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EUROSYSTEM

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Stability and Security.

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Call for Applications: Visiting Research Program

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

The OeNB offers a stimulating and professional research environment in close proximity to the policymaking process. Visiting researchers are expected to collaborate with the OeNB's research staff on a prespecified topic and to participate actively in the department's internal seminars and other research activities. They will be provided with accommodation on demand and will, as a rule, have access to the department's computer resources. Their research output may be published in one of the department's publication outlets or as an OeNB Working Paper. Research visits should ideally last between 3 and 6 months, but timing is flexible.

Applications (in English) should include

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

Applications for 2013 should be e-mailed to *eva.gehringer-wasserbauer@oenb.at* by November 1, 2012.

Applicants will be notified of the jury's decision by mid-December. The following round of applications will close on May 1, 2013.

The Economy has Bottomed Out

Martin Schneider,
Josef Schreiner,
Maria Silgoner[1]

While Japan's economy is showing the first signs of a hesitant recovery, the upturn already gained a foothold in the U.S. economy in the second half of 2011 on the back of robust domestic demand. Conditions in the labor market relaxed perceptibly, while the real estate market is still waiting for a rebound. The U.S. Federal Reserve System and the Bank of Japan changed their respective monetary policies at the beginning of 2012 to communicate their inflation goal clearly. At the same time, both central banks decided to keep their key interest rates at a historically low level for the time being. By contrast, China's economy has lost momentum, prompting the Chinese central bank to start easing monetary policy.

After the euro area economy had started to revive in the first half of 2011, conditions clouded over from mid-2011. In the fourth quarter of 2011, real GDP weakened by 0.3% against the previous quarter. With the consolidation measures required in all sectors dampening economic activity, net exports remained the only stable support for growth. In the first quarter of 2012, GDP is anticipated to decline marginally as well, but leading indicators signal that it will recover thereafter. Ongoing tensions in the bond markets that progressively spread to other financial market segments called for new monetary policy measures – the reduction of interest rates, the provision of additional long-term liquidity and the relaxation of the eligibility criteria for collateral. These measures along with the EU and international rescue packages as well as EU economic governance reforms eased tensions in the financial markets at the beginning of 2012 and restored confidence.

Economic conditions deteriorated noticeably in the Central, Eastern and Southeastern European (CESEE) EU Member States until the turn of the year 2011 to 2012. In the fourth quarter of 2011, average growth in the region flagged markedly; many countries reported contracting growth. In recent months, signs of a trend reversal in the first quarter of 2012 have been mounting. However, if the rally continues beyond the first quarter of 2012, it will be very small.

In 2011, the Austrian economy expanded by a stronger than expected +3.0%, but successively lost momentum in the course of the year. GDP growth, still above average in the first half of 2011, contracted slightly in the fourth quarter. Quite likely, the economy has already bottomed out. The OeNB's Economic Indicator signals a stabilization of Austria's economy for the first half of 2012. Despite the high employment growth recorded in 2011, which lasted into the beginning of 2012, unemployment rose somewhat. After peaking in fall 2011, inflation is currently subsiding notably.

JEL classification: E2, E3, 01
Keywords: global outlook, euro area, Central, Eastern and Southeastern Europe, Austria

1 Recovery in the U.S.A.; China, the Motor of Global Growth, Is Losing Steam

1.1 U.S. Economy Posts Clear Signs of a Comeback

At the end of 2011, the U.S. economy exhibited clear signs of revival. Real GDP expanded by 3.0% annualized in the fourth quarter of 2011. Domestic demand – above all gross fixed capital formation and consumer spending – powered domestic demand, while public spending made a negative contribution to growth. A marginally negative contribution came from net exports as well. The recovery of the labor market continued: At the beginning of 2012, the unemployment rate came to 8.3%, the lowest value since spring 2009. Conversely, the recovery of the real estate market is still languishing. At the end of 2011, real estate prices as mea-

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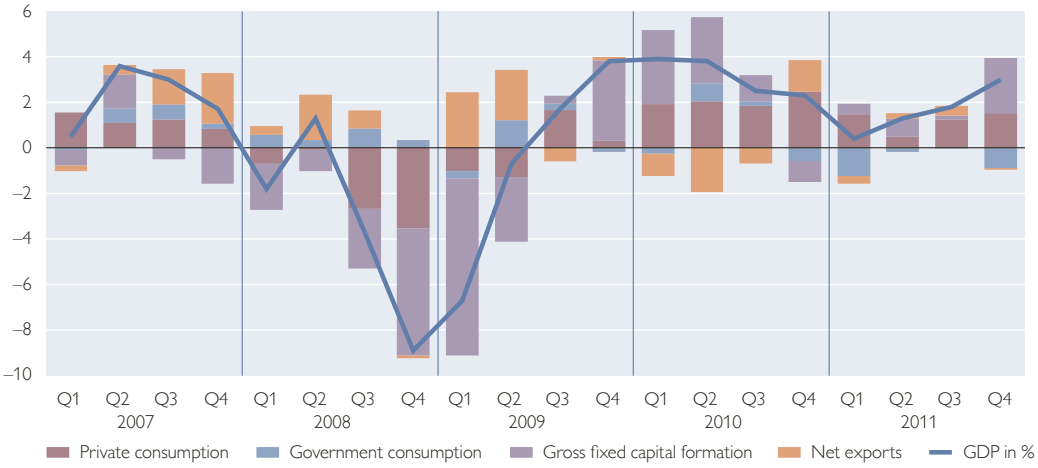
March 15, 2012

Chart 1

U.S.A.: Components of Real GDP Growth

Contributions to growth (quarter on quarter, seasonally adjusted, annualized) in percentage points



Source: Bureau of Economic Analysis.

sured by the Case Shiller house price index were still 4% lower than one year earlier and were still receding.

Leading indicators point to a continuation of the upswing. The IMF is forecasting 1.8% growth for 2012 and an acceleration of the expansion to 2.2% in 2013. While domestic demand is expected to firm, global foreign demand will be sluggish. The future direction of fiscal policy remains a factor of uncertainty: The U.S. budget deficit will be close to 10% again in 2012, and government debt could burgeon to nearly 110% of GDP in 2013.

The strong reduction of unemployment could soon feed into higher inflationary pressure; at the current juncture, it has checked the downtrend in overall inflation. In its decisions and communications, the Federal Reserve System (Fed) will put greater emphasis on the development of inflation. For the first time in the existence of the Federal Open Market Committee (FOMC), this body at the end of January 2012 defined an official inflation target of 2% as measured by the annual change in the price index for personal consumption expenditures, which is a goal that is in keeping with the targets of other central banks across the world. In January 2012, the rise in the price index for personal consumption expenditures in the U.S.A. came to 2.4%. Unlike for central banks pursuing a classical inflation targeting policy, the legislator prescribes that the Fed pursue not just price stability, but also maximum employment and moderate long-term interest rates. The Fed has announced that it would follow a balanced approach in promoting the objectives in case they are not complementary.

In addition to setting an explicit inflation target, the Fed took an additional step in January 2012 to increase transparency, namely by announcing that it would regularly publish the individual FOMC participants' detailed projections of the expected path for the target federal funds rate. The detailed projections for January 2012 showed that FOMC members' expectations diverged strongly and that the majority of participants expected interest rates to remain low at least until 2014. Based

on the information available, the FOMC decided to keep the target range for the federal funds rate at 0% to 0.25%.

1.2 Short-Lived Recovery in Japan after the Devastating Earthquake

The severe earthquake that hit Japan in March 2011 induced a pronounced contraction of growth and led to a disruption of global value-added chains. In the third quarter of 2011, however, the reconstruction activities and the normalization of exports had a positive impact on growth, as expected. GDP widened by 1.7% on a quarterly annualized basis, buoyed nearly equally by domestic demand and net exports.

But this increase proved to be short-lived. Toward the end of 2011, the deteriorating global economy and the strength of the Japanese yen had a dampening effect on export demand. In the course of 2011, the Japanese yen firmed by 6% against the U.S. dollar and by 8% against the euro. Japan was also affected by the Thai flood crisis, which disrupted value-added chains once again. In the fourth quarter of 2011, real GDP shrank by 0.2%; the only negative growth contribution came from net exports. In 2011 as a whole, Japanese growth dropped by 0.7%. At the beginning of 2012, things began to pick up, with industrial output and consumer as well as business confidence rallying. The IMF anticipates 1.7% growth for the Japanese economy in 2012, and roughly the same pace of growth for 2013.

