euro area may be related both to the harmonization efforts at the EU level (i.e. minimum taxation on alcoholic beverages or cigarettes) and the low price elasticity of these items, which makes them a first-rate candidate for tax revenue-raising attempts in budgetary consolidation periods, especially in countries with initially low tax rates. Overall, there are only few items (cars, hard liquor, tobacco products) where dispersion has declined markedly in the euro area since the cash changeover with no corresponding decline in the control group.

Finally, it appears that there has been some convergence in service prices and that service price dispersion is lower in the euro area than in the control group, especially toward the end of the sample and except for household-related services. One way of interpreting this is that economic convergence within the euro area causes inputs for services, mostly wages, to converge across countries. But convergence in services prices can come not only via convergence in costs, but also through an increase in market competition in services, fueled by privatization and market liberalization. Examples in our data sample are car insurance, telephone charges or the costs for electricity.¹²

Overall, in line with the existing literature, there are indications of price level convergence for some items during the first half of the 1990s. Evidence of a further surge in convergence related to the introduction of the euro can, however, hardly be inferred from charts 1 through 5.

To confirm the preliminary conclusion of the purely visual inspection of price dispersions, table 2 indicates for the euro area and the group of control countries whether there are overall convergence or divergence trends within each of the item sub-groups.¹³ For instance, the category beer and wine refers to the overall picture for local and top quality beer and wine of superior, fine and table quality, each in small outlets and in big stores. For the euro area we show the results for the entire sample as well as for the subperiods 1990 to 2002 and 2002 to 2006.

The analysis of table 2 sheds light on a number of interesting aspects of the price level convergence process in the euro area and in Europe more generally.

A first general observation is that convergence mostly took place before the cash changeover in 2002. A similar conclusion can be drawn when splitting the sample in 1999 (not shown in table 2). There are only few instances in which the introduction of the euro can be associated with price level convergence. Examples are cigarettes and tobacco products, as well as several food items.

Second, tradable and branded goods prices do not seem to have con-

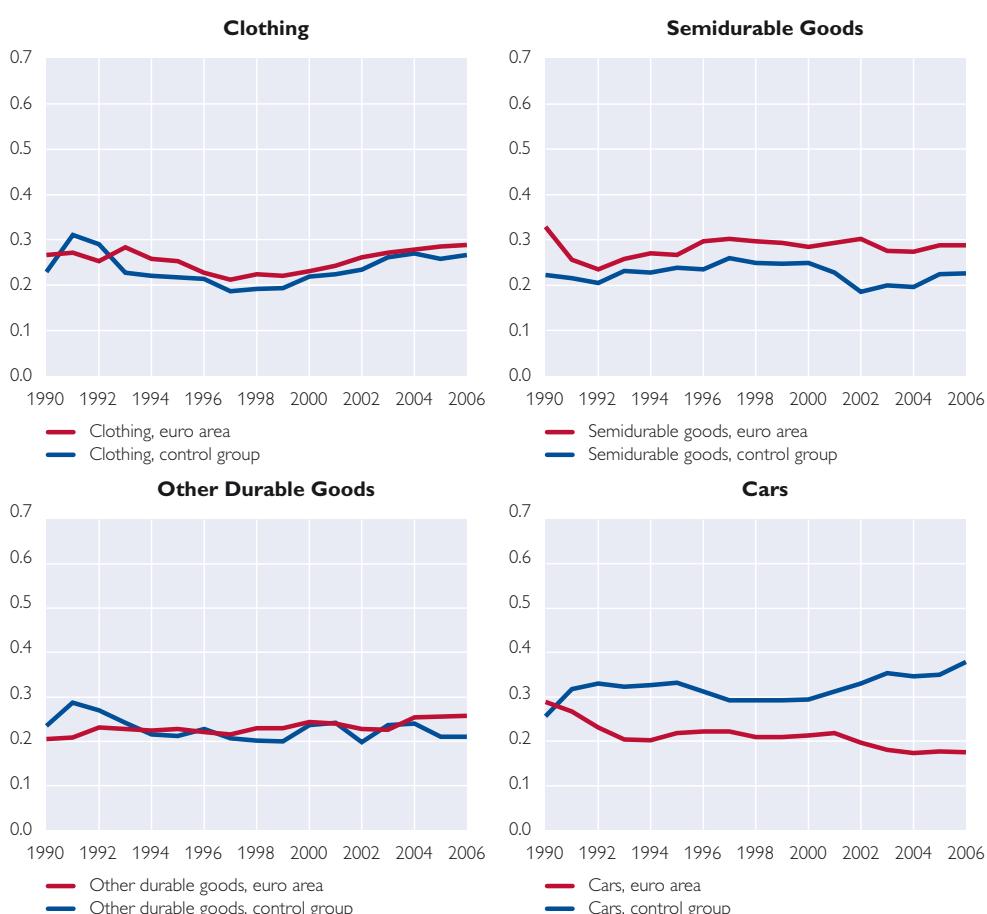
¹² The temporary steep increase in rent prices dispersion in the group of control countries can be entirely attributed to housing market developments in the city of London.

¹³ "Overall convergence" is defined as convergence in at least two-thirds of the subitems. A corresponding definition holds for "overall divergence"; all other cases are labeled as "mixed."

Chart 2

Price Dispersion of Goods

Variationskoeffizient

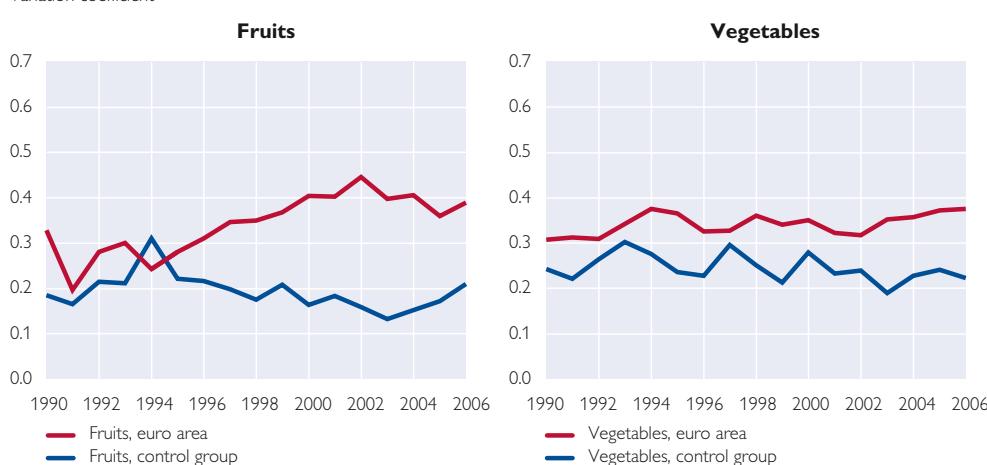


Source: Authors' calculation using EIU CityData prices.

Chart 3

Price Dispersion of Foods

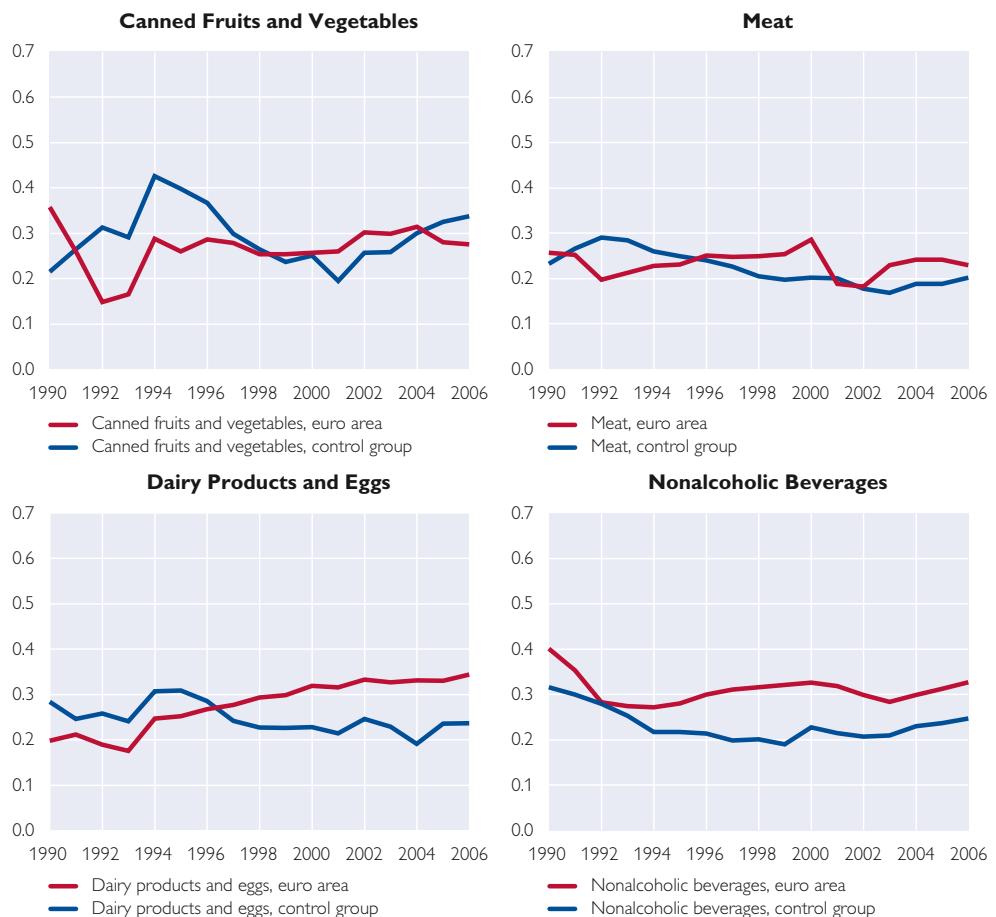
Variation coefficient



PRICE LEVEL CONVERGENCE IN EUROPE: DID THE INTRODUCTION OF THE EURO MATTER?

Price Dispersion of Foods – Part 2

Variation coefficient



Source: Authors' calculation using EIU CityData prices.

Chart 4

Price Dispersion of Services

Variation coefficient

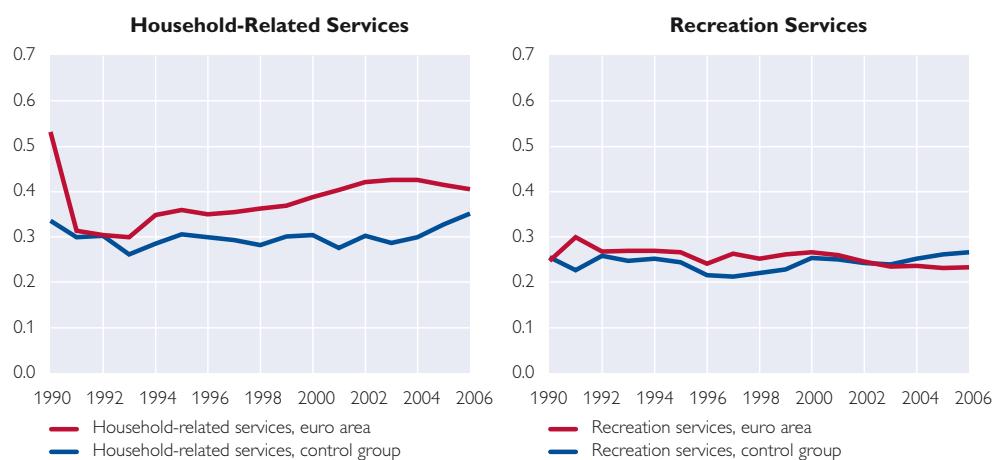
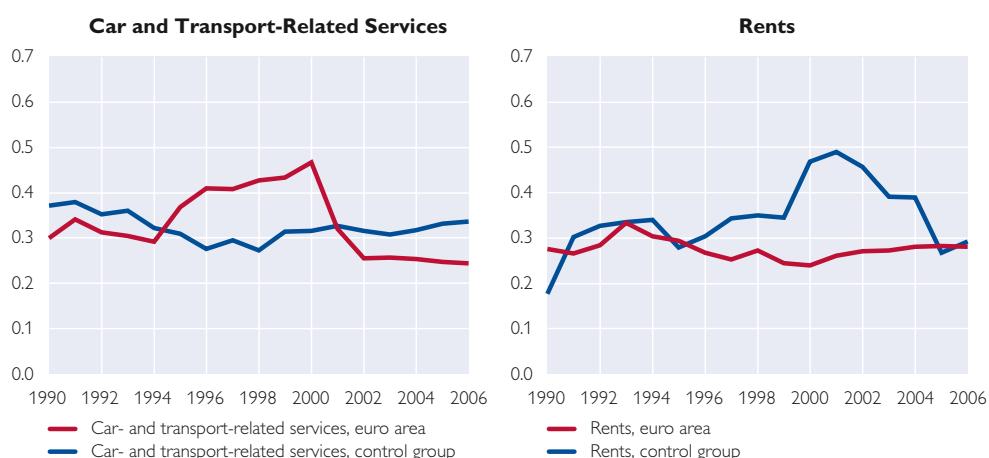


Chart 4

Price Dispersion of Services – Part 2

Variation coefficient

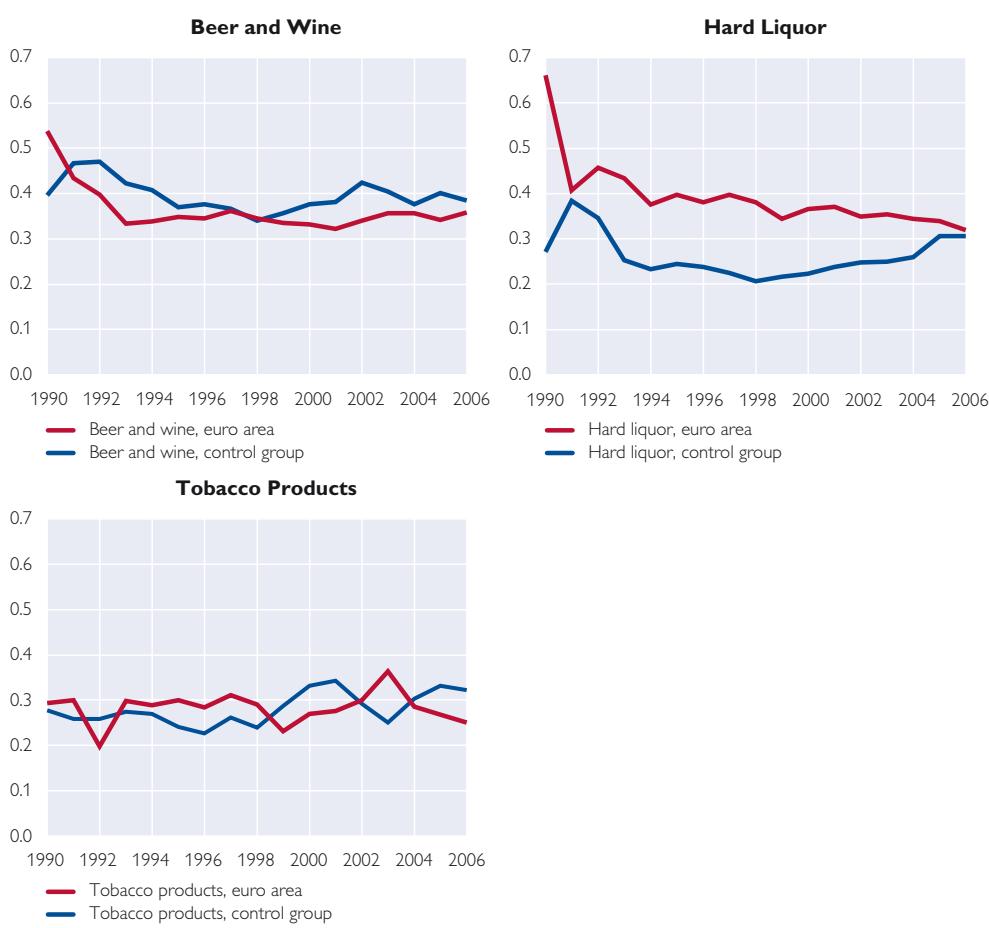


Source: Authors' calculation using EIU CityData prices.

Chart 5

Price Dispersion of Alcohol and Tobacco Products

Variation coefficient



Source: Authors' calculation using EIU CityData prices.

PRICE LEVEL CONVERGENCE IN EUROPE: DID THE INTRODUCTION OF THE EURO MATTER?

Table 2

Price Convergence and Divergence before and after the Euro Cash Changeover

	Euro area			Control countries	
	1990 to 2006	pre-euro	post-euro	pre-euro	post-euro
Goods					
Clothing	C	C	D	M	M
Cars	C	C	C	M	D
Other durable goods	C	M	D	M	M
Semidurable goods	C	C	M	C	D
Tobacco products	M	D	C	D	C
Food					
Fruits	D	D	C	M	D
Vegetables	C	C	M	C	M
Canned fruits and vegetables	C	C	M	C	D
Meat	C	M	C	M	M
Dairy products and eggs	D	M	M	C	C
Semidurable food	C	M	C	M	M
Nonalcoholic beverages	C	C	D	C	D
Coffee and tea	D	D	M	C	M
Beer and wine	C	C	M	C	M
Hard liquor	C	C	C	C	D
Services					
Household-related services	M	M	M	M	M
Car- and transport-related services	M	C	M	M	C
Recreation services	C	C	M	M	D
Household energy	M	M	M	C	M
Rents	C	C	M	M	D

Source: ELU CityData.

Note: Pre-euro: 1990 to 2001, post-euro: 2002 to 2006. C represents convergence, D divergence and M mixed evidence.

verged more than service prices. As mentioned above, this may be interpreted as a sign of wage convergence and of stepped-up market competition triggered by privatization and market liberalization. Also, the type of outlet, i.e. hypermarkets/supermarkets versus normal-sized shops, does not substantially influence price level convergence and divergence.

Third, the control group's price level convergence and divergence behavior is different, with some exceptions, such as beverages or cigarettes and tobacco. Price dispersion tends to be lower in the euro area countries, especially at the end of the sample. This may relate to the lack of exchange rate variability.

Carree and Klomp (1997) provide a method for testing for the statistical significance of changes in price

dispersion. The T2 test statistic is given by

$$T_{2i} = (N - 2,5) \ln \left[1 + \frac{1}{4} \left(\frac{\hat{\sigma}_{it}^2 - \hat{\sigma}_{iT}^2}{\hat{\sigma}_{it}^2 \hat{\sigma}_{iT}^2 - \hat{\sigma}_{iIT}^2} \right) \right]$$

where $\hat{\sigma}_{it}^2$ is the variance of the price of product i across the cities in the sample evaluated at period t , $\hat{\sigma}_{iT}^2$ is the squared covariance between the price data at period t and period T , and N is the number of cities in the sample. Under the null hypothesis of no change in dispersion, the T_2 test statistic is χ^2 distributed with one degree of freedom.

Carree and Klomp's test statistic is defined for the standard deviation as a measure of dispersion. However, our investigation is based on the variation coefficient, defined as the standard deviation divided by the mean.

This measure accounts for the fact that dispersion may rise when the average price level increases. In contrast to the standard deviation, this measure is comparable across items and country groups and thus more appropriate for our purpose. As an additional check, we nevertheless perform Carree and Klomp's test for the standard deviation of all individual items. The results are not overwhelming, given that the tests are very often not statistically significant, especially for the subperiods. We should thus interpret the cases of convergence and divergence in table 2 with some caution.

As a check of robustness, we perform the same exercise using not just the capital city for those countries where more than one city is covered by the data set (Germany, France, Italy and Spain), but the average of the cities. The results show some differences, indicating some intracountry heterogeneity. Furthermore, we repeat the exercise using the year 1999 as the threshold between the two sub-periods. The results are broadly in line with the baseline scenario.

4 Other Factors May Out-weigh Possible Euro Effects

In this study, we assessed the degree of price convergence in the euro area using the widest set of products for which price level data are available. We specifically investigated the question whether the introduction of the euro was a driving force of price level convergence. Our conclusions broadly confirm the findings of earlier studies, suggesting that the bulk of price

convergence took place in the early 1990s and that there is not much evidence that the introduction of the single currency as an accounting unit and later as cash currency has led to a further narrowing of price differentials.¹⁴

The evolution of price dispersion in the euro area since the introduction of the euro differs, however, from that in a group of comparable European countries which we use as a control group. Overall, price dispersion in the euro area exceeds that of the control group, but has remained remarkably stable after the introduction of the euro, while the control group has experienced an increase in dispersion since 2003. For some tradable goods, there is price convergence (e.g. cars), but surprisingly, there is also price convergence for some services. This could be explained by an increase in competition in services and perhaps also by the convergence that took place for local factors such as wages and per capita income.

Several reasons can be put forward to explain this lack of further convergence after euro introduction. One explanation is that most product market integration took place in the early 1990s, so that no second convergence wave was to be expected. By 1999/2002, the consumer goods markets had already become highly integrated, with some notable exceptions, such as cigarettes and tobacco products. Also, convergence of monetary and fiscal policies was already a precondition for monetary unification. Engel and Rogers (2004) claim

¹⁴ While earlier studies (Rogers, 2001 and 2007; Engel and Rogers, 2004) were written soon after monetary unification and often claimed that it may have been too early to detect significant effects, this argument applies much less to our study. Depending on whether one judges the introduction of the euro as an accounting unit or as cash currency as the relevant event, the euro has now been reality for eight or five years, so that potential effects should be visible in the price data.

that it was not the adoption of the euro per se that effected market integration, but rather the commitment toward harmonizing monetary policy. Along this argument, it would not be surprising that the final step of this integration process, the introduction of the common currency, had no overwhelming visible effect.

Another argument is that the euro may have had small convergence effects after all, but that other factors continue to hamper market integration and dominate the euro effects. Sales taxes are only fractionally harmonized at the EU level, where only minimum standards are required. Other local factors, such as price regulation, transport or distribution costs, market segmentation or local consumer preferences, may play a role. Some goods and services contain a large nontradable component or are not tradable at all. The Services Directive was decided only recently and allows for several exceptions, so that effects will be limited and visible only in the years to come. Furthermore, factors such as transaction costs or information barriers between local and foreign consumers may severely hamper international competition between producers and distributors. In some cases, finally, structural

policy measures that are expected to induce price level convergence in the longer run may even increase price dispersion in the short to medium run. An example is the liberalization of network industries, which each EU country implemented at its own pace (European Commission, 2001). All these factors may have outweighed the potential positive effects of the introduction of the common currency as an accounting unit and later as a cash currency.

From a monetary policy point of view, the remaining substantial price level differentials matter only insofar as potential future price level convergence may imply future temporary inflation divergence. As low-price countries tend to be those with high inflation rates and high-price countries mostly show low inflation, price level convergence could imply an amplification of these inflation differentials. This does not pose a problem for decision-making itself, as the common monetary policy is geared toward price stability at the euro area average and the overall effect of price convergence on aggregate inflation remains *a priori* unclear. Widening inflation differentials may, however, pose a challenge for the communication of the common monetary policy.¹⁵

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¹⁵ For a related discussion, see also ECB (2003).

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The Euro on the Road East: Cash, Savings and Loans

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The euro is already present throughout Central, Eastern and Southeastern Europe today. Against this backdrop, the OeNB has been regularly conducting household opinion polls for years in the countries that make up this economic space. The survey questions place special emphasis on euro cash holdings. The results show that the choice to hold euro cash is based on a wide variety of motives, above all geographic proximity, coupled with increasing economic interlinkages, the desire to minimize risk, and tradition. Decisions to have savings in euro or to take out euro-denominated loans can be attributed to similar considerations. In addition, macroeconomic factors such as inflation and exchange rate expectations may also play a role. What clearly emerges is that the extent of currency substitution varies considerably from country to country. In terms of cash, Slovenia, which was about to adopt the euro at the time of the most recent poll, is the frontrunner (approximately 40% of the population reported euro cash holdings in the second half of 2006). Hungary is last, with only a 7% rate. In terms of savings and loans, Croatia posts the highest percentage according to both the OeNB survey and the aggregated bank balance sheet data (approximately 80% of all savings deposits and/or borrowings of households and enterprises are denominated in foreign currency). At the opposite end of the spectrum is the Czech Republic, a country with approximately 10% in both areas.

JEL classification: E41, E50, O14

Keywords: currency substitution, demand for euro.

1 Introduction

The euro is already present throughout the Central, Eastern and Southeastern European (CESEE) countries today. When the survey was conducted, cash holdings, savings deposits and loans were already denominated in euro to a certain extent – and not only in Slovenia, the first new EU Member State to have fulfilled the convergence criteria as of spring 2006 and to have changed over to the euro on January 1, 2007. A number of CESEE countries have already oriented their monetary and exchange rate policies to the euro, demonstrating that the new currency has seamlessly taken over from the Deutsche mark, the U.S. dollar and IMF Special Drawing Rights. Even in foreign trade invoicing and the CESEE capital markets, the euro is playing a significant role, in many respects an increasingly significant one.

Five years after the introduction of the first euro banknotes and coins, this paper seeks to offer an intermediate assessment of the presence of the euro in CESEE – specifically through a theoretical analysis of currency substitution (section 2) and an empirical analysis of how large cash holdings, savings deposits and loans in euro are and what the related motivation is (section 3). The microeconomic analysis is conducted against the macro-economic and historical background specific to the individual countries. From a central bank perspective, this study aims above all to clarify the economic policy implications of this development (section 4). It concludes with a summary (section 5). The focus of this paper is on the EU Member States of CESEE with the strongest economic and financial ties to Austria, i.e. Bulgaria, Poland, Romania, Slovakia, Slovenia,

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the Czech Republic and Hungary, as well as on EU candidate Croatia, a country that also has extensive economic and financial relations with Austria.

2 Theoretical Aspects of Currency Substitution in Central and Eastern Europe

The monetary authorities in smaller, open economies often choose to peg their currencies to the currency of a neighboring economic area, chiefly with the aim of importing price and exchange rate stability. In times of crisis, they may go a step further and designate a foreign currency as sole legal tender. In most cases (with Latin America offering numerous examples), this means pegging the national currency to the U.S. dollar, or “dollarization.” In CESEE countries, the same phenomenon may be observed,² although for obvious reasons in the form of “euroization” (known as official or “de jure” euroization). Independently, reflecting overall political and economic convergence with the EU and the euro area, many Central and Eastern Europeans already use the euro today, more or less on a daily basis (so-called “unofficial” or “de facto” euroization). As a result, euro cash holdings and euro-denominated savings and loans are no longer unusual in many CESEE countries. Possible motives include geographic proximity as well as economic interlinkages, the desire to minimize risk and, lastly, tradition.³

The influence of geographic proximity on euro holdings is above all ap-

parent in cross-border activities such as commuting, migration, tourism and local cross-border trade. Euro cash received in the course of these activities is also used for domestic transactions. Closely related to this geographic factor is the issue of economic interlinkages, since historic ties, political influence and concrete business decisions can clearly reduce or increase the distance factor.

Efforts to minimize risk can be traced back to a variety of causes. While experience indicates that people usually hold euro cash out of distrust for both their national currency and the domestic banking sector, those with euro-denominated savings fully trust the banking sector of their country, yet maintain a certain degree of skepticism in relation to its currency. Such an attitude need not be related to present risks. It may well have been triggered by the memory of long past banking crises that sharply devalued or wiped out savings, however, or of past periods of high or hyperinflation that often resulted in drastic devaluation of savings in domestic currency. In economics, this phenomenon is referred to as “hysteresis,” meaning that negative experience tends to have a lasting influence, dictating present behavior well after the macroeconomic situation has been fully stabilized (Mourmouras and Russell, 2000). At any rate, current economic trends in CESEE provide little reason to seek refuge in foreign (hard) currency, given that the various national currencies are either stable – partially as a result of

² The euro has been legal tender in Kosovo since September 1999 and in Montenegro since November 1999. In both cases, the euro has replaced the Deutsche mark.

³ On the issue of currency substitution, see also Giovanni and Turtelboom (1992), Feige et al. (2002) and Calvo and Végh (1992).

institutionally decided exchange rate pegging – or are gradually getting stronger. Since the economic catch-up process has subjected most of the Central and Eastern European currencies to continued upward pressure on real exchange rates, using them would make perfect economic sense if the differential between domestic and global interest rates (or the interest rate differential with the relevant key currency) were not (over)compensated by anticipated changes in nominal exchange rates. Currency risk is rarely factored adequately into decisions to hold euro-denominated savings accounts, and above all to take out loans in euro and other foreign currency – a circumstance that both national and international institutions and supervisory authorities monitor with concern.

Lastly, the tradition (or habit persistence) factor applies chiefly to cash, and is particularly pronounced in the countries of the former Yugoslavia. In the 1970s and 1980s, immigrant workers and tourists mainly brought home Deutsche marks, and to a lesser extent Austrian schillings. This was also the primary opportunity for households to gain access to foreign currency. Part of those household cash holdings were kept in foreign currency accounts, but in the early 1990s, those accounts were frozen overnight to provide the state with additional foreign exchange. This explains why such funds have tended to be hidden under the mattress since then. The compensation paid in domestic currency at the time was of no use, since the deposits lost value due to negative real interest rates and monetary disintegration.

3 Cash, Savings and Loans Denominated in Euro

Since 1997, the Oesterreichische Nationalbank (OeNB) has been conducting opinion polls in five CESEE countries to ascertain the level of (euro) cash holdings as well as savings and loans while also probing the motives involved. The European Commission carries out similar surveys as part of its Eurobarometer activity, and also other studies by international institutions on migration and foreign exchange remittances between family members provide relevant insights (OECD, 2006; World Bank, 2005; European Commission, 2006b). In addition, a large number of analyses have been devoted to foreign currency-denominated loans in CESEE, including OeNB studies (see References below), whose results supplement the above-mentioned surveys.

Section 3.1 examines the extent of euro use in CESEE and the possible motives involved, first and foremost on the basis of the findings in the above-mentioned surveys.

3.1 Euro Cash Holdings: Volume and Motives Identified in the OeNB Survey

As with most questions relating to personal wealth, obtaining hard data on euro cash holdings outside the euro area is difficult. Surveys and econometric models can be methodologically used for this purpose.⁴ For example, the volume of foreign currency cash holdings can be estimated using models that are applied to national accounts and monetary data (Feige, 2003). The results obtained by Feige point to relatively high cur-

⁴ See Fischer et al. (2004).

rency substitution rates in several CIS (Commonwealth of Independent States) countries and significantly lower rates in CESEE countries. Only in Croatia, Macedonia and Romania does the currency substitution rate exceed the 50% mark. The lowest rates (under 20%) are to be found in the Czech Republic, Hungary and Slovakia.

Another approach involves directly questioning households and then projecting the extent of currency substitution from the answers. Since 1997, this approach has been used in a survey commissioned by the OeNB to poll 1,000 Hungarians, Slovenians, Czechs, Slovaks and Croatians every spring and fall on their foreign currency holdings and the related motives (Stix 2001, 2002, 2004).⁵ Questions about how respondents assess the overall economic situation in their country, about their personal habits and about the planned changeover to the euro round off the interview. The data collected in this way are unique with respect to both scope and time scale. In particular, the data go back to the period prior to the adoption the euro, so that any effects produced by the changeover can also be analyzed.

Chart 1 shows that at the start of the OeNB survey series, a sizeable share of the respondents held cash in foreign currency (DEM, ATS, USD).

When the euro was introduced, Deutsche mark and Austrian schilling holdings were to a large extent exchanged for euro or domestic currency, but only rarely for U.S. dollars. With the exception of Hungary, the proportion of the population with euro cash holdings has increased in every country since 2002.⁶ More specifically, by the end of 2006, approximately 41% of all households in Slovenia, about 30% in the Czech Republic and Slovakia, 25% in Croatia and about 7% in Hungary had euro cash holdings.

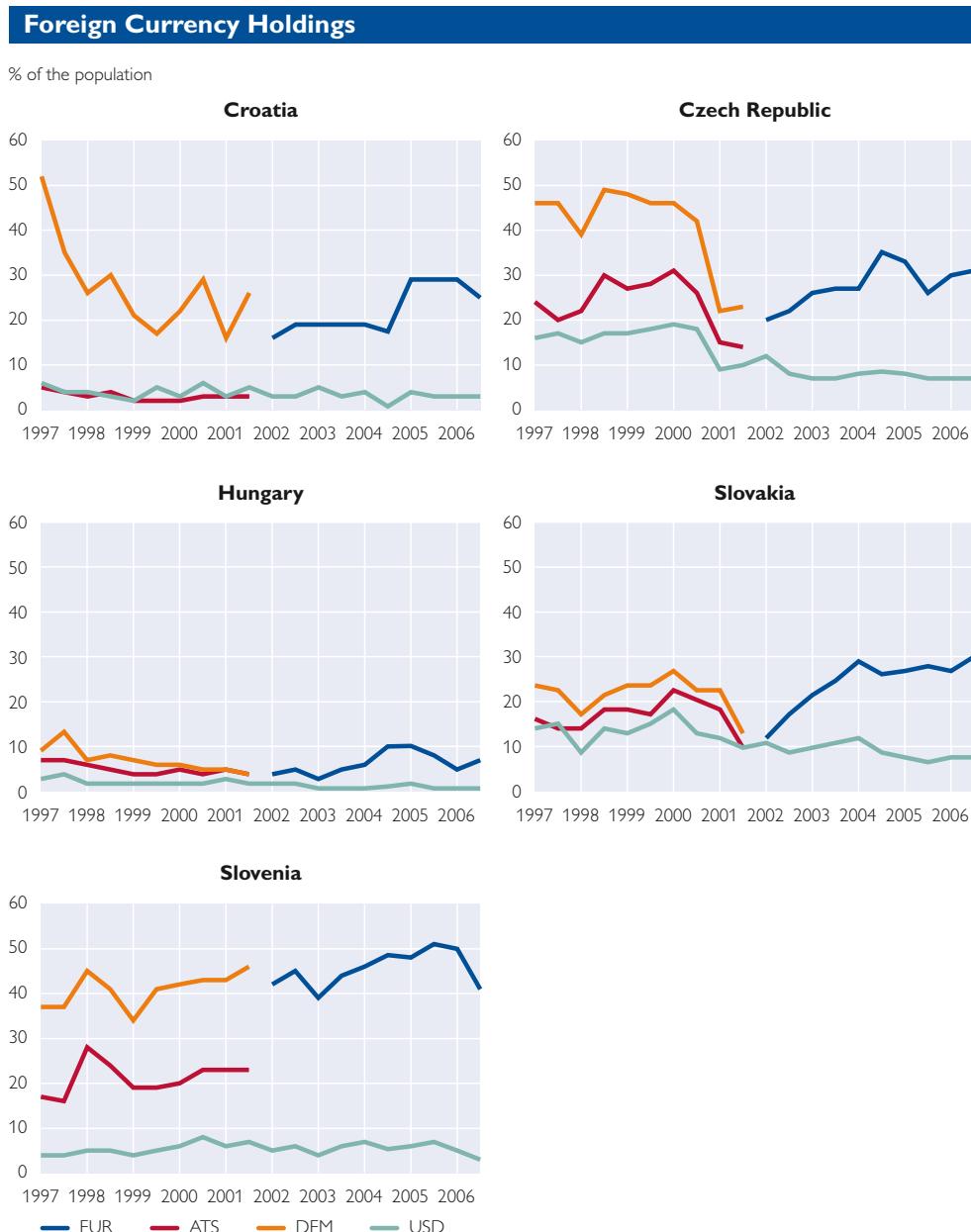
According to the OeNB survey, households in Slovenia and Croatia have the highest volume of euro cash holdings.⁷ Moreover, the cash holding gap between these two and the other countries surveyed is too large to be attributable to Slovenia's and Croatia's greater economic strength. The motives discussed above, such as geographic proximity and economic interaction, the impending euro changeover and, ultimately, tradition would seem to offer a more likely explanation (chart 2). This assumption is further borne out by the fact that the euro tends to fulfill a general reserve function or to be used for domestic transactions in Slovenia and Croatia, whereas euro cash holdings in the other countries are used mainly for spending and vacations abroad.

⁵ Opinion polls have drawbacks of their own, since illegal holdings are not recorded. In addition, only private individuals are polled, with the result that cash held for business purposes is not accounted for. It may therefore be assumed that the phenomenon is significantly underreported. Even so, the evolving survey results over time provide valuable insights into the trend in foreign currency holdings.

⁶ In the second half of 2006, the proportion dropped in Slovenia. This probably has to do with the introduction of the euro on January 1, 2007.

⁷ Further surveys will be required to determine whether the considerable decrease recently observed in Croatia represents a statistical outlier.

Chart 1



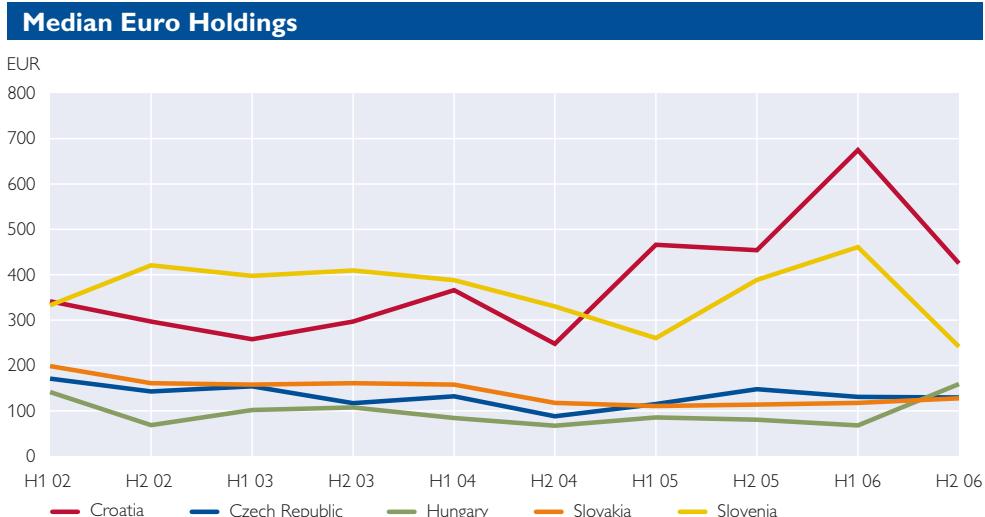
Source: OeNB.