In mid-February 2012, the Bank of Japan (BoJ) decided to expand its Asset Purchase Program by JPY 10,000 billion to JPY 65,000 billion to stimulate the economy and to weaken the Japanese yen; it was successful on both counts. At the same time, only three weeks after the Fed had made public its new communication strategy, the BoJ announced an explicit inflation target of 1% as its price stability goal. In January 2012, overall inflation was just barely positive at 0.1%, whereas core inflation was clearly negative at –0.9%. Given the development of exchange rates and the oil price, deflationary tendencies are not likely to last. The BoJ's target for the key interest rate has remained unchanged at 0% to 0.1% since the end of 2010.

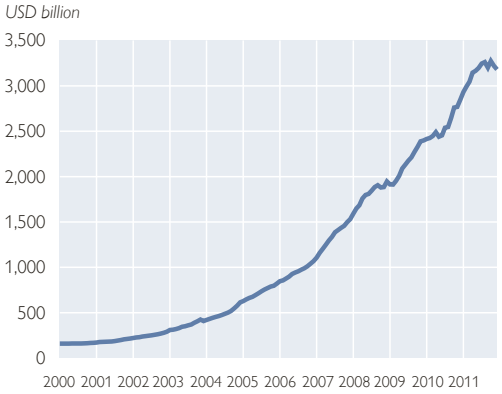
1.3 Chinese Economy Cools Markedly

The pace of Chinese economic growth has eased considerably. The annualized growth rate of real GDP stood at 8.9% in the fourth quarter of 2011. For 2012, the IMF forecasts economic growth in China to abate to 8.2% in view of the weakening of global growth. The Chinese economy had performed more powerfully even during the crisis year 2009. In the meantime, the Chinese government has lowered its growth target for 2012 to 7.5%. High commodity prices, above all, are depressing economic activity. With imports augmenting at a rapid pace and export demand flagging at the same time, the trade balance switched into deficit. As the economy has slowed, inflation has subsided quickly as well. Having topped out at 6½% in mid-2011, inflation lessened to just over 4% at the end of 2011. The acceleration to 4.5% in January 2012 is primarily attributable to the scheduling of the Chinese New Year festivities in 2012, which traditionally drive up food prices.

To address flagging growth, in February 2012 the government announced the establishment of a fund to support small and medium-sized enterprises; moreover, tax relief measures were passed. At the beginning of December 2011, the Chinese central bank started

Chart 2

China: Reserve Assets excluding Gold



Source: Thomson Reuters, national source.

to loosen monetary policy, lowering the minimum reserve rate by 1 percentage point (to 20.5%). The interest rates have remained unchanged for the time being, but additional expansionary monetary policy measures are expected for 2012. In the fourth quarter of 2011, China's foreign currency reserves decreased (in U.S. dollar terms) for the first time since the 1998 Asian financial crisis. The main reason for this development is the decline in the value of euro-denominated assets following the depreciation of the euro. The level of currency assets, however, also mirrors the flows of goods, services and capital between China and the rest of the world. Both China's current account surplus and net direct investment diminished substantially. The decline reflects the risk-averse behavior of international investors and the deterioration of China's fundamentals, but also China's opening up to international investment opportunities.

2 Financial Market Tensions and the Weak Euro Area Economy Call for New Monetary Policy Measures

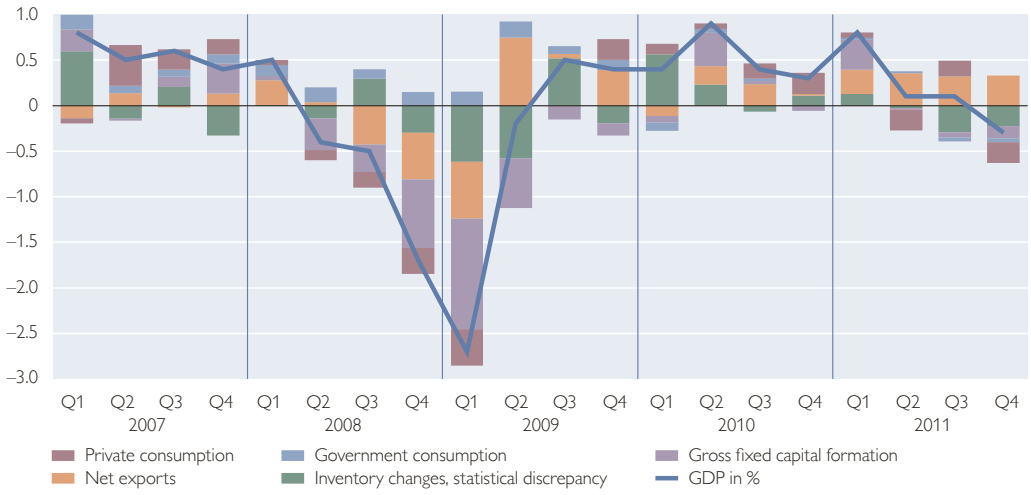
2.1 First Signs of Recovery after Negative Economic Growth in the Fourth Quarter of 2011

In the fourth quarter of 2011, euro area GDP contracted quarter on quarter for the first time in 2½ years, sinking by 0.3%. Domestic demand put a brake on growth. The austerity measures passed in many euro area countries reduced the contribution of public consumption

Chart 3

Euro Area: Components of Euro Area Real GDP Growth

Contributions to growth (quarter on quarter, seasonally adjusted) in percentage points



Source: Eurostat.

to growth to virtually zero; consumer spending also declined more and more. The deterioration of the labor market situation, rising prices and fiscal consolidation measures burdened disposable incomes and dampened the propensity to consume. Declining business confidence and more unfavorable financing conditions quelled investment, which no longer made a positive contribution to growth from the second quarter of 2011. Construction output shrank by 1.8% in the fourth quarter. Inventories were drawn down in the second half of 2011, and capacities were cut. Net exports remained the only robust support of economic activity.

But these euro area-wide figures mask significant differences across countries and industries. Some countries, for instance, succeeded in still posting markedly positive overall growth rates in the second half of 2011 (Austria, Finland, France and Germany). By contrast, real GDP started to contract quarter on quarter as early as the third quarter of 2011 in Ireland, Italy, the Netherlands and Portugal.

The unemployment rate in the euro area rose continuously, starting from 9.9% in April 2011 to reach 10.7% in January 2012. In the fourth quarter of 2011, employment diminished once again against the previous quarter. A strong divergence of unemployment rates was observable in the euro area: The jobless rate is at a 20-year low in Germany, whereas it rose steeply in Greece, Italy, Portugal and Spain.

2.2 The Economy Appears to Have Bottomed Out

Leading indicators signal that the economic cycle has bottomed out. Around the turn of the year 2012, national indicators had already pointed to an upturn in Germany; the positive signals are currently becoming stronger and more broadly based. The European Commission's Economic Sentiment Indicator rose for the second month in a row in February 2012. At 94.4 points, it is still substantially below its long-term average of 100 points, but the subindex on industrial confidence, which accounts for 40% of the composite index, has already surpassed its long-term average. Confidence in construction improved greatly, but consumer confidence remained weak, as did consumers' willingness to make major purchases of durable consumer goods. This indicator has also been rising since the beginning of 2012.

Despite these encouraging signs, real GDP is expected to contract somewhat again in the second quarter of 2012. Technically speaking – assuming two successive quarters of negative growth – the euro area is thus in recession again, but the recession should be short and shallow. By the second half of 2012, growth rates should have turned positive again.

In its projections of March 2012, the ECB anticipates real GDP growth to come to between –0.5% and 0.3% in 2012 and to quicken to 0.0% to 2.2% in 2013. Very low short-term interest rates and a slight easing of financial market tensions will support the euro area economy. Financial market developments and the world economic environment represent downside risks to these forecasts. The European Commission tends toward greater caution in its forecast for 2012 (–0.3%). GDP is anticipated to contract most sharply in Greece (–4.4%), Italy (–1.3%), Portugal (–3.3%), Spain (–1.0%) as well as the Netherlands (–0.9%). For Portugal, it will be the second year of recession, and Greece is entering its fifth year. What is more, domestic demand is not expected to make a positive contribution to growth in the next quar-

ters precisely in the countries experiencing the greatest sovereign debt problems.