Note: Values on the vertical axis reflect the percentage of respondents reporting cash holdings in the respective currency.

When survey questions pertain to personal details, it emerges that the share of households with euro cash holdings is higher for those with relatives in euro area countries than for those with no family ties abroad. Such holdings may stem – at least partially – from remittances from family members abroad.

As already mentioned, the reasons for maintaining foreign currency cash holdings in CESEE vary from country to country. In Croatia and Slovenia, the primary motive is to have a general reserve fund – cited as the most important factor by 75% of all Croatians and 55% of all Slovenians surveyed. In contrast, spend-

Chart 2



Source: OeNB.

Note: The median holdings of euro assets shown in this chart are based on categorical answers and were obtained through linear interpolation.

ing abroad emerges as the main reason among the Czechs, Hungarians and Slovakians. Use of foreign currency for domestic transactions is only a noteworthy motive in Croatia and Hungary, and even there, it is mentioned by relatively few respondents (chart 3).

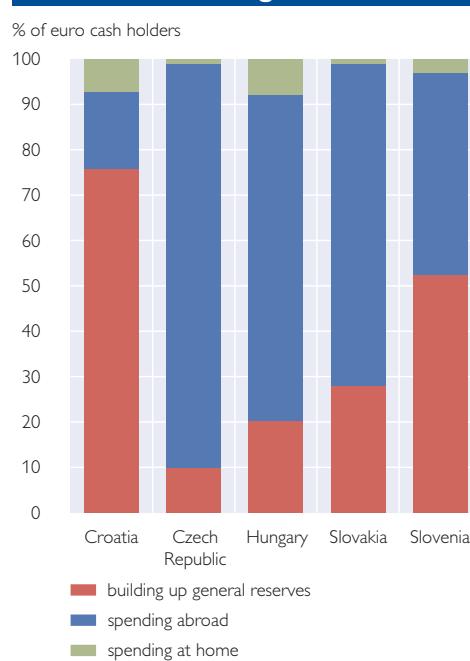
The survey evidence on cash amounts and the motives for holding them thus implies that currency substitution is a reality only in Croatia and Slovenia (prior to the euro changeover). In the other three countries surveyed, only relatively small amounts of cash are held, and they are mainly used for transactions abroad.

Even if domestic transactions do not represent the main motive for euro holdings, between 50% and 63% of the Slovenians, Czechs and Slovakians, about 40% of the Hungarians and 30% of the Croatians already observed transactions in euro in their country (during the last six months of the survey period). Payments by tourists may, however, account for the majority of such trans-

actions. When respondents are directly asked whether they themselves have made any payments in euro, much lower rates are obtained. None-

Chart 3

Motives for Holding Euro Cash



Source: OeNB survey.

Note: Survey respondents were asked "For which reason do you keep euro cash? Mainly to build up general reserves, for spending abroad, or for spending at home?" This chart reflects (valid) answers given in the first survey of 2006.

theless, 15% of the Slovenians and 9% of the Croatians surveyed claimed to have made payments in euro in their country during the six-month period preceding the last survey (carried out in November 2006). This was also true of 6% of the respondents in the Czech Republic and Slovakia, and 3% of those in Hungary.

The OeNB survey findings on possible motives for holding euro cash are confirmed in particular by the country ranking in the Eurobarometer survey conducted by the European Commission. Based on personal interviews (European Commission, 2004) and telephone polling (European Commission, 2005 and 2006a), the Eurobarometer examines issues such as the attitude of respondents toward the euro and their specific behavior in relation to the single European currency. But because it contains no questions on cash holdings, the survey should be considered a supple-

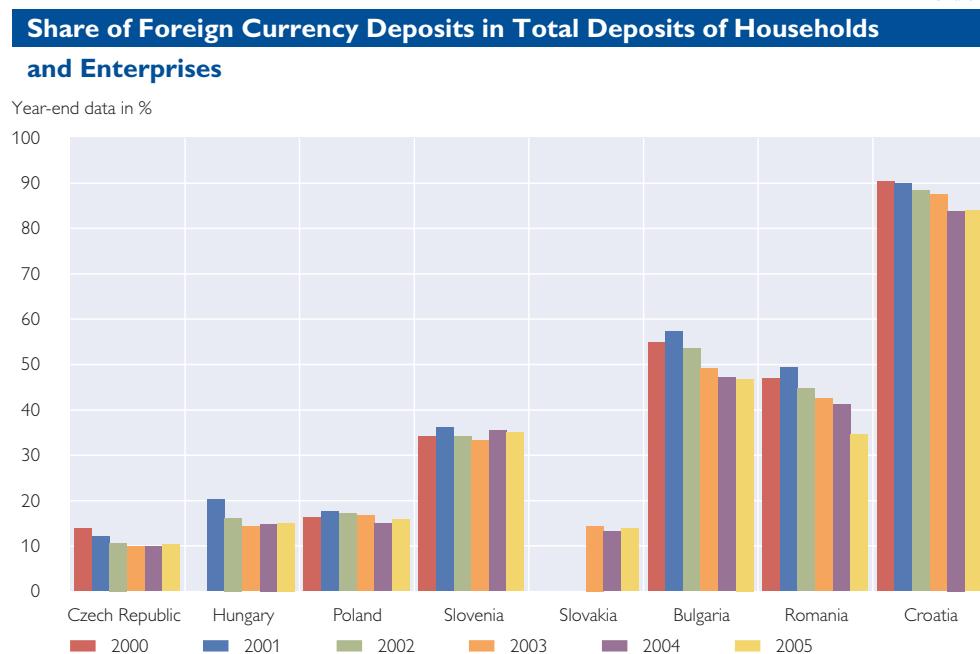
mentary source of information. The OeNB finding that Slovenia stands far ahead in terms of use of euro cash also emerges from the survey by the European Commission.

3.2 Euro-Denominated Savings: Volume and Motives

3.2.1 Euro-Denominated Savings According to Bank Data

Based on aggregated balance sheet data from deposit money banks, at year-end 2005 foreign currency savings by households and enterprises accounted for 32% of total savings deposits in the CESEE countries included in the study (unweighted average). The actual share ranged from 10% to 84% (chart 4). Following a 2001 increase in average share, influenced by the euro cash changeover on January 1, 2002, the share of foreign currency savings in relation to total savings deposits has declined slightly since 2002. The decisive factors in this regard were growing confidence

Chart 4



Source: NCBs, OeNB.

Note: Data for Croatia include deposits indexed to foreign currencies.

in domestic currencies, the positive economic outlook for CESEE and the partially related shifts in exchange rate and interest rate expectations. The considerable diversity subsisting between countries can be attributed in part to historical factors (e.g. earlier periods of high inflation that reduced the value of savings in local currency), and in part to differing economic policies that resulted in widely varying interest rate differentials between deposits in domestic and foreign currency.

3.2.2 Euro-Denominated Savings According to the OeNB Survey

Savings in foreign currency are also covered by the OeNB survey. The differences between countries that it reveals are striking. Whereas 65% of all Croatians and 57% of all Slovenians with savings accounts hold at least part of their savings in foreign currency, the rates in Slovakia, the Czech Republic and Hungary range only from 12% to 20%.⁸ This evidence is to a large extent consistent with banking sector data, at least as regards country ranking. The survey confirms that Croatia is in first place and Slovenia in second place. Slovakia, the Czech Republic and Hungary lag far behind according to both surveys.

Up until 2005, the OeNB survey contained a question on the security of savings deposits. Based on the responses, the countries reviewed can be divided into two groups: those that rated the security of savings deposits high right from the start (Slovakia and Slovenia), and those in which households gradually moved from initial

skepticism to growing confidence in the banking sector (Croatia, the Czech Republic and Hungary). In 2002, for example, under 50% of the Croatian respondents judged savings security “good” or “very good,” whereas 60% did by the end of 2005. Quite apart from actual experience with various banking and currency crises, the specific characteristics of respondents obviously play a role here. Households with no savings are highly critical of banks, while those that have foreign currency-denominated savings accounts tend to take a more favorable view of them.

Do households that anticipate high inflation or the devaluation of their national currency have larger foreign currency-denominated cash holdings or savings in the comparatively strong euro? Interestingly, such motives are at most discernible in the Czech Republic and Slovakia. No such correlation can be observed elsewhere, meaning that inflationary expectations have no impact on decisions to hold foreign currency. Leaving aside the Czech Republic, the outcome with respect to exchange rate expectations is the same. In all the other countries, the exact opposite would appear to be true, i.e. the more people anticipate national currency devaluation, the more they will choose to hold national currency.

How can this behavior be explained? On the one hand, it may safely be assumed that tradition and the associated habit persistence factor play an important role here. On the other hand, it could also be argued that in addition to exchange rate expectations, interest rate differentials

⁸ The value for Slovenia is likely to be overestimated in the survey on account of difficulties with the definition of concepts.

have a decisive influence on foreign currency holdings (section 2). Since the OeNB survey does not cover interest rate differentials, nothing conclusive can be said on this issue. Finally, it should be borne in mind that in and of themselves, inflationary expectations should have no effect on decisions to hold foreign currency, given that such expectations may already include hysteresis components. The primary channel through which inflation influences foreign currency holdings is thus the carryover of historically conditioned habits, a factor that, as argued above, is most pronounced in the countries of the former Yugoslavia.

3.3 Euro-Denominated Loans: Volume and Motives

Households and enterprises show a greater overall tendency to take out foreign currency-denominated loans than to hold savings in foreign cur-

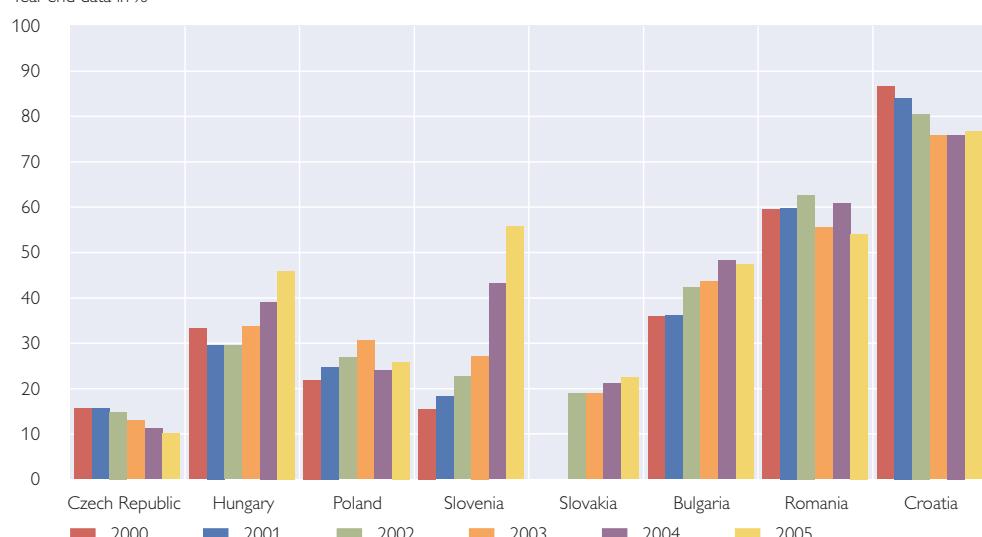
rency. The unweighted average share of foreign currency-denominated loans in total loans at year-end 2005 was 42%, ranging from 10% in the Czech Republic to 77% in Croatia (chart 5). These national differences are probably attributable in part to historical factors, and in part to economic policy factors.

Since 2004, foreign-currency denominated loans have accounted for a steadily growing share of total borrowing by households and enterprises. Whereas that share showed little change before 2004, it has risen from 37% to 42% since then. This trend is due primarily to substantial increases in Slovenia and in Hungary. In Slovenia, the share of foreign currency loans doubled from the end of 2003 to the end of 2005, accounting for 56% of total borrowing, and continued upward during the first half of 2006. The prospects of entering the euro area and subsequent measures

Chart 5

Share of Foreign Currency Loans in Total Loans to Households and Enterprises

Year-end data in %



Source: NCBs, OeNB.

Note: Data for Croatia include loans indexed to foreign currencies.

adopted to ease the transition to the new currency are among the probable causes of this increase (Gruber and Ritzberger-Grünwald, 2005).

3.4 Denomination of Foreign Currency Savings and Loans

The largest proportion by far of all foreign currency-denominated savings and loans in the eight countries reviewed is denominated in euro, although detailed data on the currency structure of these assets and liabilities is not available for every country. What the available data nonetheless indicate is that over the past few years, the euro has generally and primarily gained ground at the expense of the U.S. dollar. This clearly has to do with the increasingly marked euro orientation of economic policy in several countries and – more broadly speaking – with the integration of the countries observed into the EU. With regard to foreign currency-denominated loans in Hungary, it should be noted that in addition to the euro, the Swiss franc also plays a major role, with its share of the total showing a massive increase since 2004. On the one hand, this would appear to reflect supply-side factors. On the other hand, the high interest rates on the Hungarian forint certainly offer borrowers a major incentive to keep an eye out for what may, at first sight, seem to be better-priced financial instruments, since Swiss franc instruments have paid particularly low interest rates in the last few years. In addition to Hungary, Croatia and Poland have also recorded sharp increases in the share of borrowings by households in Swiss francs.

A final point worth mentioning is that in some CESEE countries, savings deposits and loans in national currency are partially indexed to foreign currencies. The trend applies more to loans than to savings, and usually involves indexing to the euro. In the countries surveyed, such indexing is common above all in Croatia, where it accounted for approximately 13% of total savings deposits and slightly under 67% of total borrowing by households and enterprises at the end of 2005.⁹

4 Economic Policy Issues and Implications of Euro Use in Central and Eastern Europe

4.1 Impact on Central Bank Earnings

For national central banks, the profit earned by issuing currency – referred to as seigniorage – diminishes or even dwindles down to nothing when foreign banknotes and coins are widely used. Conversely, earnings rise for those currency-issuing institutions whose banknotes and coins are increasingly used and whose money supply in circulation necessarily expands as a consequence (Schobert, 2001). At the same time, such institutions face higher costs for cash logistics, mainly related to the withdrawal of old banknotes. For reasons of geographic proximity, these costs in Europe are borne chiefly by the OeNB and its branches, since they frequently are the first contact points for cash transport out of CESEE countries (Schautzer, 2006).

⁹ In charts 4 and 5, deposits and loans indexed to foreign currencies have been included in foreign currency-denominated deposits and loans, mainly to facilitate comparison.

4.2 Impact on Monetary Transmission

Currency substitution also has an impact on how effective monetary policy instruments are. There is a negative correlation between increasing foreign currency-denominated savings and loans and the efficiency of monetary policies using the interest rate channel, since central bank interest rate policies influence trends in savings and loans denominated in local currency. In addition, the interest rate channel as such is a fairly weak policy tool, due to the relatively limited financial market depth that still characterizes most of the countries under review. Extensive currency substitution in the area of savings and loans further reduces the effectiveness of the interest rate channel. For lasting macroeconomic stability to be achieved, monetary policy must therefore operate primarily through other channels or receive greater support from other policy areas.

4.3 Impact on Financial Stability

Widespread use of foreign currency-denominated instruments, particularly borrowings, is a potential source of financial instability for the countries affected (see e.g. ECB, 2006b). This is especially true when borrowers have no foreign currency income or no way of hedging their currency exposure. Households and small and medium-sized businesses are often confronted with both problems. When exchange rate turbulence sets in, such borrowers can face solvency problems, which in turn represent an indirect credit risk for the banks that granted the loans. For central banks, this often means that stabilizing the

local currency in relation to the euro becomes the overriding policy objective, not only on macroeconomic grounds, but also for reasons of financial stability. Thus, in economies with high currency substitution levels, not only is the interest rate channel of limited use; exchange rate management ceases to a large extent or even completely to be an effective policy instrument.

4.4 Impact on Economic Activity

Last of all, it should be pointed out that a substantial portion of foreign currency-denominated loans in CESEE are used to finance home ownership. It can be assumed that borrowers in this segment will do everything in their power to service their mortgage loans so that they can continue to reside in their houses or apartments. While that limits the financial stability risks previously discussed, it suggests that private consumption patterns will show increasing volatility or higher volatility than in countries where foreign currency is less commonly used to finance home ownership. This volatility affects the business cycle, and therefore business cycle synchronization between the CESEE countries and the other EU Member States.

4.5 Possible Impact on Future Euro Area Entry

In judging whether a country is mature enough to join monetary union, the extent of euro cash use or euro-denominated savings and loans is not directly relevant, since the European Central Bank (ECB) and the Euro-system take a neutral stance vis-à-vis the de facto use of the euro in non-

member countries.¹⁰ This explains why the high and rising share of foreign currency-denominated loans in Slovenia was not singled out as an issue in the May 2006 Convergence Reports by the ECB and the European Commission. The ECB and the Eurosystem take an entirely different position, however, on unilateral moves to introduce the euro as legal tender (“de jure euroization”), while it should be noted that such policies are not currently on the political agenda in any of the countries under review. Any such unilateral attempts to adopt the common currency outside the framework set forth in the Treaty (establishing the European Community) would run counter to the economic reasoning underlying Economic and Monetary Union. The Eurosystem views euro adoption as the final step in a structured convergence process that unfolds in a multilateral framework. It follows that the euro adoption stages provided for in the Treaty cannot be circumvented through unilateral “euroization.”¹¹ Moreover, the sensibility of unilateral adoption of the euro as legal tender can also be questioned on economic grounds.¹²

5 Summary

Even though the process of enlarging the euro area to the East has slowed down in the last two years, the euro is already present throughout Central, Eastern and Southeastern Europe. Survey results show that the choice to hold euro cash is based on an extremely wide variety of motives.

Geographic proximity, coupled with increasing economic interlinkages, the desire to minimize risk, and tradition are the most common reasons for holding euro cash. Decisions to have savings and take out euro-denominated loans can be attributed to similar considerations. In addition, with households making more active financial management decisions, national economic determinants such as inflation and exchange rate expectations – both of them reflected in interest rate differentials – may also play a greater role.

What clearly emerges is that the extent of currency substitution varies considerably in the countries covered by this paper. In terms of savings and loans, Croatia was far out in front during the period under review, and also belonged to the leading group with regard to cash holdings. Most of the possible motives identified are probably present in Croatia. In addition to a Deutsche mark and Austrian schilling tradition and the desire to minimize risk, Croatia, like most other CESEE countries, possesses a high percentage of foreign banks that either actively seek to attract customers or are considered extremely competent in handling foreign currency transactions.

It may be stated in conclusion that currency substitution in Central, Eastern and Southeastern Europe, as observed in recent years, will be a temporary phenomenon. Ultimately, all EU Member States are bound by the Treaty on European Union to adopt the euro. Therefore, the time

¹⁰ Since its inception, the ECB/ESCB has upheld this neutral policy on the use of the euro in nonmember countries. See Duisenberg (1998): “The ESCB will take a neutral stance towards an international role of the euro. It will neither hinder nor deliberately encourage the development of this role, but will rather leave this to market forces.”

¹¹ See ECB (2003).

¹² See Backé and Wójcik (2002).

at which the euro becomes legal tender in those countries depends on how fast the EU enlargement and convergence process itself moves forward. In this respect, Slovenia has clearly taken over the vanguard role,

since it adopted the euro as legal tender on January 1, 2007 – ahead of all the other new Member States. Only time will tell at what pace and in what order the other CESEE countries will follow suit.

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Austria's Experience with Euro Migration since the Cash Changeover

Doris Schneeberger,
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The introduction of the euro in 2002 offered a unique opportunity to learn more about the patterns and structures of cross-border cash movements. The Oesterreichische Nationalbank (OeNB) has carried out various surveys to analyze the migration of cash in greater depth. This article presents the results of two surveys, which demonstrate that cash is very mobile. An Austrian wallet will typically hold coins and banknotes from almost all euro area countries. Euro coins minted in countries other than Austria are readily discernible, as all coins have a common European face and a distinct national face. For euro banknotes, closer inspection is required, as only the letter contained in the banknote's number betrays the country of origin.

Surveys on cash migration show that the volume of euro banknotes and coins in circulation in Austria, as well as the mix of denominations, remained relatively stable at Austrian households from 2002 to 2004, albeit with a slight increase in the share of foreign banknotes and coins. In Austria, migration continues to generate an influx of banknotes. In particular, EUR 50, EUR 20 and EUR 5 banknotes exhibit a high degree of migration. The results of the two OeNB surveys clearly reveal that banknote migration took place at a considerably faster pace than coin migration.

This brief study calculates migration factors for individual countries in order to explain the migration taking place. These factors throw light on whether a country is one of cash emigration or one of cash immigration, while falling short of offering a clear explanation for the underlying reasons of migration.

JEL classification: E51

Keywords: cash, migration, cross-border cash flows.

1 Introduction

In early 2002, almost all euro banknotes and coins in circulation in Austria were still of Austrian production. Over the years, cash production stocks from different euro area countries began to mix together. This was particularly evident in the case of euro coins, which became desirable objects of collection not least due to the fact that one side betrays the national origin of the coins. For euro banknotes, however, migration is of even greater significance, as banknotes are traded internationally and play a key role in tourism. Various factors such as travel and tourism, economic integration and payment habits cause banknotes to be distributed unevenly across euro area countries. To date, knowledge of cross-border banknote flows has been scant. In this context,

the euro cash changeover in 2002 offered a unique opportunity to learn more about the patterns and structures of cross-border cash movements. The OeNB has carried out various surveys to analyze this migration of cash in greater depth.

Following a brief definition of the term "migration," the results of two OeNB empirical surveys on migration in Austria are presented below. Their aim was to obtain more precise data on the speed at which euro banknotes and coins mixed, as well as on the countries in which those banknotes and coins were first issued.

By way of conclusion, this brief study makes use of a migration ratio in a bid to explain the impact of current cash migration on currency in circulation at a national level.

Refereed by:
Mara Výborný, ECB

2 Definition

As a rule, the term “euro migration” is defined as cross-border euro cash flows. These can proceed via several channels. First, euro banknotes are dispensed by a Eurosystem central bank and deposited by third parties at another Eurosystem central bank. Second, coins and banknotes in household volumes migrate as people travel, spending money abroad. In addition, large volumes of banknotes are moved by cash-in-transit companies, currency traders or banks. The migration of cash is therefore influenced by a multiplicity of migration factors, including geographical location, tourism, commuter movements and the international integration of banking markets.

3 OeNB Surveys on Euro Migration

This section presents the results of two studies on euro migration which were commissioned by the OeNB. The first study was carried out by GfK Austria GmbH (formerly FESSEL-GfK), and the second is a sample survey conducted at the cash logistics company GELDSERVICE AUSTRIA Logistik für Wertgestionierung und Transportkoordination G.m.b.H. (GSA), which is an OeNB subsidiary.

3.1 Survey on “Euro Migration”¹

From March 2002 to January 2004, a study on cash migration in Austria was carried out in a series of eight surveys in all. Households throughout Austria were requested to ascertain the country of origin of the euro banknotes and coins kept in their wallets, piggy banks and glass jars.

The respondents surveyed were all heads of their respective households.

The key purpose of this survey was to find out how fast euro banknotes and coins had mixed following the introduction of the euro. As a tourist destination and thanks to its geographical location, Austria is ideally suited for such a study, as it was expected that cash would migrate relatively quickly. In addition, the study aimed to throw light on how much cash Austrians actually hold in their wallets. The results below are presented first for coins and then for banknotes.

3.1.1 Coins

It is observable that the volume of coins held in wallets remained more or less unchanged over the entire survey period. The glut of small change frequently feared in the run-up to the euro's launch did not occur. Over the entire survey period, the number of coins held in wallets remained constant, and their distribution among different denominations remained stable. In January 2004, for instance, a typical Austrian wallet held 15.6 coins worth EUR 6.49 on average. Chart 1 shows the shares of different denominations held in wallets ascertained by the first and the eighth (last) survey.

An analysis of the share of “foreign” euro coins in Austrian wallets shows that this grew rapidly following the introduction of the euro (March 2002: 6%; September 2002: 20%). In January 2004, the share of coins minted in other euro area countries reached a peak of 25.8%, its highest level so far.

¹ FESSEL-GfK study (2002–2004), commissioned by the OeNB.

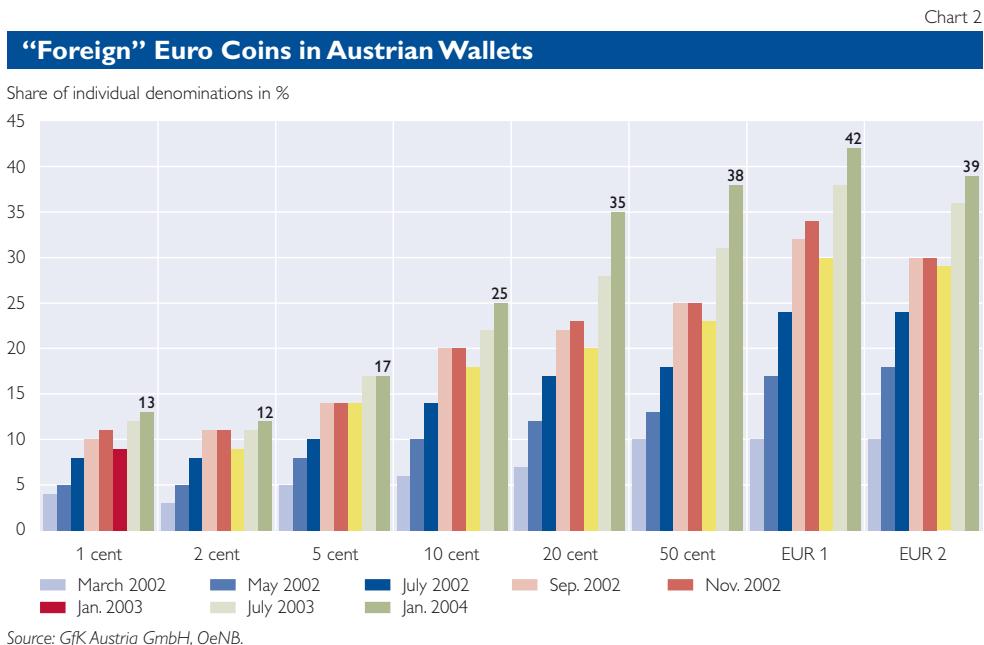
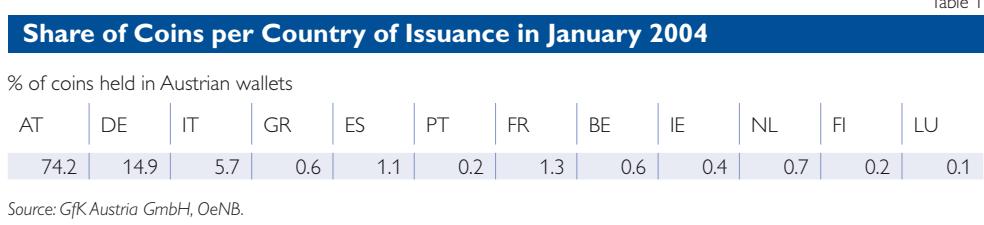


After Austrian coins, the next most frequently found were German coins (around 15%), followed by those of Italian mintage (some 6%; see table 1).

As already evident in March 2002, higher-value coin denominations were far more frequently of foreign origin than lower-value denominations. In January 2004, for instance, only 13% of 1 cent coins came from abroad, compared with around 40% of EUR 1 or EUR 2 coins. Chart 2 shows that a rise in migration, albeit at varying levels, is observable over time for all coin denominations.

3.1.2 Banknotes

Banknotes revealed a similar picture as for coins. The number of banknotes and their distribution among differ-





ent denominations were constant over the entire survey period. In January 2004, the typical Austrian wallet held 6.87 banknotes worth EUR 192.42 on average. The EUR 10 denomination was the most frequently found banknote, as it is dispensed by default by Automatic Teller Machines (ATMs) in Austria. In addition, EUR 5 and EUR 20 banknotes were often found in wallets. The highest denomination found in wallets was the EUR 100 banknote, which is also dispensed by ATMs.² For instance, every tenth

Austrian had at least one EUR 100 banknote in his or her wallet, whereas people very seldom use EUR 200 and EUR 500 banknotes. Chart 3 shows a comparison of wallet contents during the first and the last survey.

An analysis of the foreign share of banknotes in Austrian wallets shows that although migration was measurable as early as March 2002, it was still not significant. At this point in time, 90% of banknotes were still printed in Austria. Unlike coins, however, banknote migration rose sharply, with the share of Austrian banknotes accounting for a share of only 61%. At the time of the last survey, every second banknote came from another country within the euro area. Of foreign banknotes, as with coins, furthermore, German (32.7%) and Italian (9.7%) banknotes made up the lion's share (see table 2).

The different foreign shares per denomination are also clearly visible in the case of banknotes. Whereas EUR 10 and EUR 100 banknotes, which are mostly brought into circulation via ATMs in Austria, were largely of Austrian origin, 72% of EUR 20 banknotes and 79% of EUR 50 banknotes came from other euro area countries in January 2004. Chart 4 shows the trend in foreign shares during the survey period.

Share of Banknotes per Country of Issuance in January 2004

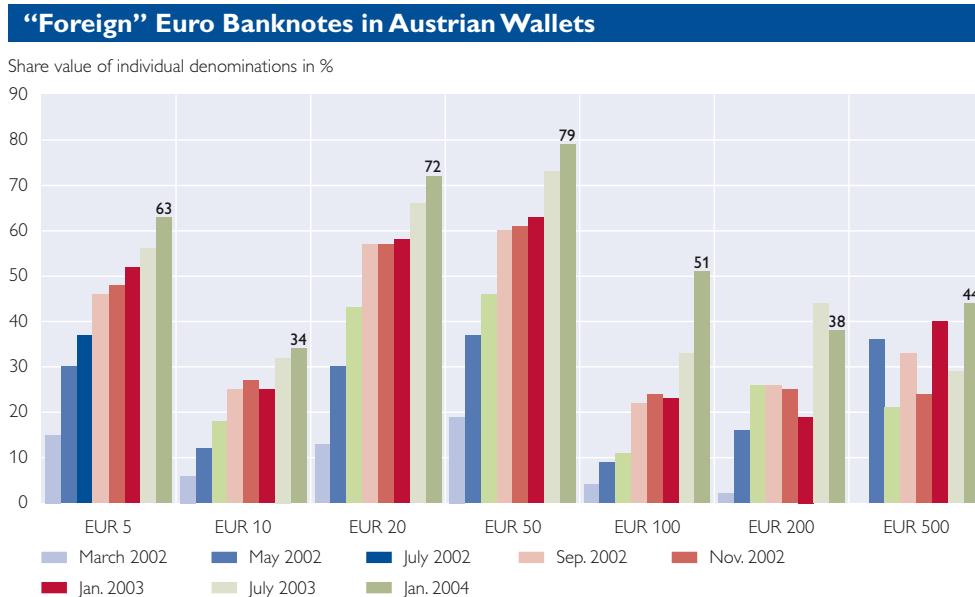
% of banknotes held in Austrian wallets

AT	DE	IT	GR	ES	PT	FR	BE	IE	NL	FI	LU
47.6	32.7	9.7	1.1	1.5	0.4	2.9	1.0	0.5	1.8	0.9	0.0

Source: GfK Austria GmbH, OeNB.

² In summer 2003, a software update of outdoor ATMs made it possible to dispense EUR 50 banknotes as a third ATM banknote category. The denomination of banknotes dispensed by ATMs was thus brought in line with the needs of the population.

Chart 4



Source: GfK Austria GmbH, OeNB.

3.2 Sample Survey at GSA

In tandem with the study on migration conducted among Austrian households, nine sample studies were carried out at the cash logistics company GSA from March 2002 to April 2005. The purpose of these studies was to analyze the cash lodgments made by the Austrian banking sector at GSA's seven different sites.

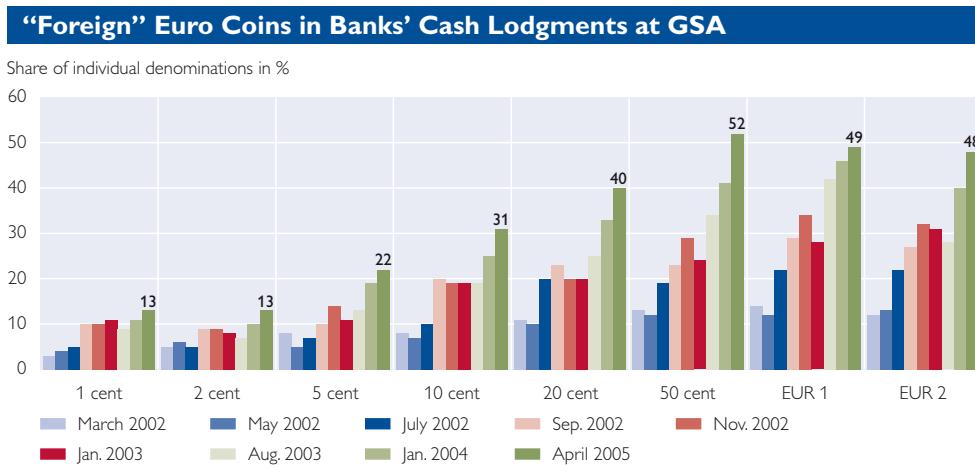
The results of this study point to a number of factors that possibly influ-

ence the share of foreign coins and banknotes in overall circulation. The factors include proximity to the border, particularly with Germany, proximity to major transit routes and transport hubs, as well as tourism. The results below are presented first for coins and then for banknotes.

3.2.1 Coins

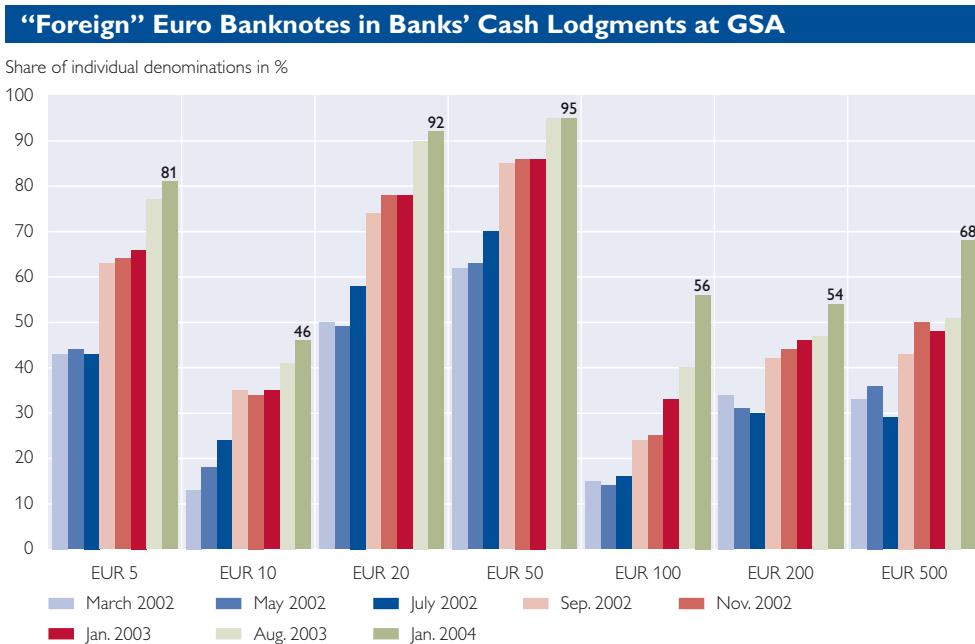
Chart 5 shows the trend in the shares of foreign euro coin denominations

Chart 5



Source: OeNB.

Chart 6



Source: OeNB.

lodged by banks at GSA in percentage over time.

An analysis of the sample results shows that, for 1 to 20 cent coins, the foreign share increased together with the value of the coin. For 50 cent, EUR 1 and EUR 2 coins, the two most recent surveys revealed a different picture. In April 2005, for instance, 50 cent coins exhibited the greatest degree of mix with foreign coins. They were followed in this respect by EUR 1 (49%) and EUR 2 coins (48%). This means that by April 2005 the situation had changed compared with January 2004 since the EUR 1 coin then accounted for the biggest foreign share (46%). A difference between eastern and western Austria is visible when comparing the foreign shares of coins in different Austrian regions. In April 2005, for example, Tirol's foreign share (42%) surpassed by a wide margin that of the country's eastern regions, which had an average foreign share of 25%.

3.2.2 Banknotes

Unlike for euro coins, the foreign shares for euro banknotes were surveyed in a series of just eight samples from March 2002 to January 2004. Chart 6 shows the trend in the shares of foreign euro banknote denominations lodged by banks at GSA in percentage terms.

Compared with coins, the significantly more rapid growth in the foreign share of banknotes is striking. The foreign share of individual denominations exceeded the 50% mark as early as March 2002 whereas this was the case for coins only two years after the introduction of the euro. Since currency trading moves banknotes in large volumes in particular, migration occurs at a faster pace and on a greater scale than for coins. For banknotes, furthermore, the degree of mix does not increase in parallel with denominational values. Instead, there exists a group of strongly mixed banknote denominations (EUR 5, 20,

50 banknotes) next to a weakly mixed one (EUR 10, 100, 200, 500 euro banknotes). Induced by tourism, a summer effect with a sharp increase in foreign shares from July to September 2002 is identifiable at least for 2002. An analysis of the overall survey period shows that the foreign share for EUR 50 banknotes grew quite considerably to as much as 95%. For all denominations, the foreign share since the introduction of the euro has roughly doubled, while it has even nearly quadrupled for some denominations.