2.3 Inflation Will Remain Elevated

While external price pressure caused by higher energy and food commodity prices had predominated in the first half of 2011, in the second half the increase in indirect taxes and administrative prices under the consolidation packages fueled inflation additionally. In whole-year 2011, inflation at constant tax rates came to 0.3 percentage points less in the euro area than the actually measured HICP rate (2.7%). Whereas the price pressure in the earlier stages of the value-added production chain slowly ebbed in the course of 2011, the prices of consumer goods remained elevated. From September through November 2011, overall inflation peaked at 3.0%; in February 2012, the rate of price increase came to 2.7%. Core inflation (excluding energy and unprocessed food) stood at 1.9% in January 2012.

The ECB staff projections of March 2012 expect an HICP increase of between 2.1% and 2.7% for 2012 as a whole. The rate of inflation is driven chiefly by energy prices and renewed boosts of indirect taxes. Inflation is not expected to subside to below 2% until the beginning of the year 2013. The medium-term outlook for inflation is favorable, given expectations of dampened growth, the recent recovery of the exchange rate of the euro to the U.S. dollar and stable inflation expectations.

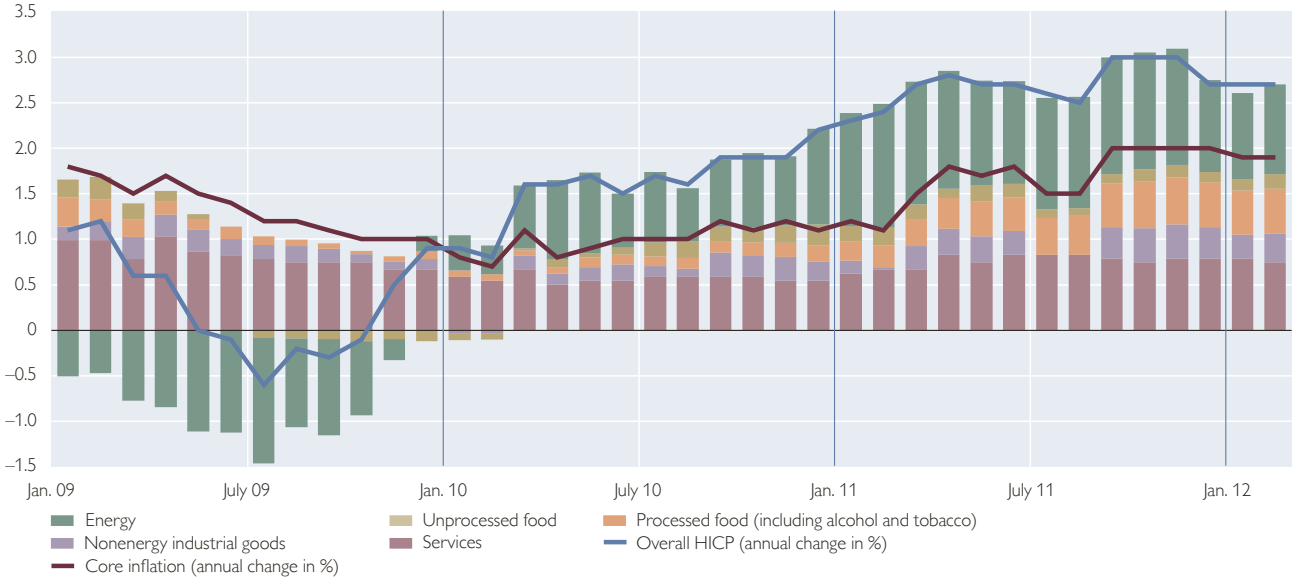
2.4 The Eurosystem Takes New Monetary Policy Measures

The continuing tensions in the government bond markets and the hike in risk premiums in the money markets made it necessary for the Eurosystem to take a number of monetary policy measures in the second half of 2011 to prevent

Chart 4

Euro Area: HICP Components

Contributions to GDP growth in percentage points, year on year



Source: Eurostat.

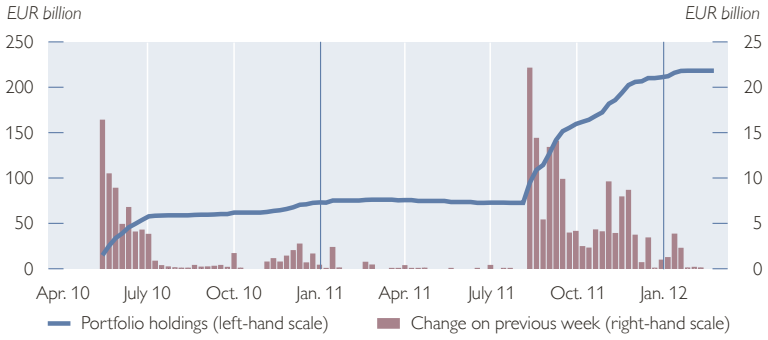
the onset of tensions like those that occurred after the bankruptcy of Lehman Brothers investment bank in the U.S.A. The high risk premiums had a negative impact on banks' refinancing conditions and consequently on those of companies and households. To counteract the danger of the euro area sliding into recession again, the Governing Council of the ECB decreased its key interest rates by 25 basis points both in November and in December 2011 to a final 1%, the same level as at the beginning of 2011.

In fall 2011, the allocation of long-term liquidity was additionally supported by the announcement of two one-year longer-term refinancing operations (LTROs). The purpose of this measure was to reduce banks' uncertainty about refinancing and to help boost lending to corporations and households. The first of the one-year LTROs was settled in October 2011; the second was changed into a three-year tender in December 2011. At the same time, an additional three-year LTRO was announced for end-February 2012. The demand for long-term liquidity was high and was fully satisfied. The liquidity provided to the banking sector amounted to EUR 900 billion at the end of 2011 and widened to EUR 1,200 billion in the first months of 2012. An additional measure taken in December 2011 to ease banks' refinancing was to increase the list of eligible collateral for Eurosystem tender operations. The rating threshold for certain asset-backed securities was reduced. Moreover, national central banks were permitted to temporarily accept as collateral additional performing credit claims that satisfy specific minimum standards. However, the Eurosystem applies a haircut to the value of all collateral to factor in potential default of the underlying securities. Finally, the minimum reserve ratio was reduced from 2% to 1%.

In addition, the Eurosystem launched a second covered bond purchase program (CBPP2) under which an intended nominal amount of EUR 40 billion of euro area bonds may be purchased until October 2012. Moreover, the Securities Markets Programme (SMP) was reactivated to prevent bond market tensions from affecting other segments of the financial market. When the tensions in the euro area sovereign bond markets eased at the beginning of 2012, the Eurosystem was in a position to scale back bond purchases again.

Chart 5

Securities Markets Programme



Source: ECB.

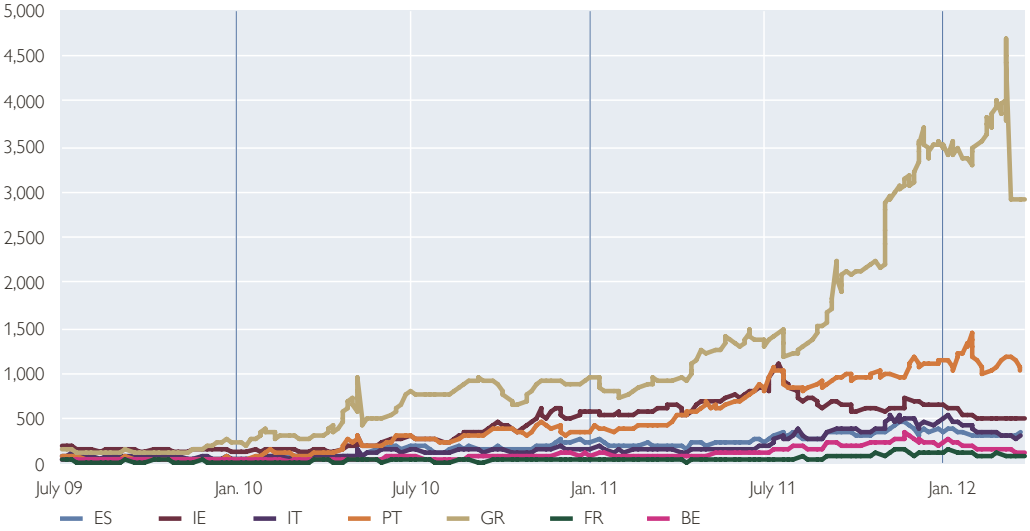
2.5 Tensions in Bond Markets Addressed by EU-Wide Measures