The results of this sample survey show that banknotes mix more rapidly at banks, as evidenced by banks' lodgments, than in private wallets. This suggests that it takes more time for foreign cash to reach the general population than banks. In addition, the higher share of foreign euro cash in banks' lodgments appears to reflect the extensive network of Austrian bank branches in Eastern Europe, which are integrated into the Austrian cash supply chain.

3.3 Problems in Measuring Banknote Migration

The results of the two aforementioned surveys reveal that migration in Austria following the introduction of euro cash commenced at a rapid pace and on a wide scale. It was clearly measurable as early as March 2002. The speed at which Austrian euro coins and banknotes mixed with those of foreign origin was particularly surprising. The results of these surveys on migration also indicate

that banknote migration occurred at a faster pace and on a greater scale than for coin migration.

Both these surveys were completed two years after the introduction of the euro, as the informative value of survey results becomes increasingly less reliable over time when cash would be expected to start remigrating. In addition, the pooling of banknote production,³ as well as the cross-border transports of banknotes between euro area central banks that have become necessary, distort the picture.⁴

4 Migration in Numbers

Migration movements of cash within the euro area make it possible to distinguish between countries of emigration and countries of immigration. Austria's geographical location (e.g. close to large euro area countries such as Germany and Italy), its strong banking presence in Eastern Europe and its importance as a tourist destination place Austria among countries of banknote immigration. This means that more banknotes flow into Austria than flow out of the country into other euro area countries and non-euro area Member States within the EU. These banknote inflows drive up banknote holdings in the OeNB's vaults, which must be processed and then redistributed within the Eurosystem. In this way, the OeNB contributes toward the efficiency of cash supply within the euro area, without receiving any remuneration for providing this service to the Eurosystem.

³ Banknotes designed to cover the Eurosystem's annual requirements are produced at a decentralized level by euro area Member States. This means that every country is responsible for the production of one to three banknote denominations.

⁴ These transports help to counterbalance national fluctuations in demand. The aim is to achieve an optimal allocation of banknotes in order to minimize printing and transportation costs.

Table 3

Immigration Ratio from January to December 2002, Adjusted for Growth in Circulation												
Calculation:	Lodgments per Country Divided by Withdrawals per Country											
	Total Euro Area Lodgments Divided by Total Euro Area Withdrawals											
	BE	DE	ES	FR	GR	IE	IT	LU	NL	AT	PT	FI
EUR 500	2.12	1.14	0.18	1.15	2.41	0.00	0.95	0.15	1.00	0.83	1.81	1.34
EUR 200	1.84	1.13	0.39	1.15	1.12	0.00	0.81	0.16	1.02	0.94	1.40	1.31
EUR 100	1.41	1.13	0.54	1.10	1.23	0.04	0.68	0.38	1.25	1.18	0.76	1.39
EUR 50	1.05	1.11	0.66	1.12	0.99	0.44	0.55	1.07	1.13	2.03	0.73	1.17
EUR 20	1.01	1.05	0.89	1.01	1.00	0.92	0.85	1.27	1.16	1.00	0.73	1.10
EUR 10	1.18	1.04	0.94	1.05	1.11	1.04	0.75	1.39	1.06	0.91	0.85	0.99
EUR 5	0.99	1.05	0.91	0.96	1.07	0.93	0.83	0.82	1.03	0.94	0.83	0.94
Total	1.05	1.06	0.82	1.06	1.04	0.85	0.71	0.75	1.09	1.00	0.81	1.11

Source: ECB, OeNB.

While the value of the euro banknotes issued by the Eurosystem is steadily growing and attained a value of some EUR 628 billion as at end-2006, the net balance of euro banknotes issued by and returned to the OeNB since the cash changeover to the euro stood at –350 million banknotes (with an equivalent value of EUR 1.1 billion) as at December 31, 2006, having fallen steadily from early 2002 to end-2006 by 234% in terms of volume and 90% in terms of value. As a result of this development, three banknote denominations exhibited a negative net balance, in Austria at end-2006, i.e. lodgments exceeded withdrawals of banknotes by a number of 563.9 million for EUR 50 banknotes, by 119 million for EUR 20 banknotes, and by 35 million for EUR 5 banknotes.

However, this was not a purely Austrian phenomenon. At least for some banknote denominations, lodgments also exceeded withdrawals in Belgium, Luxembourg, the Netherlands, Spain and Greece.

4.1 Migration Ratios by Country Comparison

An ESCB subgroup on currency information systems developed a migra-

tion ratio, among other things, in order to measure cash migration within the euro area. This ratio takes into account a country's physical banknote lodgments and withdrawals and puts them in relation with the euro area's total lodgments and withdrawals.

If, in a given country, this ratio stands at 1, the ratio of lodgments to withdrawals is then equal to the average ratio of lodgments and withdrawals in the Eurosystem during the period under review in this country. Euro area countries with a ratio of less than 1 are regarded as "euro emigration countries." Euro area countries with a ratio of more than 1 are considered as "euro immigration countries." Table 3 shows the migration ratio for individual euro area countries in 2002.

In 2002, Austria on balance still had a ratio of 1. On closer analysis, however, the first signs of the development in individual denominations emerged as early as 2002. Inflows of EUR 50 banknotes from abroad, which were high from the start, made the net balance of EUR 50 banknotes issued by and returned to the OeNB turn negative for the first time in July 2002. This trend continued over the years and, in the course of time, the

Table 4

**Immigration Ratio from January to December 2006,
Adjusted for Growth in Circulation**

Calculation::	Lodgments per Country Divided by Withdrawals per Country												
	Total Euro Area Lodgments Divided by Total Euro Area Withdrawals												
	BE	DE	ES	FR	GR	IE	IT	LU	NL	AT	PT	FI	
EUR 500	1.42	1.07	0.65	1.34	1.10	0.29	0.80	0.13	1.67	1.10	1.03	0.91	
EUR 200	1.57	0.98	1.08	1.11	1.00	0.67	1.37	0.12	0.83	1.20	4.52	0.98	
EUR 100	1.38	0.97	1.38	1.03	1.04	0.57	0.92	0.22	1.16	0.99	2.37	1.12	
EUR 50	0.96	0.99	1.02	1.00	1.01	0.71	0.90	0.86	0.98	2.35	1.62	0.93	
EUR 20	1.01	0.96	1.25	0.95	1.11	1.04	1.08	1.52	1.17	1.50	0.93	0.97	
EUR 10	2.02	0.95	1.21	0.99	1.50	1.21	1.07	1.57	1.06	0.99	0.97	1.02	
EUR 5	0.94	0.97	1.09	1.14	1.19	0.99	1.05	0.74	1.09	1.37	1.00	0.98	
Total	1.02	0.97	1.14	0.99	1.07	0.91	0.99	0.78	1.06	1.21	1.01	0.97	

Source: ECB, OeNB.

same happened for other denominations. Thus, EUR 20 banknotes and EUR 5 banknotes have also exhibited a negative net balance since September 2003 and November 2004, respectively. Austria's high euro inflows would appear to reflect, above all, the country's strong banking presence in Eastern Europe, as well as its geographical location.

The migration ratio shown in table 4 reflects how the situation changed in the course of 2006.

An analysis of the overall migration ratios of individual countries shows that Austria (1.21) and Spain (1.14) had the highest overall migration ratios in 2006. By contrast, Luxembourg (0.78) and Ireland (0.91) had the lowest migration ratios and can thus be regarded as euro emigration countries.

The analysis of ratios for individual denominations reveals mixed results. At 0.65, Spain, for example, had a very low migration ratio for EUR 500 banknotes. However, this is distorted, for instance, by robust domestic demand for EUR 500 banknotes in Spain.

In Austria, only two denominations had a migration ratio of less than 1 at end-2006, namely the EUR 10

and the EUR 100 banknotes, two ATM denominations for which demand remains constant. It must, however, be pointed out that this migration ratio is influenced by various factors, for which precise quantification is not possible. Owing to the anonymity of cash, therefore, domestic demand, for example, cannot be differentiated from external demand, and migration to other euro area countries cannot be differentiated from migration to countries beyond the euro area.

5 Summary

The aforementioned surveys on migration in Austria show that the volume of euro banknotes and coins in circulation in Austria, as well as the mix of denominations, remained relatively stable at Austrian households from 2002 to 2004, albeit with a slight increase in the share of banknotes and coins originally issued in other euro area countries. In Austria, migration continues to generate an inflow of banknotes. In particular, EUR 50, EUR 20 and EUR 5 banknotes exhibit a high degree of migration. The negative net balance of banknotes issued by and returned to the OeNB for these denominations

shows that Austria is largely an “importer” in these banknote denominations. The immigration of banknotes also generates ever mounting banknote processing costs, for which no compensation or reallocation scheme has been set up within the Eurosystem, however.

The results of both OeNB surveys suggest that banknote migration in Austria commenced at a very fast pace and on a large scale mainly because of the country’s geographical location,

tourism and commuter movements and, particularly, owing to the strong presence of Austrian banks in Eastern Europe.

Even if the calculation of migration ratios does not offer a clear explanation of migration and its underlying reasons, it is nonetheless clear that the euro has helped to remove the economic borders between countries in the euro area. Cash is no longer national. It is European.

Cash Logistics in Austria and the Euro Area

Anton Schautzer¹

Five years of euro banknotes and coins also means five years of experience with cross-border cash logistics. A total of 11.3 billion euro banknotes valued at EUR 628.2 billion are currently in circulation. Handling this enormous amount of cash involves numerous tasks for the national central banks (NCBs) of euro area countries. For example, NCBs must put banknotes and coins into circulation, monitor cash in circulation and its quality, manage the cash cycle and ensure the public's trust in the currency. These tasks are coordinated by the ECB and implemented at the national level.

Within the Eurosystem, the OeNB has established itself as a competence center for cash logistics. In particular, the OeNB's organization of the cash cycle based on close cooperation between the central bank and commercial banks in a public-private partnership model has earned worldwide recognition.

In 2006, a total of 1.2 billion banknotes and 1.7 billion coins were handled (i.e. checked for fitness and prepared for circulation) in Austria. These quantities clearly illustrate the scope of the underlying efforts and at the same time highlight the need for an efficient organizational structure. The highest priority in this context is to ensure the public's trust in the currency. For this purpose, it is important to continue developing cash as a product in the future, to invest in the security of cash as a means of payment, and to ensure a high-quality cash supply at the European level.

JEL classification: E51

Keywords: cash, cash logistics, banknote and coin production, cash in circulation, cash hub.

1 Introduction

January 1, 2007, marked the fifth anniversary of the introduction of euro banknotes and coins. Supplying an economy with cash requires extensive logistical efforts, but these efforts largely go unnoticed by the general public, which tends to take a ready supply of cash for granted.

The purpose of this article is to shed some light on how the cash cycle operates. The study begins with a discussion of the underlying decision-making process in the Eurosystem,² ranging from demand analysis based on theoretical models, benchmarks and simulations to the allocation of production quotas and cash transport logistics. This description focuses primarily on euro banknotes.

At the European level, responsibility for euro coins is assigned to the European Commission, not to the European Central Bank (ECB). In Austria, however, the Österreichische Nationalbank (OeNB) is also responsible for coins due to its 100 percent share in the Austrian mint (Münze Österreich AG). For this reason, coins are also covered in this study.

Due to its geographical location, Austria plays a key role in Central Europe – especially for the new Member States of the European Union (EU), which will gradually introduce euro banknotes and coins in the coming years. One of the OeNB's stated aims is to become the “cash hub” of Central Europe.

¹ The author would like to express his gratitude to Doris Schneeberger, Helmut Stix and Martin Taborsky for their valuable comments.

² The Eurosystem is an organizational unit established within the framework of the Economic and Monetary Union. The system consists of the ECB and the NCBs of those EU countries which have introduced euro banknotes and coins. The Eurosystem is not to be confused with the ESCB, which comprises the ECB and the NCBs of all EU Member States.

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The study also describes the cash supply chain in Austria in greater detail. How is cash circulation organized? Which functions are performed by Oesterreichische Banknoten- und Sicherheitsdruck GmbH (OeBS), GELDSERVICE AUSTRIA Logistik für Wertgestionierung und Transportkoordination G.m.b.H. (GSA), and Münze Österreich AG? These questions will be answered using key figures and charts in order to provide as clear and complete a picture of Austrian cash logistics as possible. The discussion initiated by the European Payment Council (EPC) in 2005 regarding the costs of cash will also be addressed in light of the results of an OeNB study on payment habits in Austria.

The study concludes with a brief discussion of the future of cash. The banknotes and coins in circulation are high-technology products even today. However, the fact that preparations for the next series of euro banknotes are already in full swing also indicates that the future has already begun.

2 Cash Logistics in Euro Area Countries

Since the introduction of the euro as the sole legal tender in the euro area, cash has no longer been the responsibility of individual central banks alone. As a result, cash logistics have become a cross-border concern which can only be coordinated at a level superordinate to the individual central banks. For this purpose, the ECB acts as a platform which brings together representatives from all the central banks participating in the Eurosystem. This cooperation is a basic pre-

requisite for the functioning of the cash cycle in euro area countries. Standardization in cash-specific services as well as fair and equal competitive conditions for all stakeholders³ within the euro area are meant to contribute to the single economic area and to maximize efficiency in the supply of cash.

[...] the Governing Council of the European Central Bank (ECB) has the exclusive right to authorise the issue of banknotes within the Community; [...] Community law has foreseen a system of a plurality of issuers of banknotes. The ECB and the NCBs shall issue euro banknotes. (Decision of the European Central Bank of 6 December 2001 on the issue of euro banknotes, ECB/2001/15, paragraph 1)

As authorized by the Governing Council of the ECB, euro area banknotes are legally issued by both the ECB and the NCBs of participating countries. However, as the ECB does not have a cash office and is not involved in any cash operations, in practice it is only the NCBs which put euro banknotes into circulation and later withdraw them from circulation. In line with this principle of decentralization for Eurosystem operations, any physical handling of euro banknotes is to be carried out by the NCBs.

In most European countries, the respective ministry of finance is responsible for coin production. In Austria, the government sold the Austrian mint to the OeNB in 1989, which means that through Münze Österreich AG, the OeNB is actively involved in the decision-making process with regard to coin production.

³ Cash producers and their suppliers, central banks, commercial banks, wholesale and retail businesses, and cash-in-transit companies.

The OeNB and Münze Österreich AG cooperate in calculating demand for each year and submit the results to the European Commission for coordination in line with the defined decision-making process. Since January 1, 1999, production and issue quantities have been subject to approval by the ECB.

At present, approximately 11.3 billion banknotes valued at EUR 628.2 billion and some 69.5 billion coins valued at EUR 17.9 billion are in circulation (as of December 31, 2006). The quantity of cash in circulation thus totals approximately EUR 646.1 billion. This value has nearly tripled since euro banknotes and coins were introduced at the beginning of 2002. One reason for this increase is certainly the fact that the euro is not only used within euro area countries but has also increasingly established itself alongside the U.S. dollar as a reserve currency outside of the euro area.

2.1 Euro Banknotes and Coins: Demand and Production

The issue of euro banknotes need not be subject to quantitative or other limits, since putting banknotes into circulation is a demand driven process. (Decision of the European Central Bank of 6 December 2001 on the issue of euro banknotes, ECB/ 2001/15, paragraph 3)

Naturally, this guideline must be seen against the backdrop of the ECB Governing Council's monetary policy decisions. The volume of euro banknotes produced annually must be sufficient to cover any increases in banknote circulation as well as the exchange of banknotes which are unfit for circulation. Moreover, sufficient logistical stocks must be available at all times in order to cover sea-

sonal fluctuations, especially during the holidays toward the end of each year.

Two approaches are used in the calculation of annual cash demand: On the one hand, the NCBs calculate their national demand for euro banknotes for each year and submit the results to the ECB (bottom-up approach), and on the other hand the ECB itself calculates the demand for the Eurosystem as a whole (top-down approach). The results generated by these two approaches are compared and harmonized by the relevant working groups in the Eurosystem. Ultimately, the Governing Council of the ECB decides on the volume to be produced.

Based on this calculated production volume, the actual production of various banknote denominations has been handled by means of a decentralized pooling system since 2002. This means that each NCB in the euro area is assigned a certain share of the overall annual production volume for euro banknotes. In this context, each NCB is only responsible for producing certain denominations (table 1). These shares are based on the capital share allocations of the central banks participating in the European System of Central Banks (ESCB). Each NCB's capital share is calculated on the basis of the respective country's share of the EU's overall population and gross domestic product (GDP). Since January 1, 2007, the OeNB's share of the ECB's subscribed capital has been 2.0159%, and its share of the ECB's fully paid-in capital (i.e., paid in by the central banks participating in the Eurosystem) has been 2.9002%. The latter figure is decisive in the allocation of national production volumes for banknotes.

Table 1

Production Volume in 2007			
Denomination	Quantity	Value	NCBs commissioning production
	millions of banknotes	EUR million	
EUR 5	980	4,900	Germany, Spain, France
EUR 10	1,280	12,800	Germany, Greece, France, Netherlands, Austria
EUR 20	1,890	37,800	Greece, Spain, France, Ireland, Italy, Portugal, Finland
EUR 50	1,730	86,500	Belgium, Germany, Spain, Italy
EUR 100	230	23,000	Italy, Luxembourg, Netherlands
EUR 200	x	x	
EUR 500	190	95,000	Germany
Total	6,300	260,000	

Source: ECB (2006).

In this decentralized pooling system, the production costs are borne by the NCBs according to the share of banknote production assigned to them.

In the future, the production of euro banknotes will be based on a single Eurosystem tender procedure (SETP). In accordance with the principles of an open market economy, this system is intended to ensure the efficient allocation of resources as well as free and equal competition for all actors involved in production.

2.2 Distribution of Cash and Management of Circulation

As mentioned above, the production of banknotes is divided up among the banknote printing works according to the allocation of capital shares to NCBs in the ESCB. However, as not all banknote denominations are produced at all printing facilities, and as stocks of banknotes are built up or reduced at different speeds due to specific national circumstances, it is also necessary to transport cash between euro area central banks. These cross-border transports ensure that banknotes are distributed according to schedule in the euro area.

At the same time, cash flows are driven by various direct and indirect

factors. Direct influencing factors include economic ties, cross-border commuting, labor migration, tourism and the tendency to hoard cash. These factors are in turn influenced by population numbers, income levels, economic power and each population's preferences for specific payment methods. These cross-border flows result in national imbalances in cash circulation which cannot be accounted for completely in banknote production and distribution planning. Yet given their responsibility for managing national cash supply chains, the NCBs need to compensate for these imbalances with individual cross-border cash transports. These are carried out on an ad-hoc basis according to demand.

As euro coins are legal tender in all countries in the euro area regardless of their national side, it is also necessary in this case (albeit to a lesser extent) to observe the phenomenon of cross-border flows and the resulting imbalances. However, coin transports are largely restricted to compensating for regional imbalances.

In order to ensure an efficient supply of cash, logistical warehouses have been set up in all euro area countries. Should drastic changes in de-

mand for euro banknotes or a sudden disruption in the banknote supply arise, additional strategic reserves are available.