Thanks to the consolidation measures launched as early as in 2010 and to the temporary economic recovery in the first half of 2011, the average budget deficit in the euro area declined by some 2 percentage points in 2011. As a consequence, government debt grew at a substantially slower pace. In a breakdown by countries, the public finances of the individual euro area countries developed very heterogeneously. Therefore, despite the fiscal improvement overall, the bond markets

Chart 6

Yield Spreads on Ten-Year Government Bonds

Basis points, comparison with Germany



Source: ECB.

were buffeted by disruptions. Moreover, rating downgrades led to a further rise in the risk premiums on government bonds. The establishment of the financial backstops – including the European Financial Stabilisation Mechanism (EFSM) and the European Financial Stability Facility (EFSF) – and the bailouts for Greece, Ireland and Portugal did not have a lasting effect in strengthening investors' confidence. By mid-2011 bond market tensions had spread to Italy and Spain as well. To prevent the crisis of confidence from coming to a head, euro area governments announced that they would enlarge the scope for action of the EFSF. The enlarged EFSF is empowered to buy bonds in the secondary market and to grant credits to banks.

In addition, a second rescue package totaling EUR 130 billion was announced in fall 2011 for Greece, as the original expectations for growth and fiscal developments proved too optimistic. This bailout for the first time provided for private creditors' involvement in reducing debt. After protracted negotiations between private sector bondholders, the financial package was finally concluded in February 2012. The Greek debt exchange operation was successful, with a high overall participation share – 83.5% – of holders of Greek government bonds (participation in Greek law bonds was 85.9%). Once the Collective Action Clause (CAC) on Greek law bonds has been activated, total participation may reach 95.6%. The activation of the CAC will extend the validity of agreements to all bondholders once a majority has agreed to them. This debt swap represents a major step in bringing the Greek debt ratio to 120.5% of GDP by 2020. The debt exchange will have to be accompanied by further austerity measures and structural economic reforms. Fitch rating agency reacted to the successful haircut with a significant improvement of the rating for new Greek government bonds to B–, and risk premiums diminished substantially.

In most other euro area countries, yields on ten-year government bonds have also subsided noticeably since the beginning of 2012, above all in Belgium, Italy and especially in Ireland. The bond market recovery is attributable on the one hand to progress with EU economic governance reform and the restructuring of Greek debt, but on the other hand may also have benefited from banks' increased demand for sovereign bonds in connection with the ample long-term liquidity provided by the Eurosystem. To further strengthen confidence in the financial markets, it will be important to maintain the fiscal consolidation course and to complement it by structural reforms. The current discussions about Spain's fiscal course have demonstrated just how quickly a trend can reverse. Most recently, the risk premiums for Spanish bonds exceeded those on Italian sovereign debt, as Italy's consolidation resolve has obviously convinced the markets.

3 Economic Developments in EU Member States in Central, Eastern and Southeastern Europe

Economic developments in the Central, Eastern and Southeastern (CESEE) EU Member States can be broken down into two phases within the review period (mid-September 2011 to mid-March 2012). Whereas economic conditions deteriorated noticeably until the turn of the year 2011 to 2012, sideways movements predominated thereafter. Signs that the economic cycle reached a turning point during the first quarter of 2012 recently increased, although any revival is likely to remain subdued throughout the rest of the year.

3.1 Tensions in the European Financial Markets Increasingly Affected CESEE Markets in the Second Half of 2011 …

Tensions in the euro area related to the sovereign debt crisis intensified in the second half of 2011 and spilled over to the CESEE EU Member States. As a case in point, since roughly mid-September 2011, credit default swap (CDS) premiums and eurobond yield spreads augmented, peaking at the turn of the year. At the same time, stock prices and exchange rates dropped sharply. Sovereign debt auctions had to be canceled or postponed in several countries – e.g. Hungary, Slovakia and Slovenia – and credit rating agencies (CRAs) downgraded several countries: a number of CRAs lowered their ratings of Slovakia and Slovenia, for instance. Conversely, prior to September 2011, upgrades of CESEE countries had predominated.

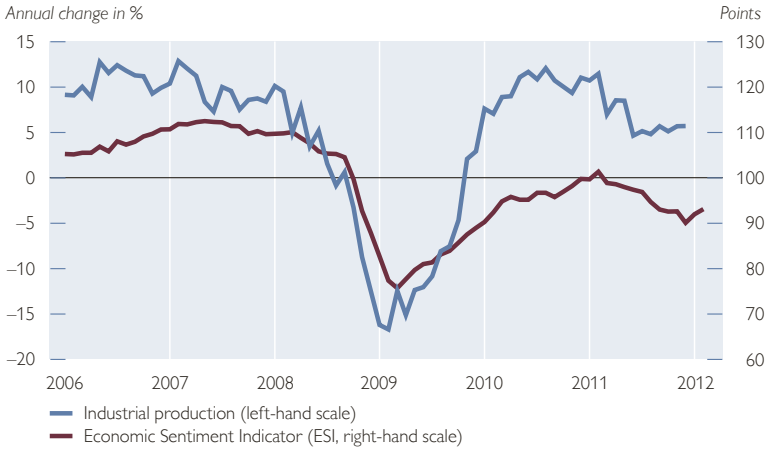
Moreover, many observers feared that the bank recapitalization passed by the euro area Heads of State or Government at their summit on October 26, 2011, could lead to lower lending growth, or even reduced lending altogether, by Western European or Western European-owned banks in the CESEE countries. The most recent credit development data indicate that after recovering somewhat at mid-2011, credit growth in fact weakened again. How much of this decline is attributable to demand factors and how much to supply factors is difficult to estimate. Credit growth has principally been slow in the CESEE region since the spread of the crisis to the European emerging markets in fall 2008.

Toward the end of 2011, Hungary moved into the limelight of international reports. After investor confidence had deteriorated markedly following the implementation of several

controversial political measures, the value of the Hungarian forint against the euro plummeted by some 20% from July to December 2011 and was traded at a historical low at the beginning of January 2012. In the meantime, the currency has recapped some of its losses. Reacting to rising risk premiums and price pressures, the Hungarian central bank increased its key interest rate by 50 basis points both in November and in December 2011 to 7% most recently. All three major rating agencies – Standard & Poor's, Moody's and Fitch – downgraded Hungarian bonds to speculative grade status. Problems placing new bond issues increased uncertainties about financing Hungary's government debt. In response, Hungary entered into talks with the EU and the IMF about the possibility of financial backing. The negotiations were stopped against the background of the adoption of a new constitution in Hungary and a new central bank law that restricted the independence of Magyar Nemzeti Bank. In January 2012, the Hungarian government was forced to backtrack on some of the contentious provisions, and the EU began to examine whether these concessions were large enough to warrant the resumption of negotiations. A positive conclusion of this examination is contingent on the actual amendment by Hungary's parliament of the legal provisions that do not conform to European Union law. Furthermore, the European Council stepped up the excessive deficit procedure (EDP) against Hungary in January 2012 after having noted that the country had made insufficient progress with fiscal consolidation. If Hungary did not take sufficient action by September 2012 to correct its excessive deficit, the EUR 500 million (0.5% of Hungarian GDP) scheduled commitments from the EU's cohesion fund would be suspended as of January 1, 2013, according to the March 2012 decision of the ECOFIN Council.

Chart 7

CESEE EU Member States: Leading Indicators



Source: Eurostat.

3.2 … and Leading and Confidence Indicators Worsened in the Second Half of 2011

Economic sentiment indicators deteriorated substantially during the review period. This development had been observable since spring 2011, accelerated during summer and concerned mainly industrial confidence and somewhat thereafter service and retail sector confidence. Consumer confidence has not revived since the crisis began in 2009. In recent years, it has consistently been measured below its long-term average.

In contrast, the real economic leading indicators performed fairly well. However, even the leading indicators worsened notably, especially at the beginning of 2011. Industrial output growth shrank from roughly 10% to only 5%, where it has hovered since summer 2011. New orders in industry exhibit a similar pattern. Construction reports constant positive growth rates, but this may well stem from the base

effects and partly from better weather conditions in the fourth quarter of 2011. Most of all, construction linked to the 2012 European Football Championship lifted building growth in Poland. Only the leading indicators of private consumption remained persistently negative. Retail sales in the CESEE EU Member States have been stagnating since May 2011 year on year; in December 2011 new car registrations were 21% below the comparable year-earlier value.

3.3 Economic Growth Weakens in Most Countries in the Fourth Quarter of 2011

After having been quite powerful, for the most part, during the third quarter of 2011 – CESEE growth rose by an average of 0.7% quarter on quarter – economic activity cooled in line with expectations in the fourth quarter. Average growth diminished to 0.5%; half the countries under review posted negative growth (table 1). This slippage may be ascribable to weaker demand in the euro area and thus smaller growth contributions by net exports, but the most recent data showing the development of GDP components signal a drop in private consumption growth in many countries. This development was already foreshadowed by the respective leading indicators. Growth remained vibrant only in Poland and Slovakia; without these two countries, the aggregate regional growth rate would be far lower.

3.4 Confidence and Leading Indicators Signal Improved Conditions

While most financial market segments are still weaker or much weaker than in summer 2011, tensions in many CESEE countries' financial markets have eased considerably since the turn of the year.

Table 1

CESEE EU Member States: Economic Growth

	2010	2011	Q1 11	Q2 11	Q3 11	Q4 11
	Real GDP growth in % against the previous period, seasonally and working-day adjusted					
Bulgaria	0.4	1.7	0.5	0.5	0.2	0.3
Estonia	2.3	7.6	2.8	1.6	0.9	–0.2
Latvia	–0.3	5.5	1.1	2.0	1.5	1.1
Lithuania	1.4	5.9	1.4	1.7	1.3	1.0
Poland	3.9	4.3	1.0	1.2	1.0	1.1
Romania	–1.7	2.5	1.1	0.2	1.1	–0.2
Slovakia	4.2	3.3	0.8	0.8	0.8	0.9
Slovenia	1.4	–0.2	–0.3	–0.1	–0.4	–0.7
Czech Republic	2.7	1.7	0.5	0.3	–0.1	–0.1
Hungary	1.3	1.7	0.7	0.1	0.4	0.3
CESEE total	**2.3**	**3.2**	**0.9**	**0.8**	**0.7**	**0.5**
Euro area	**1.9**	**1.4**	**0.8**	**0.1**	**0.1**	**–0.3**

Source: Eurostat.

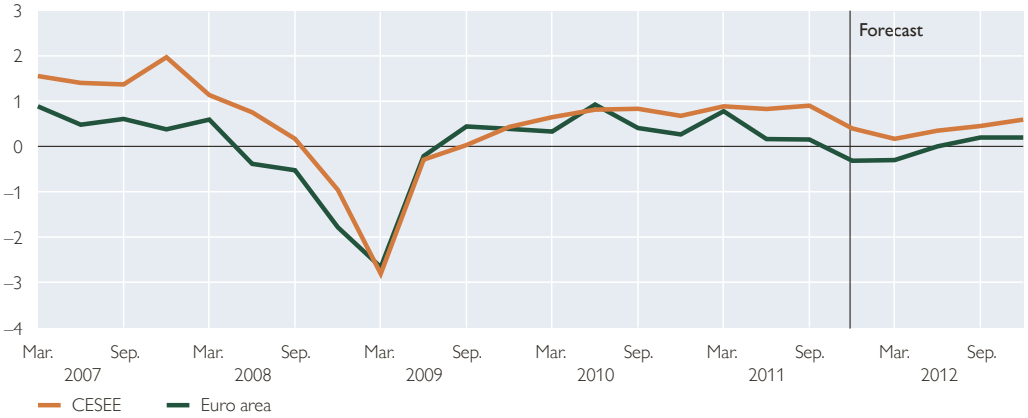
The improvement seems to be due to a slight reduction of international risk aversion, falling yield spreads on euro area sovereign debt and last but not least the ECB's long-term refinancing operations, which had a positive impact on the liquidity conditions of euro area banks as well as their CESEE subsidiaries. CESEE currencies gained against the euro (Hungarian forint: +5.5%, Polish zloty: +6.5%); stock prices advanced (Poland: +7.5%, Romania: +17.5%), and both eurobond spreads and CDS premiums fell (by over 100 basis points each in Bulgaria, Lithuania and Romania).

Moreover, a certain positive momentum of leading and confidence indicators may be noted (chart 7). In December 2011, industrial production as well as construction output mounted slightly faster than in the previous months. Business confidence strengthened by 3 points from December 2011 to February 2012, mainly because consumers and service providers displayed more optimism about economic prospects.

Chart 8

GDP Development

Change on previous quarter in %, seasonally and working-day adjusted



Source: Eurostat, European Commission.

3.5 Turning Point to End Economic Downswing in the First Quarter of 2012

The substantial worsening of international framework conditions in the second half of 2011 led to a significant downward revision of the forecasts for the CESEE region. All key forecasters successively marked down their growth predictions for 2012. Expectations for CESEE growth had still been pegged at between 3.5% and 4% in the first half of 2011, but have been slashed to a final value of around 1.5% most recently.

According to the most recent Interim Economic Forecast of the European Commission of February 23, 2012, the turning point in the economic cycle may have already been reached. The pace of economic activity will decline further in the first three months of 2012, but from the second quarter, growth should begin to rebound slowly but surely. In the fourth quarter, it is anticipated to come to 0.6% quarter on quarter. For 2012 as a whole, therefore, CESEE expansion is assumed to come to 1.5% – i.e. 0.4 percentage points less than expected in the European Commission's fall 2011 forecast. In a breakdown by countries, the increase is calculated to be highest in Latvia (+2.1%), Lithuania (+2.3%) and Poland (+2.5%). Stagnation or even a marginal dip is anticipated for Slovenia, the Czech Republic and Hungary, however.

In 2013, the revival is supposed to pick up more speed, bringing average growth to about 2.5%. In Slovenia and Hungary, economic growth is projected to remain sluggish at just over 1%, while Latvia, Lithuania and Poland will remain at the head of the group, with growth running to just over 3% in all three countries.

Both in 2012 and in 2013, the CESEE region is thus set to grow by 1.5 to 2 percentage points faster than the euro area.

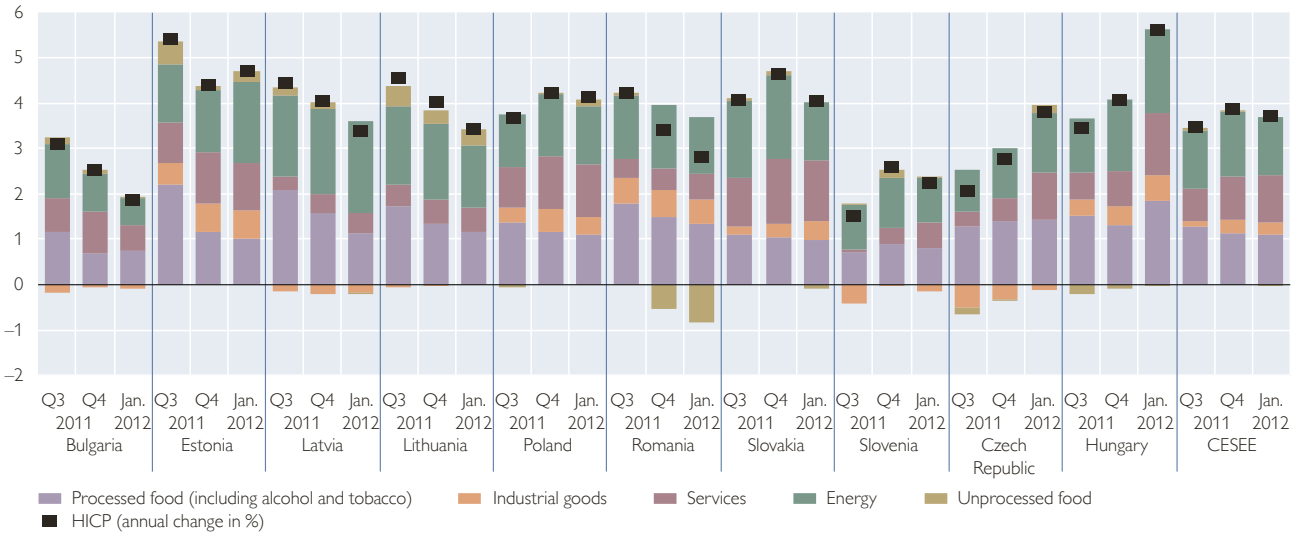
3.6 Inflation Passes Its Peak in Summer 2011 in Most CESEE Countries