Together with the NCBs, the ECB monitors stocks of euro banknotes and coins. Circulation is monitored using detailed monthly reports on stocks, circulation and handling. Quantitative circulation monitoring is complemented by observing the quality of cash in circulation, which is done by recording handling statistics (unfit rates) as well as random statistical testing.

3 The OeNB as a Hub in the Euro Area

Austria's geographical location in the center of Europe, at the crossroads of important European transport axes, and in the midst of emerging economic and high-population areas (e.g. in the CentrOPE Region) brings about a competitive advantage for the OeNB. The enlargement of the EU has given rise to a historical opportunity to develop long-term partnerships with the countries of Central, Eastern and Southeastern Europe. Especially in the field of banknotes and coins, the OeNB and its subsidiaries have already begun to establish themselves as a competence and logistics center as well as a "cash hub." One of the major pillars of this strategy is ensuring the availability of state-of-the-art vault systems which meet the requirements of a supra-regional cash logistics center.

The success of these efforts has already begun to show itself in various ways:

- The OeNB has been designated as a location for strategic stocks within the framework of a new cash storage scheme for euro area countries which focuses on only

a few locations for logistical reasons.

- The OeNB's expertise proved instrumental in the preparations leading up to the introduction of euro banknotes and coins in Slovenia in 2007 and in the initial supply of banknotes for that country in order to ensure a smooth transition to the new currency. In this context, the actual supply of euro banknotes was handled via the OeNB.
- On the basis of an international treaty, the OeNB is responsible for supplying Kosovo, which is under the administration of the United Nations.
- Moreover, the OeNB serves as a key advisor in cash-related matters for many central banks in Central, Eastern and Southeastern Europe.

It is also a fact that – not least due to the strong presence of Austrian commercial banks in Central, Eastern and Southeastern Europe – a great deal of euro cash flows back into the euro area via Austria. This underpins the strategic importance of the OeNB, but at the same time it also requires substantial additional effort in banknote handling.

4 Cash Logistics in Austria

Cash logistics are traditionally based on a cyclical system. Once banknotes are printed at the banknote printing works or the coins are minted at the mint, they are accepted by the central bank and distributed to commercial banks, which then supply the economy – businesses and households – with cash. The return flow of cash from economic actors is also handled via commercial banks, which return cash received from customers to the central bank. The central bank then

processes the returned cash, verifies that it is fit for circulation, sorts out unfit banknotes and coins, and once again makes new and still-fit banknotes and coins available to commercial banks.

However, this traditional approach has frequently been called into question. The need to cut costs and increase efficiency have led to the development of new models. While central banks in many countries are withdrawing from the cycle, that is, leaving handling and sorting activities to commercial banks and only providing for the issuance of new banknotes and coins, Austria has chosen a unique solution based on a public-private partnership.

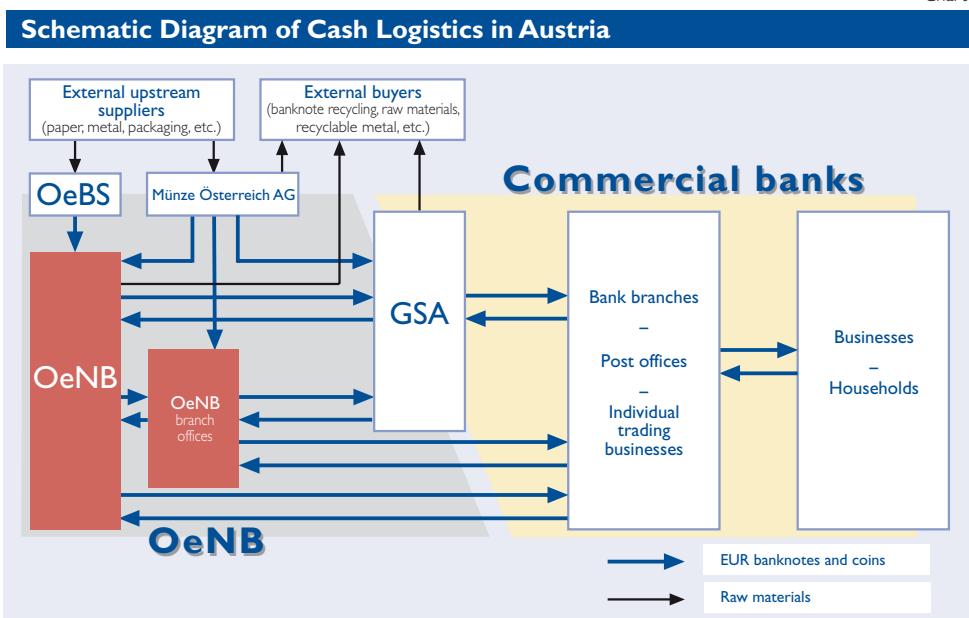
This partnership was enabled by the establishment of GSA, an organization in which the OeNB and Austria's commercial banks cooperate as shareholders. GSA's main task is to handle banknotes and coins. This specialization and cooperation arrangement has made it possible to achieve

economies of scale in cash handling, thus enabling both the commercial banks and the OeNB to reduce costs. Moreover, the OeNB's control function supports the high quality of banknotes in circulation, which central banks in the Eurosystem have undertaken to ensure in order to maintain the public's trust in the currency. The specialized nature of this organization enables it to offer a range of services which is perfectly tailored to the needs of the market.

In addition to GSA's customer-oriented services subject to fees, the Eurosystem guarantees a standardized range of services which is made available to customers free of charge and is offered by the OeNB in Austria.

From a legal standpoint and in light of the core sovereign functions of a central bank, this duality (i.e. the OeNB and GSA) is entirely permissible. The central banks in the Eurosystem are obliged to issue banknotes. In Austria, this obligation is accom-

Chart 1



Source: OeNB.

Table 2
**Statistics on Banknotes and Coins
in 2006**

	Lodgments	With-drawals	Handled
billions of Banknotes			
Banknotes	1.2	1.0	1.2
%			
of which: in Vienna	60	55	40
billions of coins			
Coins	1.8	2.2	1.7
%			
of which: in Vienna	44	41	40

Source: OeNB.

panied by a national legal requirement under which the OeNB is obliged to receive the fractional coins minted by Münze Österreich AG and to put them into circulation (§ 8 paragraph 5 of the Fractional Coin Act). Analogous or similar obligations can be found – even without an explicit basis in EU law – in all Member States of the Economic and Monetary Union (EMU).

However, the sovereign duties assigned to the NCBs in the Eurosystem not only include the actual process of putting banknotes and coins in circulation, but also accepting returned banknotes, counting, sorting and verifying authenticity, storing and holding reserve stocks, exchanging and withholding unfit or incomplete banknotes, and removing counterfeit banknotes and coins from circulation.

In the ECB's opinion, it is permissible to outsource certain tasks related to the issuance of banknotes as long as the responsibility for fulfilling these duties remains with the central bank. This requirement is met in Austria. The Cashier's Division at the OeNB acts as the leading operational control and review unit. Central bank

officials perform strategic control and review functions in the supervisory bodies of the companies within the OeNB group. This ensures that the sovereign functions and services are provided, the quality standards prescribed by the ECB are fulfilled, and changing ECB requirements are implemented in their entirety.

Table 2 illustrates the scope of activities related to the cash cycle at the OeNB (including the GSA). In 2006, some 1.2 billion banknotes and 1.7 billion coins were handled. 40% of these handling activities were carried out in Vienna. Of the banknotes processed, 18% were destroyed. Coins which are unfit for circulation are returned to Münze Österreich AG for further processing.

4.1 Role of the OeNB

Subject to the approval of the ECB, the Oesterreichische Nationalbank shall be empowered to issue banknotes denominated in euro. (Nationalbank Act 1984 as amended in 2002, Section XI, Article 61 paragraph 1)

According to the Nationalbank Act, the OeNB is authorized to put banknotes (and coins) into circulation in Austria. In this context, the OeNB must ensure that the following tasks are fulfilled:

- issuing cash;
- accepting returned cash;
- maintaining the Austrian population's trust in the currency;
- providing protection against counterfeit banknotes and coins by means of training sessions;
- ensuring sufficient quality in the banknotes and coins circulating in Austria.

The OeNB makes every effort to increase the efficiency of cash logistics in Austria in accordance with the general conditions and security

requirements of the Eurosystem. This requires strategic decisions, as was the case with the establishment of the GSA.

The Oesterreichische Nationalbank shall be obliged, upon demand, to exchange banknotes which are legal tender in Austria against banknotes of other denominations which are legal tender in Austria. (Nationalbank Act 1984 as amended in 2002, Section XI, Article 62 paragraph 1)

At the Eurosystem level, an agreement was made to offer certain services in banknote and coin transactions (lodgments and withdrawals) free of charge in all euro area countries if certain formal requirements are met (packaging, presorting). In Austria, these free services are provided by the OeNB.

4.2 Oesterreichische Banknoten- und Sicherheitsdruck GmbH (OeBS)

OeBS is the company responsible for printing and producing banknotes in Austria and for developing security features. From 1816 – the year in which the OeNB was established – until 1998, the banknote printing works operated as a department within the OeNB. This department was spun off in 1998, with ownership remaining in the hands of the OeNB. The printing works was spun off in order to address the new challenges Austria faced due to its accession to the EU and its participation in the monetary union. At the time, the Eurosystem was expected to put the production of banknotes out to tender in line with competition law, and the OeBS wanted to be prepared for this competition through the spinoff.

Within the framework of the ESCB, OeBS now produces the share

of annual banknote production assigned to Austria on the basis of its ECB capital share allocation. In addition, OeBS also participates in invitations to tender for banknote production worldwide. In this way, OeBS was awarded the contract for the production of the new Azerbaijani manat (AZN), which has been in circulation since the beginning of 2006, as well as other contracts.

Extensive research and development (R&D) activities are required in order for a company such as OeBS to meet the requirements of high-quality and secure banknotes and to hold its own on the world market for banknote production. Therefore, OeBS also places great emphasis on its R&D activities, the importance of which is highlighted by a number of patents.

4.3 GELDSERVICE AUSTRIA G.m.b.H. (GSA)

The tasks of GSA range from cash handling to cash deliveries and destruction as well as trade in foreign banknotes and coins. The company has been operating in its current form since mid-2001. Today, GSA has nearly 300 employees and handles some EUR 77 billion in banknotes and coins each year. GSA's majority shareholder is the OeNB, which currently holds 91.4% of the company's shares. The remaining 8.6% is held by Austrian commercial banks and insurance companies.

4.4 Münze Österreich AG

The tasks of Münze Österreich AG include minting, putting into circulation and withdrawing fractional and trade coins, as well as manufacturing and selling other products made of precious and nonprecious metals. The origins of the company date as far

back as 1194, when the minting of coins began under Babenberg rule in Austria. In 1989, the Republic of Austria sold 100% of the shares in Münze Österreich AG to the OeNB. Using state-of-the-art machinery, some 200 employees produce approximately 300 million coins each year. Münze Österreich AG's product range includes not only circulating and commemorative coins but also gold coins and bars.

4.5 OeNB Cashier's Division

The OeNB Cashier's Division is Austria's main cash office. This division has supervisory and directive authority in the OeNB group (OeBS, Münze Österreich AG, GSA), and together with the OeNB branch offices it supplies the Austrian economy with banknotes and coins as needed. Its various organizational units help ensure the high quality of the currency in circulation.⁴

One of the division's key activities is forecasting the demand for banknotes and coins in Austria. In addition, the analytical preparation of data material for cash cycle management is also gaining in importance. As qualified specialists from the Cashier's Division are delegated to the relevant bodies in the Eurosystem, the division also actively participates in decision-making for euro area countries.

When cash is returned from circulation, GSA and the Cashier's Division check whether banknotes and coins are authentic and still fit for circulation. Analyzing the results of these tests and constantly reviewing the quality of currency in circulation form the basis for managing quality standards using parameters such as

unfit rates and machine settings. Unusable and thus unfit banknotes are destroyed, while damaged or unfit coins are passed on to Münze Österreich AG. Counterfeit banknotes and coins are recorded, collected, assessed and classified. This information forms the basis for international counterfeiting investigations.

The OeNB Test Center performs an important function in connection with the sovereign duty of verifying the fitness and authenticity of banknotes and coins. By performing functional tests on banknote authentication devices and counting machines as well as cash recycling systems, the Test Center creates a solid foundation for efficient and accurate banknote authentication throughout Austria.

From the central bank's perspective, cash is regarded as a product. It is produced, delivered, exchanged and returned for inspection. As is the case with other products, the demand for cash also fluctuates. This means that proper and secure storage is also necessary. The sovereign mandate of safekeeping banknotes and coins in vaults is also the responsibility of the Cashier's Division.

In order to enhance the public's trust in the currency, the Cashier's Division also offers cash authentication training sessions for the general public. In these training sessions, the euro's security features are explained in detail. Actual counterfeit cash is used in order to demonstrate how counterfeits can be detected in just a few simple steps.

In addition to providing guidance for authenticity checks, the Cashier's Division also enables the public to exchange old schilling banknotes and

⁴ OeNB Test Center, National Counterfeit Center (NCC), Eastern Austria Unit.

coins for euro. This service is provided at all OeNB cash offices – at two locations in Vienna and at all of the branch offices throughout Austria. As an additional measure, the “Euro Bus” has been touring Austria since 2002 in order to raise people’s awareness of the euro’s security features and to provide people with an opportunity to exchange schillings for euro outside of Austria’s provincial capitals. Through this initiative, the OeNB has been able to reach more than 372,000 people, and as a result more than ATS 272 million has been exchanged for euro in the last five years.

These OeNB services are also offered by the Cashier’s Division in co-operation with the public relations unit and the OeNB’s branch offices.

5 Cash in Austria

With the euro launch, Austria introduced a new currency which now enjoys worldwide acceptance, is legal tender in 13 EU Member States and can thus also move freely beyond the borders of euro area countries. In order to ensure optimal planning and the efficient deployment of banknotes and coins in the euro area, it is becoming increasingly important to analyze the use and flows of banknotes and coins. The results and insights derived from such analyses have an impact on short- to medium-term cash production planning as well as the long-term strategic orientation of a central bank.

In the fall of 2005, the OeNB conducted a survey on the payment habits of households in Austria and compared the findings to those of similar surveys from the years 1996 and 2000. This research focused on the question of whether it was possi-

ble to identify shifts in usage between individual payment means over time.

One of the key statements in the study “How are Payments Made in Austria?” (Mooslechner et al., 2006) is the fact that cash is still by far the most important means of payment for Austrian households. Moreover, no major shifts in preferences are expected in the future, which also means that no drastic effects on monetary policy or cash logistics can be expected.

In addition to analyzing households, the study also took a closer look at the retail and banking sectors. The findings for households were largely congruent with those for the retail sector, especially with regard to the significance of payment media relative the overall number of transactions.

One fundamental issue in the project was the question of how much cash costs in an economy. Based on the share of total transactions calculated for each payment method and on extensive surveys in the retail and banking sectors, it was possible to estimate the costs of cash in Austria and compare them to similar research in other euro area countries.

This examination of the costs of cash rested on three main pillars:

- costs of cash to the central bank (OeNB);
- costs of cash to the banking sector;
- costs of cash in the retail sector.

An overall view of the results for these three areas warrants the conclusion that despite the country’s high level of circulation, the costs of cash in Austria are fairly low by international comparison. This points to the efficiency of organization in cash logistics. Measured as a percentage of

GDP, the costs of cash were estimated at 0.47% of GDP, with 0.02% of GDP attributed to the central bank, 0.22% to the banking sector and 0.23% to the retail sector.

6 The Future of Cash

The origins of cash date back a very long time, yet its significance as a universal medium of exchange, as an accounting unit and as a store of value has remained unchanged until this day. Through the efforts of central banks to combat counterfeiting, banknotes and coins have now become high-technology products based on a great deal of research and development work.

Even today, physical cash is by far the most important means of payment for trade in goods and services. Preference for a means of payment is mainly based on factors which are difficult to quantify, such as transaction times, anonymity, risk of loss (loss of value, physical loss due to theft, etc.), purchasing power, traceability of transactions, technical equipment and availability. In the specific case of cash, the actual costs play a secondary role in the eyes of the consumer. Given low interest levels, opportunity costs (loss of interest income) are barely a consideration in the development of consumer preferences.

The shares of various payment media in the total volume of transactions is shifting only very slowly (Mooslechner et al., 2006). Against this backdrop, the significance of cash is not likely to change in the coming years. In order to maintain the public's trust in the currency and its resistance to counterfeiting at a high level in the future, the relevant units in the ECB are constantly working on future generations of banknotes. In fact, the launch of the second series

of euro banknotes is already scheduled for the beginning of the next decade.

7 Summary

The introduction of euro banknotes and coins as legal tender in the first 12 euro area countries initially raised the question of an efficient cross-border supply of cash. In this context, it was necessary to adapt cash supply logistics to the new circumstances and to coordinate activities at the Eurosystem level. At the national level, it was necessary to observe and in some cases respond to phenomena which had barely merited attention in the past (e.g. cash migration).

Most cash-related decisions are made centrally by the ECB for – and in accordance with – the Eurosystem. However, the implementation of these decisions is left to the NCBs. At present, numerous differences still prevail between national systems. However, one of the stated objectives of the Eurosystem is to create fair and equal competitive conditions for all actors in cash services with due consideration of specific national circumstances.

In the field of cash handling, Austria has chosen its own model in the form of a group structure which has served to reduce costs and increase efficiency, as well as earning international recognition. The expertise accumulated in this way has helped the OeNB establish itself more and more as a hub and a competence center in the field of cash logistics in Central Europe.

Percentage shifts toward noncash payment methods can be identified, but this has not undermined the high significance of cash in day-to-day life: In terms of value and quantity, there has even been a steady increase. The

ECB maintains a neutral position with regard to the various payment media, leaving it up to the consumers to decide which ones to use. In any case,

however, it is important to ensure that cash remains a secure, stable and universal means of payment.

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Euro Banknotes in Circulation and the Allocation of Monetary Income within the Eurosystem

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Banknotes in circulation are traditionally the most important liability item in the balance sheet of central banks. The launch of euro cash created the need to treat this item in new way to reflect the joint liability of all Eurosystem members – the ECB and all national central banks (NCBs) of the euro area – for euro banknotes. In this context, the implications of banknote migration expected both within and outside the euro area, as well as its potential impact on the distribution of profits among the euro area central banks, were subject to extensive discussions already before the cash changeover.

A major challenge for the Eurosystem has been the fair allocation of monetary income. This is the income accruing to the individual NCBs in the performance of their monetary policy functions. In particular, this income – traditionally referred to as seigniorage income – includes income derived from assets held against notes in circulation and deposit liabilities to credit institutions.

The experience of the first five years after the cash changeover shows that the combination of all relevant aspects of the Eurosystem's banknote circulation and seigniorage income rules has ensured a fair allocation of monetary income, the functional integrity of the Eurosystem,² and thus the fulfillment of the objective stipulated by Article 32 of the Statute of the European System of Central Banks³ (ESCB).