The CESEE EU Member States' inflation rates averaged a steady 3.5% to 4% in recent months. Regional trends may be distinguished, namely the disinflationary effect of food prices in connection with a base effect and good har-

Chart 9

CESEE EU Member States: Inflation Rate

Contributions to GDP growth in percentage points, year on year



Source: Eurostat.

vests in 2011 along with a stronger inflation of prices in the services sector. Both effects more or less canceled each other out.

Among the different countries, inflation developments varied: Inflation subsided sharply in Bulgaria and Romania, but in the Czech Republic and Hungary, it accelerated by roughly the same degree. Bulgaria and Romania benefited particularly from the favorable development of food prices, partly because food accounts for such a large share of these countries' basket of goods, whereas costlier services (and to a lesser extent a rise in industrial goods prices) pushed up inflation markedly in the Czech Republic and Hungary. Price pressures in these countries may be traced partly to tax increases that took effect on January 1, 2012. The value-added tax rate was raised from 25% to 27% in Hungary, and the reduced tax rate in the Czech Republic went up from 10% to 14%. Moreover, energy price increases were higher than the regional average in both countries, not least because of the depreciation of the Hungarian forint and the Czech koruna since mid-2011.

In its most recent forecast, the European Commission projects inflation to recede in the region in 2012. The regional average is expected to come to 3.3%, some 0.7 percentage points below the 2011 inflation value. The disinflation process is assumed to be most pronounced in the Baltic countries, Romania and Slovakia. Because of the value-added tax increases in the Czech Republic and Hungary, these two countries are liable to be the only ones in which inflation will rise in 2012 compared to 2011.

4 Austria

4.1 Economic Activity to Stabilize in the First Half of 2012

Economic activity in Austria successively lost momentum in the course of 2011. Whereas GDP advanced at an above-average rate in the first half of 2011, it contracted marginally in the fourth quarter of 2011 in the wake of a

Table 2

Austria: Real Gross Domestic Product and Demand Components (in real terms, seasonally and working-day adjusted)

	GDP	Private consumption	Government consumption	Gross fixed capital formation	Exports	Imports	Domestic demand	Net exports	Changes in inventories	Statistical discrepancy
	Change on previous period in %						*Contributions to GDP growth in percentage points*			
Q1 11	0.8	–0.1	1.0	1.4	2.2	1.9	0.3	0.2	0.4	0.1
Q2 11	0.5	0.1	0.9	1.0	1.2	1.1	0.5	–0.1	0.1	0.2
Q3 11	0.2	0.2	0.5	0.9	0.3	0.3	0.5	0.0	0.1	0.1
Q4 11	–0.1	0.3	0.1	0.7	–0.4	0.3	0.2	0.0	0.2	–0.2
2009	–3.6	0.2	0.7	–7.4	–13.7	–12.5	–1.4	–1.7	–0.6	–0.1
2010	2.5	1.7	0.0	0.0	8.3	7.4	0.9	0.9	0.7	0.0
2011	3.0	0.8	2.4	5.2	6.8	6.6	1.7	0.4	1.3	0.3

Source: Austrian Institute of Economic Research (WIFO), OeNB.

decline in export growth and the downturn phase of the investment cycle. What is more, government consumption lost considerable steam. Since summer 2011, goods exports have been moving sideways. In the fourth quarter, they even declined quarter on quarter.

But by the time the OeNB published its last economic outlook for Austria at the beginning of December 2011, conditions had improved noticeably. Most national and international leading indicators bottomed out in November, and since December 2011, surveys have shown a continuous improvement of company and household sentiment. The negative sentiment gauged in fall 2011 and the current improvement may, however, be overstated on account of the media reports on political officials' handling of the crisis at the time. Even in a conservative interpretation, the indicators clearly signal an end to the global slowdown.

The results of the OeNB's Economic Indicator suggest a stabilization of economic activity in the first and second quarters of 2012. Whereas no significant increase in exports of goods is to be expected – the OeNB's Export Indicator of March 2012 shows a constant sideways movement for January and February – investment is likely to edge up, drawing on improved order books and favorable financing conditions. Most likely, consumer spending will not be able to fulfill its role as a support for economic activity in the first quarter of 2012. Diminishing retail sales and a drop in the number of new car registrations signal a stagnation, perhaps even a reduction, in private consumption in the first quarter of 2012. The excellent employment situation and the current downtrend in inflation should provide for a stable development of real incomes. The currently observable surge in crude oil prices represent a distinct downside risk for economic activity, however.

Given recent progress in solving the Greek debt crisis, the European sovereign debt crisis is not expected to worsen during the forecasting period until the end of the second quarter of 2012. Nevertheless, the European debt crisis represents an important risk factor for the Austrian economy as well.

Box 1

Results of the OeNB's Economic Indicator of March 2012[1]

The results of the OeNB's Economic Indicator for the first and second quarters of 2012 project growth of 0.2% and 0.3%, respectively, which signals a stabilization of economic activity. Thus, a recession as defined in technical terms (two successive quarters of contraction) is not to be expected. This forecast, however, applies only under the assumption that the European debt crisis does not take a turn for the worse. The positive growth outlook is ascribable above all to the significant improvement of business sentiment. The growth forecast for the first quarter of 2012 has remained unchanged compared to the last release of the OeNB's Economic Indicator results.

Short-Term Outlook for Austria's Real GDP in the First and Second Quarters of 2012 (seasonally and working-day adjusted)

2010				2011				2012	
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Year-on-year quarterly change in %									
0.9	2.4	3.2	3.4	4.2	3.9	2.6	1.4	**0.8**	**0.6**
Quarterly change in %									
0.0	0.7	1.5	1.1	0.8	0.5	0.2	-0.1	**0.2**	**0.3**
Annual change in %									
2.5				**3.0**				**x**	

Source: Results of the OeNB's Economic Indicator of March 2012, Eurostat.

[1] *The next release of the OeNB's Economic Indicator is scheduled for July 2012.*

4.2 Dynamic Employment Developments Powered by Complete Liberalization of the Labor Market in May 2011

The Austrian labor market thrived in 2011. In view of high economic growth, businesses were on a hiring spree. Payroll employment widened by 61,000 persons or 1.8%. The largest share of new jobs was created in goods production (+10,400). In addition to the number of directly employed persons, the number of leased workers went up considerably (+9,100). However, employment was raised in the retail/wholesale industry as well (+10,700).

The robust pace of employment growth continued until the beginning of 2012 despite the deterioration of the economic situation in the course of 2011. Since the second quarter of 2011, though, the leading indicators have pointed toward a slowdown. The number of vacancies reported by companies has been declining already since the second quarter of 2011, for example.

Much of the high pace of job growth in 2011 can be attributed to the full liberalization of the Austrian labor market in May 2011. The number of jobholders from the eight countries for which restrictions were lifted (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) has been soaring since May 2011. Between April 2011 and February 2012, employment from these countries jumped by 30,200 persons in seasonally adjusted terms. This rise accounts for two-thirds of the entire increase in employment by 47,900 persons.