JEL classification: E52, E58

Keywords: Seigniorage, monetary income, banknotes, liability base.

1 Introduction

Judging from the balance sheets and financial reports⁴ of central banks in the euro area, the economic significance of the changeover to the euro did not become fully apparent until banknotes and coins were introduced on January 1, 2002. The important change was that since that date *banknotes in circulation, as reflected in the balance sheets of the euro area NCBs, have no longer corresponded with the net balance of banknotes physically put*

into and withdrawn from circulation by the NCBs.⁵

In the run-up to the launch of euro cash, sceptics⁶ had warned that, in view of expected cash migration flows, income positions might shift to the detriment of certain members of the Eurosystem. The fact that such predicted distortions have not occurred is primarily attributable to the forward-looking implementation of the provisions stipulated under Article 32 of the ESCB Statute that

¹ The authors would like to thank Birgit Erdelmeier and Ian Ingram as well as Ernest Gnan for their valuable comments.

² See Scheller (2003, p. 131).

³ Consisting of the NCBs of all EU Member States and the ECB.

⁴ All balance sheet and profit and loss account items mentioned in this paper reflect the format and nomenclature laid down in the "Guideline of the ECB of 10 November 2006 on the legal framework for accounting and reporting in the European System of Central Banks" (ESCB), ECB/2006/16; see Annex IV in particular. The accounting provisions laid down by this guideline, in fact the world's only multilateral and central bank-specific framework for financial reporting, are recommended by the IMF for central bank accounting alongside the International Financial Reporting Standards (IFRS).

⁵ Euro banknotes are fully fungible within the euro area, i.e. they may be exchanged for value at any euro area NCB, irrespective of the original issuer.

⁶ See Sinn and Feist (2000), Bini Smaghi and Gros (2000) as well as Gros (1998) in detail.

Referred by:
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were designed to ensure fair allocation at all times.⁷ The cornerstone of this regime is the proportional share of euro area NCBs in the ECB's fully paid-up capital (*relative capital share*): The relative capital share determines the *banknote allocation key* in line with which the total value of euro banknotes in circulation (excluding the ECB's share) is allocated among the NCBs and thus accounted for in the NCBs' balance sheets. Furthermore, the *banknote allocation key* also governs the reallocation of overall *monetary income* arising from banknotes in circulation (*seigniorage income*⁸).

However, ongoing efforts to observe the fairness principle have led to an operationally complex regime. While the (re)allocation regime is precisely defined in the ESCB Statute, its implementation and balance sheet presentation are complex for two reasons. First, the income⁹ to be pooled for reallocation needs to be calculated on the basis of *earmarked assets*, taking into consideration various intra-Eurosystem balances arising from the application of the banknote allocation key. Second, the fact that the key for subscription of the ECB's capital has to be adjusted every five years¹⁰ and also following any enlargement of the euro area entails repeated adjustments.

Following an explanation of the regulatory framework (section 2), section 3 of this paper clarifies the Eurosystem's accounting regime for euro banknotes in circulation. In this context, it is shown how the corresponding figures have developed in the balance sheet of the Oesterreichische Nationalbank (OeNB) since 2002. On this basis, sections 3 and 4 refer to the intra-Eurosystem balances that arise from the application of the banknote allocation key and explain how monetary income relates to the monetary assets reflected in NCBs' balance sheets. In addition, section 4 demonstrates how the key for the allocation of *monetary income* applicable since 2002 functions and shows on the basis of the OeNB's balance sheet how financial effects were kept neutral for the distribution of monetary income, particularly by smoothing the *net balance of euro banknotes put into and withdrawn from circulation*. Section 5 concludes.

2 Regulatory Framework

As set forth in Article 16 of the ESCB Statute,¹¹ the Governing Council of the ECB has the exclusive right under Article 106 of the Treaty establishing the European Community to authorize the issue of banknotes within the Community. To this effect, the Governing Council of the ECB decided in

⁷ See Scheller (2003, p. 530–533) in detail.

⁸ For the definition of this term, see Scheller (2003, p. 530).

⁹ See subsection entitled "Cash, monetary policy and central bank profits" in Deutsche Bundesbank (2002, pp. 32–34; above all p. 34).

¹⁰ Under article 29.3 of the ESCB Statute.

¹¹ The ESCB Statute was published as a "Protocol on the Statute of the European System of Central Banks and the ECB" annexed to the Treaty establishing the European Community and has since been adjusted by the Treaty of Amsterdam and the Treaty of Nice.

2001 that the ECB and the – then 12 – euro area NCBs would issue euro banknotes as legal tender from January 1, 2002.¹² The ECB's share of total banknotes in circulation was set at 8%, whereas the remaining 92% are to be allocated to the NCBs in proportion to their paid-up shares in the capital of the ECB (see also section 3.1). However, the physical issue – actually putting banknotes into circulation and withdrawing them from circulation, as well as any physical handling¹³ – occurs only through NCBs. This division of responsibilities¹⁴ as well as the disclosure of the ECB's share call for balance sheet adjustments within the Eurosystem (section 3).

Since euro banknotes in circulation constitute a key element of the regime governing the allocation of monetary income within the Eurosystem, the decisions of the ECB's Governing Council based on Article 16 of the ESCB Statute of 6 December 2001 on the issue of euro banknotes (ECB/2001/15) and those based on Article 32 on the allocation of monetary income to the NCBs of participating Member States from the financial year 2002 (ECB/2001/16) onward should be seen as a "twin solution."¹⁵ In the end, monetary income is basically redistributed via

(remunerated) *intra-Eurosystem balances* created by the application of the banknote allocation key.

Table 5 shows the capital shares and banknote allocation keys that were valid until December 31, 2006, and those which apply from January 1, 2007,¹⁶ onward, respectively.

3 Balance Sheet Presentation of Euro Banknotes

This section first clarifies the balance sheet presentation of euro banknotes in circulation and the adjustment of physical circulation levels via intra-Eurosystem balances. After illustrating the development of banknotes in circulation since 1999, the impact on the OeNB's annual accounts is described in detail.

3.1 Banknotes in Circulation versus Banknote Liabilities Allocated to NCBs

Euro banknotes are issued by the ECB and euro area NCBs, whose number stood at 12 at end-2006 and now stands at 13 since Slovenia joined the euro area on January 1, 2007. To reflect the joint liability of the Eurosystem, the total value of euro banknotes in circulation is allocated on the last working day of each month among the members of the Eurosystem in accordance with a banknote allocation

¹² Decision of the ECB of 6 December 2001 on the issue of euro banknotes (ECB/2001/15), Official Journal of the European Union (OJ) L 337, 20.12.2001, p. 52–54. This decision was recently amended by the Decision of the ECB of 15 December 2006 (ECB/2006/25) as a result of capital key adjustments (owing to accessions and Article 30.5).

¹³ Decision of the ECB (ECB/2001/15, Article 3.1).

¹⁴ According to this concept, the ECB's share is put into circulation through the NCBs, in proportion to the relative capital key.

¹⁵ Decision of the ECB (ECB/2001/16, recitals 6 to 9).

¹⁶ On January 1, 2007 the capital shares and banknote allocation keys were readjusted on the accession of the Romanian and Bulgarian NCBs to the ESCB and owing to the switch of Slovenia to the euro and Banka Slovenije's concomitant accession to the Eurosystem. For a current overview of shares see www.ecb.int.

key determined by the Governing Council of the ECB.¹⁷

The purpose of the banknote allocation key is to adjust the total value of banknotes in circulation by two factors. First, the total value of euro banknotes in circulation is reduced by 8% to account for the ECB's share. Second, the remaining 92% are distributed among the euro area NCBs in proportion to their shares in the ECB's fully paid-up capital. The percentage resulting for the OeNB – its *relative capital share* – has been 2.9002% (previously: 2.9095%) since January 1, 2007. The amount established with the capital share mechanism (CSM) described here corresponds to the OeNB's share in the total value of euro banknotes in circulation and is disclosed as the OeNB's banknote liabilities under "Banknotes in circulation."

The difference between the *value of euro banknotes allocated to the individual euro area NCBs* and the *banknotes they have actually put into and withdrawn from circulation* gives rise to (remunerated) intra-Eurosystem claims or liabilities. If the net balance of banknotes in circulation exceeds the value of banknotes allocated to an NCB, a corresponding "net liability related to the allocation of euro banknotes within the Eurosystem" is disclosed. If, however, the net balance of banknotes in circulation is

lower, a corresponding net claim arises. Overall amounts of interest income and expense on these balances are cleared through the ECB as single net amounts and disclosed as "interest income" in the profit and loss account.

Since the ECB itself does not physically put banknotes into circulation, it always discloses a net intra-Eurosystem claim. The interest income earned on this claim corresponds to the seigniorage income that the ECB derives from its 8% share in the issue of euro banknotes.

The Governing Council of the ECB has decided that the seigniorage income of the ECB shall be due to the NCBs in the same financial year it accrues and distributed to NCBs as an advance dividend on the second working day after the end of each financial year.¹⁸ It shall be so distributed in full to the NCBs unless the ECB's net profit for the financial year is less than its seigniorage income for the same year. Furthermore, the Governing Council of the ECB can decide to reduce the distribution amount proportionally in respect of costs incurred by the ECB in connection with the issue and handling of euro banknotes or to transfer part or all of the seigniorage income to the ECB's provision for foreign exchange rate, interest rate and gold price risks.^{19,20} In the NCBs' profit and loss accounts,

¹⁷ Decision of the ECB of 6 December 2001 on the allocation of monetary income of the NCBs of participating Member States from the financial year 2002 (ECB/2001/16), OJ L 337, 20.12.2001, pp. 55–61, as amended by ECB/2003/22, OJ L 9, 15.1.2004, p. 39.

¹⁸ Decision of the ECB of 17 November 2005 on the distribution of the ECB's income on euro banknotes in circulation to the NCBs of the participating Member States (ECB/2005/11). As with other net profits of the ECB, this distribution is made on the basis of the relative capital key. The interest paid by NCBs on the ECB's claims against them in respect of its share of banknotes will usually be offset in the profit and loss account by profit distributions for that year.

¹⁹ Decision of the ECB of 17 November 2005 amending decision ECB/2002/11 on the annual accounts of the ECB (ECB/2005/12); replaced by ECB/2006/17 on January 1, 2007.

²⁰ See Scheller (2004, p. 129).

seigniorage income distributed by the ECB is disclosed under “Income from equity shares and participating interest.” With respect to 2005 and 2006, the Governing Council of the ECB decided to retain all seigniorage income.

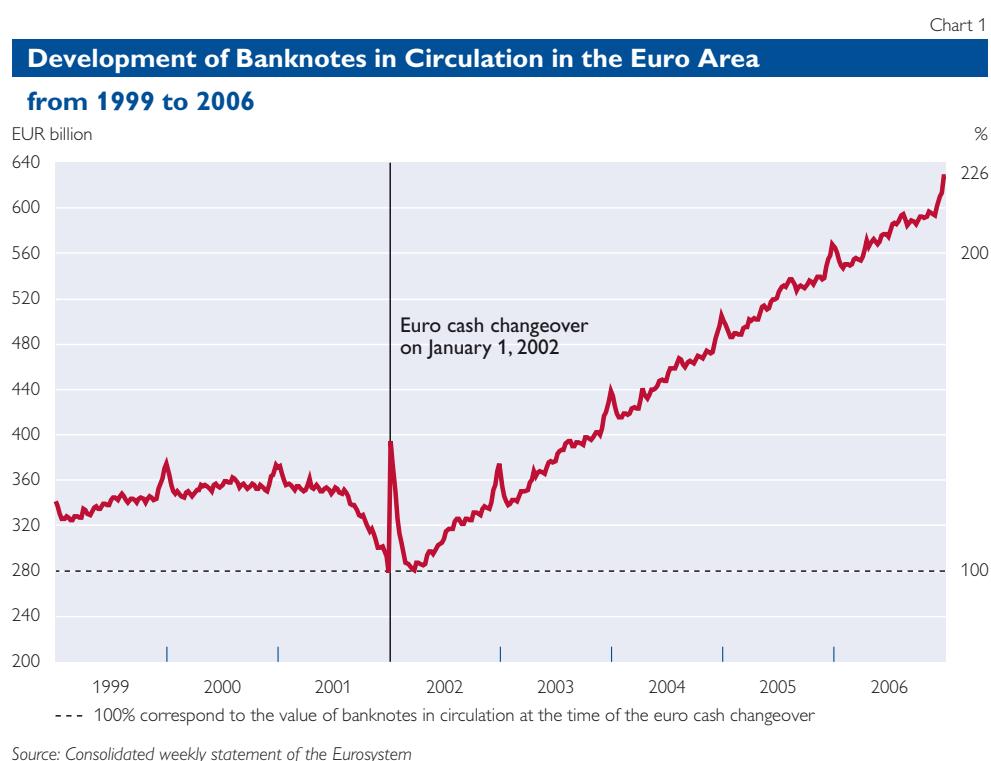
3.2 Development of Euro Banknotes in Circulation and Intra-Eurosystenm Balances since 2002

Since euro banknotes were first issued on January 1, 2002, the levels of circulation have steadily increased. At end-2006, the value of banknotes in circulation peaked at a historic high of more than EUR 628 billion. This means that circulation levels have grown some 19% on average per year.²¹

Chart 1 shows the development of banknotes put into and withdrawn from circulation by the Eurosystem since the beginning of 1999. Until 2002, banknotes in circulation were exclusively composed of national banknotes from euro area countries. In 2002, following the introduction of euro cash, banknotes in circulation comprised both national banknotes and euro banknotes, with the share of national banknotes in circulation falling significantly during the year.

3.3 Impact of the Eurosystem Accounting Regime for Banknotes in Circulation on the OeNB's Balance Sheet

The amount disclosed under the liability item “Banknotes in circulation” in the OeNB’s balance sheet corre-



²¹ Since the focus of this paper is on accounting aspects, the reasons for this growth will not be analyzed. Instead, only the facts underlying this development will be highlighted.

Table 1

Value of Euro Banknotes in Circulation versus Euro Banknote Liabilities

EUR million

Banknotes in circulation disclosed on the OeNB's balance sheet

Net balance of euro banknotes put into and withdrawn from circulation by the OeNB

December 31, 2006

1,138

Adjustments arising from

OeNB liability related to the ECB's share of euro banknotes in circulation¹

OeNB claim related to the allocation of euro banknotes within the Eurosystem (CSM)

-1,462

17,139

Euro banknote liabilities allocated to the OeNB²

16,815

Source: OeNB.

¹ This amount corresponds to the OeNB's share of 8% of the euro banknotes in circulation that is disclosed on the ECB's balance sheet.

² This amount corresponds to 2.6765% (in accordance with the OeNB's banknote allocation key applicable as at December 31, 2006) of the total of value euro banknotes in circulation.

Chart 2

Development of Banknotes in Circulation Disclosed

in the OeNB's Balance Sheet from 1999 to 2006

EUR billion

%



Source: OeNB.

sponds to the OeNB's share of total euro banknotes in circulation within the euro area as established in line with the accounting regime described in section 3.1. The starting point for calculating that liability is the value of banknotes that the OeNB physically put into and withdrew from circulation in the given period, as set out in the Decision of the Governing Council of the ECB of 6 December 2001 (ECB/2001/15).

Table 1 shows the relevant figures for the OeNB as at December 31, 2006, based on a total value of euro banknotes in circulation in the euro area of EUR 628 billion.

Adjustments resulting from this reallocation give rise to an intra-Eurosystem claim for the OeNB at end-2006, recorded in the OeNB balance sheet as the asset item "Net claims related to the allocation of euro banknotes within the Eurosystem."

Table 2

Euro Banknotes in Circulation Allocated to the OeNB (Annual Averages)				
	Annual average euro banknote liabilities ¹	Change		
	EUR million	%		
2002	8,887	-3,632	-29.0	
2003	9,913	+1,026	+11.5	
2004	11,751	+1,838	+18.5	
2005	13,618	+1,867	+15.9	
2006	15,218	+1,511	+11.1	
Average 2002 to 2006	11,859	x	x	

Source: OeNB.
¹ See footnote 21.

The share of euro banknotes allocated to the OeNB has been increasing in line with the total value of euro banknotes in circulation within the euro area. Chart 2 shows the development of banknotes in circulation disclosed in the OeNB's balance sheet²² since 1999; euro banknotes have, of course, only been included since 2002.

Table 2 shows the annual average value of the liability item "Banknotes in circulation" over the past five years.

4 Allocation of Monetary Income within the Eurosystem

According to the concept defined in Article 32 of the ESCB Statute, the monetary income of euro area NCBs is pooled and then reallocated to the NCBs in proportion to their share in the fully paid-up capital of the ECB.²³ Since the financial year 2003, the so-called semi-direct method²⁴ has been used to calculate such income in line

with Article 32.2 of the ESCB Statute and will be used at least until end-2007.

In order to better describe the process of allocating monetary income, this section is divided into three subsections. The first introduces the regime for allocating *monetary income*. The second provides a detailed explanation of the smoothing mechanism (*compensatory amount*) introduced in connection with the banknote allocation key (section 3). The third and final subsection presents the financial impact on the OeNB's income.

The guiding principle of the provisions governing reallocation is the fair allocation of seigniorage income²⁵ arising from the use of monetary policy instruments, irrespective of which euro area NCB actually earns this income. The pooled monetary income of euro area NCBs is also reallocated in line with their share in the ECB's fully paid-up capital.

²² In 2002 the OeNB disclosed both euro banknotes and Austrian schilling banknotes in circulation under this balance sheet item. From 2003 it shows only euro banknotes in circulation under this item.

²³ Income will not be reallocated provided the pooled amount for covering an annual loss incurred by the ECB is fully/partially retained by the ECB under Article 33.2.

²⁴ Decision of the Governing Council of the ECB of 6 December 2001 (ECB/2001/16), recently amended by the Decision of the Governing Council of the ECB of 19 May 2006 (ECB/2006/7).

²⁵ See Scheller (2003, p. 530 ff.) in detail.

4.1 Regime for Allocating Monetary Income within the Eurosystem

The concept of monetary income pursuant to Article 32 of the ESCB Statute refers to the monetary income that accrues to the euro area NCBs in the performance of the Eurosystem's monetary policy function. As defined by the ESCB Statute, the monetary income of the euro area NCBs corresponds to their annual income derived from earmarked assets held as a counterpart against notes in circulation and their deposit liabilities to credit institutions (*monetary base*).²⁶ The monetary income so accrued is reduced by expenses incurred due to the use of liquidity-absorbing monetary policy instruments. In particular, the Eurosystem's minimum reserve requirements materially affect the calculation of monetary income, as the interest paid by NCBs to credit institutions on their minimum reserve deposits reduces the income to be pooled under Article 32.4 of the ESCB Statute.

In addition, costs that may be claimed by business partners in the event of defined TARGET²⁷ malfunctioning are deductible from the monetary income to be pooled. Interest to be paid for the financial year and incurred in the context of the remunerated intra-Eurosystem net liability related to the allocation of euro banknotes within the Eurosystem is also deducted. Furthermore, costs

incurred in connection with the issue of banknotes may also be deducted, subject to a decision of the Governing Council of the ECB under Article 32.4 of the ESCB Statute. However, such a decision has not been made so far.