Table 3

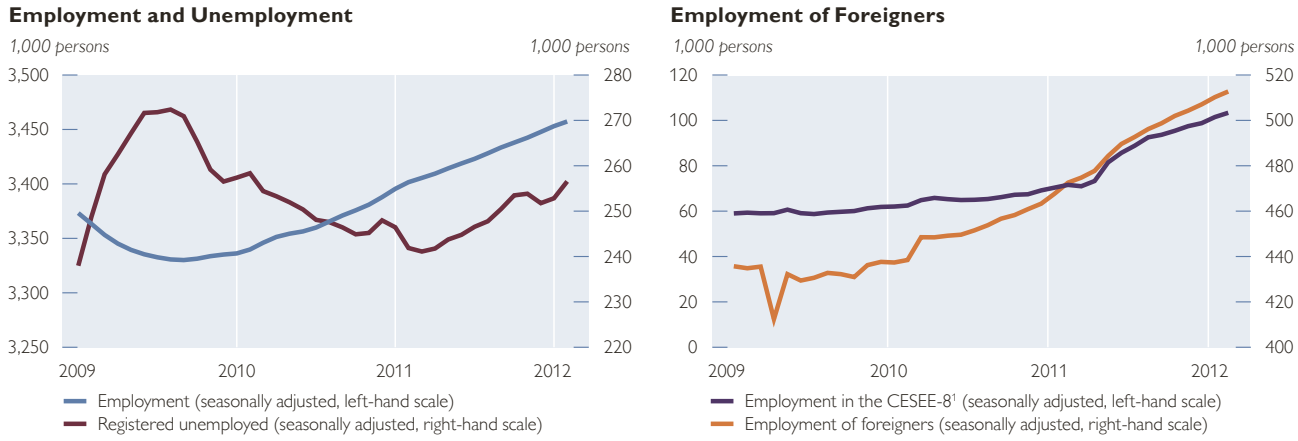
Developments in the Austrian Labor Market (seasonally adjusted)

	Payroll employment (1,000)		Unemployed (1,000)		Persons in training programs (1,000)		Unemployment rate in %		Registered vacancies (1,000)	
		Change on previous period		Change on previous period			AMS	Eurostat		Change on previous period
Oct. 11	3,438	4.5	253	3.0	65.4	–0.1	6.8	4.2	30.4	–0.0
Nov. 11	3,443	4.5	254	0.4	68.0	0.3	6.8	4.3	30.3	–0.1
Dec. 11	3,448	5.2	252	–2.1	55.8	–0.5	6.8	4.2	30.6	0.4
Jan. 12	3,453	5.3	253	1.1	66.3	0.9	6.8	4.0	29.5	–1.2
Feb. 12	3,457	4.3	257	3.7	70.4	1.1	6.9		29.7	0.3
Q1 11	3,401	19.3	243	–2.9	69.4	–3.7	6.7	4.4	33.8	0.7
Q2 11	3,414	13.3	243	0.3	64.0	–2.2	6.7	4.1	33.6	–0.2
Q3 11	3,428	14.0	248	4.8	56.4	0.6	6.8	3.9	31.0	–2.6
Q4 11	3,443	14.5	253	4.8	63.1	–0.2	6.8	4.2	30.4	–0.6
2009	3,342	–45.2	262	49.8	64.1	14.0	7.3	4.8	27.2	–10.2
2010	3,360	18.5	250	–11.4	73.2	8.7	6.9	4.4	30.9	3.7
2011	3,422	61.1	247	–3.5	63.2	–9.9	6.7	4.2	32.2	1.3

Source: Austrian Public Employment Service (AMS), OeNB, Eurostat, Main Association of Austrian Social Security Institutions.

Chart 10

Complete Liberalization of the Labor Market in May 2011 Determines Employment Developments



Source: Austrian Public Employment Service, Statistics Austria.

[1] *Estonia, Latvia, Lithuania, Poland, Slovakia, Slovenia, the Czech Republic and Hungary.*

Despite animated employment growth, seasonally adjusted unemployment rose by 15,400 persons from a low in March 2011. The number of AMS (Austrian Public Employment Service) training participants – these persons are not registered as unemployed but are part of labor supply – grew only minimally (+2,600) during the same period. The Austrian unemployment rate (national definition) edged up in the course of 2011 and in the first two months of 2012, whereas it was on a downtrend according to the Eurostat definition.

4.3 Inflation Eases Perceptibly

Currently, inflation is subsiding noticeably in Austria. In 2011, the HICP mounted by 3.6% in Austria, more than the euro area average of 2.7%. The rise in inflation was propelled above all by energy and food prices in the first quarter of 2011, while services

were the main inflation drivers during the remainder of the year. Toward the end of 2011, inflation began to cool off; it came to 2.6% in February 2012. This represents a drop by 0.3 percentage points from January 2012. Therefore, for the first time in a year, the Austrian rate of price increase slipped below the euro area average.

The decline in overall inflation was attributable primarily to a slowdown in the inflation of energy prices as well as of nonenergy and nonfood industrial goods, for which the inflation rate had fallen to just 0.2% in February 2012. The most recent reduction of inflation for these products is traceable above all to the fall in the prices of clothing and footwear. However, most recently, the prices of audio-visual, photographic and information processing equipment also fell.

The rate of inflation for food (including alcohol and tobacco) came to 3.2% in February 2012, also down from the January rate of 3.5%. The price of processed foods, in particular, showed a significant downtrend. The rate of price increase of unprocessed foods sank only marginally.

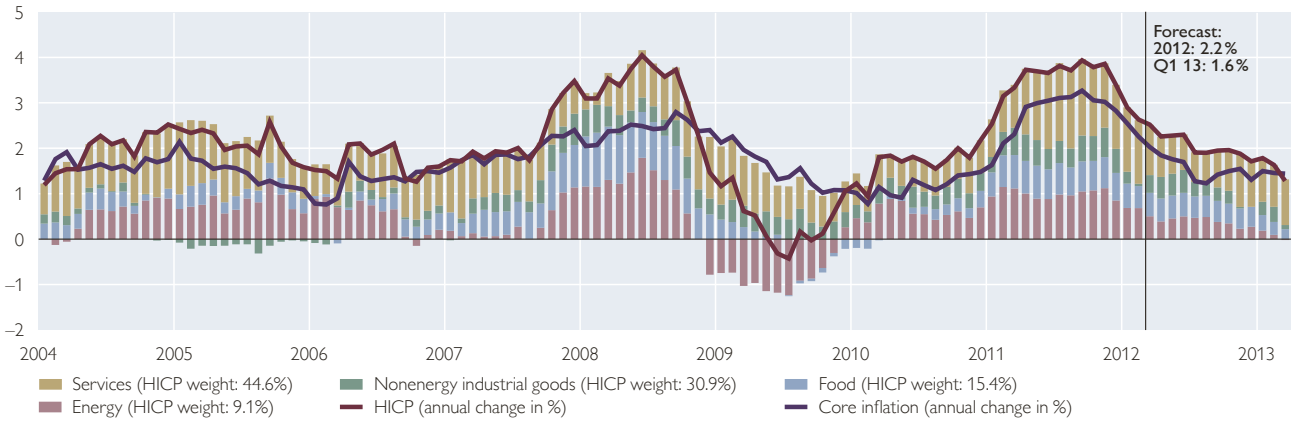
While energy price inflation exhibited a downward movement, it was still high in February 2012 at 7.5%. The most recent powerful expansion of crude oil prices fed into burgeoning motor fuel prices. Utility gas prices were also on the rise. By contrast, the prices of fuel oil, solid fuels and electricity were growing more slowly recently. In February 2012, the annual rate of inflation in services prices remained unchanged from the January rate at 3.2%. The recent deceleration of the prices for hotel services, administered service prices (above all those of hospital and dental services, education and school services) and housing service prices was offset by accelerating prices of package holidays and recreational as well as sports services.

In its current inflation forecast, the OeNB assumes that inflation will decline continuously. Full-year inflation is expected to run to 2.2% in 2012, with the rates of price increase anticipated to drop below the 2% mark from mid-year.

Chart 11

HICP Inflation and Contributions by Subcomponents

Contributions to growth in percentage points *Last observation: February 2012*



Source: OeNB, Statistics Austria.

In Focus:
10 Years of Euro Cash

Editorial

Claudia Kwapil

On January 1, 1999, the euro was introduced as the common currency of more than 300 million people in Europe. In the first three years of its existence, the euro was "invisible," as it was used only as a unit of account and for electronic transactions. It was not until the cash rollout on January 1, 2002, that the euro was widely perceived as Europe's new currency.