Any income from monetary policy-related refinancing operations (the asset item "*Lending to euro area credit institutions related to monetary policy operations denominated in euro*," mainly arising from tender operations), TARGET claims and other relevant intra-Eurosystem balances²⁸ are part of the monetary income to be pooled under the semi-direct method applicable from 2003 to 2007. Gold holdings equivalent to the share of each euro area NCB in the ECB's capital are also taken into consideration, but for the calculation of monetary income a zero return is assumed for gold, since gold effectively generates no income.

Where the value of an NCB's earmarked assets exceeds or falls short of the value of its monetary base, the difference is offset by applying to the value of the difference the average annual rate of return on all euro area NCBs' assets earmarked for the calculation of monetary income. The average annual rate is calculated by the ECB and has so far fallen just short of the average annual *marginal rate of return on the Eurosystem's main refinancing operations*.²⁹ The resulting amount is added to the monetary income to

²⁶ For the definition of relevant income versus other income, see Scheller (2003, p. 533).

²⁷ Trans-European Automated Real-time Gross settlement Express Transfer. TARGET is a real-time gross settlement system for settling large-value euro-denominated payments, which consists of 16 national real time gross settlement (RTGS) systems, the ECB payment mechanism and an interlinking component connecting the RTGS systems.

²⁸ In particular, this includes balance sheet asset items comprising remunerated euro claims equivalent to the transfer of foreign reserve assets to the ECB, as well as disclosed net balances related to the allocation of euro banknotes in circulation within the Eurosystem provided these are shown as a net claim in the relevant financial year.

²⁹ Specifically, the latest available (marginal) rate for the Eurosystem's main weekly refinancing operation.

be pooled as income when the monetary base exceeds the value of the earmarkable assets. Conversely, the result is deducted as an expense from the monetary income to be pooled when the earmarkable assets exceed the monetary base.

The sum of income thus calculated is to be pooled by individual euro area NCBs following adjustment for expenses incurred with regard to the use of monetary policy instruments (especially minimum reserve balances) as well as for TARGET liabilities and other significant intra-Eurosystem balances. Finally, the aggregate net income is reallocated to the euro area NCBs in proportion to their respective share in the ECB's fully paid-up capital.

The actual annual reallocation of monetary income takes place retroactively on the last working day in January of the following year through TARGET payments among the euro area NCBs.

Both this calculation – which is based on the daily transfer of financial data from euro area NCBs to the ECB – and the net payments of monetary income among the NCBs resulting from the reallocation occur via the ECB, which acts as a central clearing house.

4.2 Compensatory Amounts Adjusting Banknote-Related Intra-Eurosystem Balances

In order to prevent sudden significant changes in the relative income positions of individual NCBs compared with the pre-cash changeover period, the intra-Eurosystem balances created by the allocation of banknote liabilities are subject to a smoothing mechanism³⁰ in the first five years following the cash changeover year. This mechanism is based on compensating factors, which reflect the difference between the average value of banknotes in circulation³¹ in a *reference period*³² before the euro cash changeover and the corresponding theoretical value calculated on the basis of the banknote allocation key. These compensating factors are progressively reduced to zero until, from the sixth year after the cash changeover, the income generated by banknotes in circulation is distributed only in accordance with the banknote allocation key. The smoothing regime (including a special provision for Luxembourg), introduced in 2002 for the OeNB and all other central banks participating in the Eurosystem at the time (i.e. except for Banka Slovenije³³), will terminate on December 31, 2007. By the same token, *compensa-*

³⁰ Decision of the Governing Council of the ECB of 6 December 2001 on the allocation of monetary income to NCBs of participating Member States from the financial year 2002 (ECB/2001/16), recently amended by the Decision of the Governing Council of the ECB of 19 May 2006 (ECB/2006/7).

³¹ For the financial year 2002 only, a special rule was in force until 31 December 2002. According to this, in addition to euro banknotes, national (in this case, Austrian schilling) banknotes in circulation were also included in the calculation of the total value of banknotes in circulation.

³² The start of the two-year reference period will always be the 30th month prior to the introduction of euro cash. This means that the reference period for Slovenia, for instance, ranges from July 2004 to June 2006. These rules are to be applied accordingly to all NCBs joining the Eurosystem in future.

³³ The smoothing adjustments will apply for Slovenia from January 1, 2007.

tory amounts apply, however, for Banka Slovenije from January 1, 2007, i.e. the day it joined the Eurosystem, and these compensatory amounts will be progressively adjusted over the six³⁴ years ahead.

Each new entry to the Eurosystem will give rise to new compensatory amounts for a smoothing period of six years each. The original plan was to allocate all monetary income fully in accordance with the ECB's capital key from 2008; now, of course, compensatory amounts will continue to apply for Slovenia beyond that date. The compensatory amounts to which every euro area central bank is entitled in the six-year smoothing period are offset in the balance sheet by a nonremunerated counterpart of the same amount.

The net intra-Eurosystem balances related to the allocation of euro banknotes within the Eurosystem, as adjusted for the compensatory amount, are remunerated on a daily basis. The remuneration rate used is the marginal rate for the main refinancing operations.³⁵ As mentioned above, the counterpart for offsetting the compensatory amount does not incur interest.

4.3 The OeNB's Share of Monetary Income Earned by the Eurosystem in the Financial Year 2005

For the OeNB, monetary income earned, interest income or expense on intra-Eurosystem balances arising from the allocation of euro banknote liabilities, the entitlement to ECB seigniorage payments for 2005, and the effects arising from transfers to risk provisions³⁶ made by the ECB are as follows:

4.3.1 The OeNB's Net Result from the Allocation of Monetary Income within the Eurosystem in 2005

According to the method described in sections 4.1 and 4.2, the OeNB contributed EUR 278 million to the monetary income pooled by all euro area NCBs, but was reallocated EUR 285 million in 2005.

The OeNB's resulting net monetary income of EUR 7 million reflects the reallocation effect within the Eurosystem, which is based on the difference between the net contributions of euro area NCBs and their redistribution entitlements based on their relative shares in the ECB's capital.

Table 3

Net Result of Monetary Income Pooled by and Reallocated to the OeNB

EUR million

	2005
Monetary income	644
Deductions (especially interest expense)	-366
Net monetary income to be pooled	-278
Reallocated monetary income	285
Net result from reallocation	7

Source: OeNB.

³⁴ The six-year rule is obtained from the special euro changeover year plus the five following years.

³⁵ Pursuant to decision ECB/2001/16, as amended by a decision of the Governing Council of the ECB of 19 May 2006 (ECB/2006/7).

³⁶ Decision of the Governing Council of the ECB of 17 November 2005 amending decision ECB/2002/11 on the annual accounts of the ECB (ECB/2005/12); replaced by ECB/2006/17 on January 1, 2007.

Table 3 shows the OeNB's net result from the allocation of monetary income for 2005.³⁷

4.3.2 Impact on the OeNB's Result for the Financial Year 2005 Taking All Relevant Components into Consideration

The result of the pooling of monetary income as explained above should be seen in the context of payment flows arising from the reallocation of banknotes in circulation. For this reason, this article presents in the following an overview of the financial impact arising from the monetary income regime in connection with the remuneration of net balances related to the allocation of euro banknotes within the Eurosystem.

Table 4 shows the financial impact for the OeNB, including all the relevant financial components of the current monetary income regime.

In 2005, the value of banknotes put into and withdrawn from circulation by the OeNB fell well short of the value of banknotes allocated to the OeNB and thus actually reported in its annual accounts as banknotes in circulation. The financial impact of this development is reflected in the

interest income on the intra-Eurosystem balances related to the allocation of euro banknotes within the Eurosystem.

Table 4 also shows the financial smoothing effect of the method described in section 4.2. The smoothing mechanism for the period from 2002 to 2007 offsets only past imbalances (from July 1999 to June 2001) via remuneration of the compensatory amount.

5 Conclusions

Until euro banknotes were issued, the disclosure of *banknotes in circulation* did not require any special regulatory framework, as each central bank was the sole institution authorized to issue banknotes in its country and would not accept banknotes issued by other central banks. This meant that each NCB disclosed the exact overall value of the banknotes it had *physically put into and withdrawn from circulation*, and no adjustment was required. In the transitional period between the establishment of the Eurosystem on January 1, 1999, and the introduction of euro banknotes on January 1, 2002,³⁸ the national currencies of other euro area NCBs

Overall Monetary Income		2005
EUR million		
Net result from the pooling and reallocating of monetary income		7
Remuneration of the intra-Eurosystem balances related to:		
the ECB's share of euro banknotes in circulation (ECB seigniorage)		146
the allocation of euro banknotes within the Eurosystem (CSM)		-25
the remunerated compensatory amount		144
Net income		27
Source: OeNB.		153

³⁷ As disclosed in the OeNB's annual accounts.

³⁸ This also applied to the dual phase when both national and euro banknotes were accepted as legal tender in 2002.

had to be accepted for conversion (at an already fixed irrevocable euro conversion rate) pursuant to Article 52 of the ESCB Statute and then had to be repatriated to the issuing central bank (where they would be finally destroyed); yet ultimately this regime did not affect the banknote liabilities of the accepting central bank.

With the introduction of euro cash as the Eurosystem's single currency, these national procedures could not be maintained since, in addition to euro banknotes withdrawn by domestic commercial banks, each euro area NCB is obliged to accept all euro banknotes returned to it, irrespective of whether they were issued by itself or by another euro area NCB.

In the absence of the now approved regime, banknote migration would have obliged a single euro area central bank to accept, in an extremely hypothetical case, liability for the total value of euro banknotes in circulation. Since, however, the current legal framework³⁹ limits the liability of each NCB to its *relative capital share*, it was necessary to provide, first, for a *fair allocation of banknotes* and, second, for smoothing process that would offset imbalances arising from the migration of euro banknotes across national borders within the EU both in accounting and financial terms.

The same principle logically applies, third, to the income derived by each NCB from its banknotes in circulation (seigniorage income) and its monetary policy instruments. Here,

too, seigniorage income used to accrue directly to each NCB before it became an integral part of the Eurosystem, and was clearly distinguishable from the income of other central banks with regard to the distribution of dividends to shareholders and/or the state. The financial consequences of joint banknote issuance and withdrawal were already acknowledged when the establishment of the Economic and Monetary Union (Treaty of Maastricht) was approved and were taken into account under Article 32 of the ESCB Statute. The Governing Council of the ECB was authorized to adopt all further measures for implementing Article 32 in the Eurosystem.

Prior to the coming into force of the aforementioned regime for the expected diverse consequences of banknote migration and for the *allocation of monetary income*, it was hardly possible to meaningfully predict how the many determinants would develop. Nevertheless, expert working groups⁴⁰ of the Eurosystem managed to create for both the balance sheet presentation of euro banknotes in circulation and the allocation of monetary income within the Eurosystem a fair and feasible regulatory framework that is open to new entrants to the Eurosystem and takes account of the principles of fairness, neutrality and equal treatment. The current monetary income regime was approved by the Governing Council of the ECB in December 2001 and is binding at least until 2007.

³⁹ See recitals 7 and 8 of the Decision ECB/2001/15.

⁴⁰ Committees in the Eurosystem are composed of experts from NCBs (see the corresponding section in the relevant ECB annual report, e.g. 2005, p. 171). In collaboration with experts from other areas of expertise, the Accounting and Monetary Income Committee (AMICO) was responsible for the development of the currently regulatory framework.

In 2007, expert working groups will conduct a systematic⁴¹ review of the current regime governing the allocation of monetary income, following a mandate of the Governing

Council of the ECB in order to ensure its future applicability in conformity with the principles of fair allocation and the functional integration of the Eurosystem.

Table 5

Capital Shares of EU Central Banks					
%	Subscribed capital		Paid-up capital		Banknote allocation key
	as at December 31, 2006	from January 1, 2007	as at December 31, 2006	from January 1, 2007	as at December 31, 2006
Deutsche Bundesbank	21.1364	20.5211	29.5652	29.5229	27.2000
Banque de France	14.8712	14.3875	20.8016	20.6987	19.1375
Banca d'Italia	13.0516	12.5297	18.2563	18.0260	16.7960
Banco de Espa��a	7.7758	7.5498	10.8766	10.8616	10.0065
De Nederlandsche Bank	3.9955	3.8937	5.5888	5.6017	5.1415
Nationale Bank van België/Banque Nationale de Belgique	2.5502	2.4708	3.5672	3.5546	3.2820
Oesterreichische Nationalbank	2.0800	2.0159	2.9095	2.9002	2.6765
Bank of Greece	1.8974	1.8168	2.6541	2.6138	2.4415
Banco de Portugal	1.7653	1.7137	2.4693	2.4654	2.2715
Suomen Pankki	1.2887	1.2448	1.8026	1.7908	1.6585
Central Bank and Financial Services Authority of Ireland	0.9219	0.8885	1.2895	1.2782	1.1865
Banka Slovenije	x	0.3194	x	0.4595	x
Banque centrale du Luxembourg	0.1568	0.1575	0.2193	0.2266	0.2020
	71.4908	69.5092	100.0000	100.0000	92.0000
Bank of England	14.3822	13.9337	x	x	x
Narodowy Bank Polski	5.1380	4.8748	x	x	x
Banca Na��ional�� a României	x	2.5188	x	x	x
Sveriges Riksbank	2.4133	2.3313	x	x	x
Danmarks Nationalbank	1.5663	1.5138	x	x	x
��esk�� n��rodn�� banka	1.4584	1.3880	x	x	x
Magyar Nemzeti Bank	1.3884	1.3141	x	x	x
Bulgarian National Bank	x	0.8833	x	x	x
N��rodn�� banka Slovenska	0.7147	0.6765	x	x	x
Lietuvos bankas	0.4425	0.4178	x	x	x
Banka Slovenije	0.3345	x	x	x	x
Latvijas Banka	0.2978	0.2813	x	x	x
Eesti Pank	0.1784	0.1703	x	x	x
Central Bank of Cyprus	0.1300	0.1249	x	x	x
Central Bank of Malta	0.0647	0.0622	x	x	x
	28.5092	30.4908	x	x	x
Total	100.0000	100.0000	100.0000	100.0000	92.0000
ECB	x	x	x	x	8.0000
Total	100.0000	100.0000	100.0000	100.0000	100.0000

Source: OeNB, based on the corresponding legal acts of the ECB.

⁴¹ See recital 11 of the Decision ECB/2001/16.

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N O T E S

Abbreviations

ARTIS	Austrian Real Time Interbank Settlement (the Austrian RTGS system)	IHS	Institut für Höhere Studien und Wissenschaftliche Forschung – Institute for Advanced Studies, Vienna
A-SIT	Secure Information Technology Center – Austria	IIF	Institute of International Finance
ASVG	Allgemeines Sozialversicherungsgesetz –	IIP	international investment position
A-Trust	General Social Security Act	IMF	International Monetary Fund
A-Trust	A-Trust Gesellschaft für Sicherheitssysteme im elektronischen Datenverkehr GmbH	ISO	International Organization for Standardization
ATX	Austrian Traded Index	IWI	Industriewissenschaftliches Institut – Austrian Institute for Industrial Research
BCBS	Basel Committee on Banking Supervision (BIS)	JVI	Joint Vienna Institute
BIC	Bank Identifier Code	LIBOR	London Interbank Offered Rate
BIS	Bank for International Settlements	M3	broad monetary aggregate M3
BOP	balance of payments	MFI	monetary financial institution
BSC	Banking Supervision Committee (ESCB)	MRO	main refinancing operation
CACs	collective action clauses	MoU	memorandum of understanding
CEBS	Committee of European Banking Supervisors (EU)	NACE	Statistical Classification of Economic Activities in the European Community
CEE	Central and Eastern Europe	NCB	national central bank
CEECs	Central and Eastern European countries	OeBS	Oesterreichische Banknoten- und Sicherheitsdruck GmbH – Austrian Banknote and Security Printing Works
CESR	Committee of European Securities Regulators	OECD	Organisation for Economic Co-operation and Development
CIS	Commonwealth of Independent States	OeKB	Oesterreichische Kontrollbank (Austria's main financial and information service provider for the export industry and the capital market)
CPI	consumer price index	OeNB	Oesterreichische Nationalbank (Austria's central bank)
EBA	Euro Banking Association	OPEC	Organization of the Petroleum Exporting Countries
EBRD	European Bank for Reconstruction and Development	ÖBFA	Austrian Federal Financing Agency
EC	European Community	ÖNACE	Austrian Statistical Classification of Economic Activities
ECB	European Central Bank	POS	point of sale
Ecofin	Council of Economic and Finance Ministers (EU)	PRGF	Poverty Reduction and Growth Facility (IMF)
EEA	European Economic Area	RTGS	Real-Time Gross Settlement
EFC	Economic and Financial Committee (EU)	SDR	Special Drawing Right (IMF)
EIB	European Investment Bank	SDRM	Sovereign Debt Restructuring Mechanism (IMF)
EMS	European Monetary System	SEPA	Single Euro Payments Area
EMU	Economic and Monetary Union	SPF	Survey of Professional Forecasters
EONIA	Euro OverNight Index Average	STEP2	Straight-Through Euro Processing system offered by the Euro Banking Association
ERM II	Exchange Rate Mechanism II (EU)	STUZZA	Studiengesellschaft für Zusammenarbeit im Zahlungsverkehr G.m.b.H. – Austrian Research Association for Payment Cooperation
ERP	European Recovery Program	S.W.I.F.T.	Society for Worldwide Interbank Financial Telecommunication
ESA	European System of Accounts	TARGET	Trans-European Automated Real-time Gross settlement Express Transfer
ESAF	Enhanced Structural Adjustment Facility (IMF)	Treaty	refers to the Treaty establishing the European Community
ESCB	European System of Central Banks	UNCTAD	United Nations Conference on Trade and Development
ESRI	Economic and Social Research Institute	UNO	United Nations Organization
EU	European Union	VaR	Value at Risk
EURIBOR	Euro Interbank Offered Rate	WBI	Wiener Börse Index
Eurostat	Statistical Office of the European Communities	WEF	World Economic Forum
FATF	Financial Action Task Force on Money Laundering	WIFO	Österreichisches Institut für Wirtschaftsforschung – Austrian Institute of Economic Research
Fed	Federal Reserve System	WIIW	Wiener Institut für internationale Wirtschaftsvergleiche – The Vienna Institute for International Economic Studies
FMA	Financial Market Authority (for Austria)	WKO	Wirtschaftskammer Österreich – Austrian Federal Economic Chamber
FOMC	Federal Open Market Committee (U.S.A.)	WTO	World Trade Organization
FSAP	Financial Sector Assessment Program (IMF)		
FWF	Fonds zur Förderung der wirtschaftlichen Forschung – Austrian Science Fund		
GAB	General Arrangements to Borrow		
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 services company)		
HICP	Harmonized Index of Consumer Prices		
HIPC	Heavily Indebted Poor Countries		
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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