Within a few days, billions of euro banknotes and coins began circulating in twelve EU Member States (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain). In the ten years that have since gone by, another five Member States (Estonia, Malta, Slovakia, Slovenia and Cyprus) have adopted the euro, making it legal tender in 17 countries[1] today.

Marking the tenth anniversary of the changeover, this special issue puts the spotlight on the euro cash project, revisiting this broad subject from different angles. The contributions presented here deal not only with the obvious topic of producing and distributing euro banknotes and coins in Austria, but also examine the acceptance of euro cash as well as its use in Central, Eastern and Southeastern Europe (CESEE). Other authors featured in this issue take a look at the balance sheet effects of euro cash migration, the related topic TARGET2 and the development of euro prices.

The first contribution, authored by *Koch* and *Schneeberger,* summarizes the extensive measures required in the run-up to the euro cash changeover to ensure the uninterrupted cash supply of businesses and households from the very beginning of 2002. Some 15 billion banknotes and 52 billion coins had to be distributed on time in all of the twelve participating countries. Austria's launch stock of euro cash was produced by two of the OeNB's subsidiaries, Münze Österreich AG and Oesterreichische Banknoten- und Sicherheitsdruck GmbH (OeBS). The cash changeover went very smoothly in Austria; within two weeks, 90% of all transactions were being conducted in euro.

Koch and Schneeberger also shed light on the volumes of euro cash in global circulation, which corresponded to a value of EUR 912 billion at end-2011. Ever since 2006, the worldwide circulation of euro has surpassed that of U.S. dollars in value terms (EUR 824 billion at end-2011). An estimated 25% to 30% of euro banknotes are used outside the euro area, while 50% to 70% of U.S. dollar banknotes are used abroad.

A large amount of euro banknotes is circulating in the CESEE countries. In their article on the use of the euro in CESEE, *Ritzberger-Grünwald* and *Scheiber* argue that people in these countries sought a safe haven in the euro as a stable parallel currency in the crisis arising during economic transition to a market system. However, euro cash holdings should also be seen in the context of the possible future EU accession of these countries.

According to the semiannual "OeNB Euro Survey," the share of people holding euro cash in late 2010 and early 2011 was highest in the former

[1] *Including overseas departments, territories and islands that are either part of a euro area country or are associated with a euro area country. Monaco, San Marino and the Vatican City State also use the euro based on a formal agreement with the European Community. The single currency is further used in Andorra, Kosovo and Montenegro, but not on the basis of a formal agreement.*

Yugoslav Republic of Macedonia and Serbia (30% to 35%), as compared to other CESEE countries. In Albania, the Czech Republic and Croatia, some 20% to 25% of the population had euro banknotes in their possession at that time, whereas in other CESEE countries, this share only amounted to between 5% and 10%. Although Central, Eastern and Southeastern Europe has undergone a phase of economic catching-up, the degree of euroization observed in the region has hardly declined in recent years. According to the survey, economically significant amounts of euro cash are primarily held by Southeastern European households, which – unlike their counterparts in Central and Eastern Europe – use euro cash as a store of value and, in some cases, as a means of payment next to their national currencies.

The next paper, by *Fluch* and *Schlögl,* focuses on public sentiment in Austria ten years after the introduction of euro cash. The authors show that Austrians were rather quick to gain confidence in the euro, familiarize themselves with the new notes and coins and develop a good sense of value for smaller euro prices. More than 90% of the Austrian population had no problems with the euro notes in the past years; in the case of coins this is true for about 70%. Only the handling of 1- and 2-cent coins still causes difficulties; 40% have had their problems with 1-cent coins and nearly 50% of the interviewed Austrians have difficulties with 2-cent coins, especially persons aged 55 or older.

Based on sentiment indicators, Fluch and Schlögl show that, up to the year 2009, the euro met with strong acceptance and satisfaction in Austria. However, in the wake of the sovereign debt crisis, Austrians' pro-euro attitude has since been waning, leading to a critical assessment at the height of the crisis in the summer and fall of 2011. According to survey results, the share of Austrians with a positive view of the euro dropped from its 2009 high of 80% to 60% in fall 2011. Dwindling confidence in the euro seems to have been primarily caused by the indecisive crisis management of EU and national policymakers, and not by euro cash as such. Nevertheless, Austrians still have a very favorable view of the personal benefits they draw from the euro: more price transparency, lower costs and fewer complications when traveling, and cost benefits in payment transactions are seen as undisputed merits.

Thanks to tourism, business travel and cross-border shopping, a large number of euro banknotes (and coins) circulate in the euro area. Prior to the introduction of the single currency, the volume of national banknotes that circulated abroad was much lower, and those that did find their way into other countries had to be channeled back to the central bank that had issued them, primarily via the commercial bank system. Euro banknotes do not have to be repatriated, as they can be used in all euro area countries irrespective of their place of issue. However, the central banks of the Eurosystem must compensate the uneven distribution of banknote flows; since tourist destinations clearly have a larger inflow of euro banknotes than other euro area countries, central banks must organize cash issuance in a way that ensures sufficient supply throughout the euro area at all times.

Krsnakova and *Oberleithner* explain the effects of banknote flows on the balance sheets of euro area central banks. The functioning of a monetary union relies on a host of rules and mechanisms. One of them is the regular adjustment of euro banknotes in circulation that ensures the even distribu-

tion of all euro banknotes in circulation in the balance sheets of the national central banks (NCBs). The authors present the relationships between the relevant items in central banks' balance sheets – primarily intra-Eurosystem balances arising from such adjustment and the liability constituted by banknotes in circulation – and provide insight into the origins of this mechanism and its legal basis. In the past ten years, the volume of euro banknotes in circulation has been steadily increasing, as is reflected in the balance sheets of the 18 Eurosystem central banks (including the ECB).

Jobst, Handig and *Holzfeind* shed light on intra-Eurosystem balances, an issue which has recently been subject to public debate in connection with TARGET2. Intra-Eurosystem balances are a necessity because the single monetary policy is implemented in a decentralized manner in line with the subsidiarity principle of the Treaty on European Union. Large claims and liabilities may arise for various reasons, many of which are related to the normal functioning of the euro area and do not require an economic policy response. Changes in TARGET2 balances also do not imply any direct changes in the risk exposure levels of national central banks. At the same time, there is no denying that the Eurosystem is facing major monetary and liquidity policy challenges. As soon as the liquidity assistance granted to the European banking system ceases to be necessary following appropriate economic policy measures such as recapitalizing banks or measures to restore confidence in government solvency, TARGET2 balances will also decline.

The next contribution of this special issue, authored by *Rumler,* deals with euro prices, a topic that is closely associated with euro cash in the minds of many people. The author examines the pass-through of commodity price changes to the consumer prices of selected products based on consumer price microdata for the period from 1996 to 2009. The estimation results for different products indicate (in part major) differences in terms of time lags and extent of pass-through. In the case of fuels (high-octane gasoline and diesel fuel), the author established a relatively strong and swift pass-through of crude oil prices, while bread (rolls) and meat (beef steak) show a rather limited degree of pass-though.

Rumler's estimation results also reveal that, for most examined products, the price pass-through was significantly stronger after the euro cash changeover than before. However, it was not possible to ascertain whether this rise was caused by the introduction of euro notes and coins. In the case of fuels and meat (beef steak), the pass-through to consumer prices was found to be stronger when commodity prices were increased than when they were cut. The result for fuels confirms the results of previous studies.

Fritzer examines the convergence of consumer prices in the euro area countries. The accession of low-price countries to Economic and Monetary Union (EMU) brought the general convergence of price levels to a halt in the past decade. However, consumer goods prices in the euro area countries, e.g. for private means of transport, clothing, shoes, audiovisual, photographic and IT equipment, continued their gradual convergence path after the euro cash changeover. Food and services price levels converged to a much lesser extent or not at all in the euro area.

A comparison of the price levels in Austria, Germany and Italy reveals that consumer goods and services prices have been converging – unlike food

prices. The latter development seems to be mainly attributable to structural changes in the trade sector: While in many sectors, labor costs and profit margins have tended to fall amid moderate deregulation, thus potentially contributing to price convergence between Austria and its main trade partners, labor costs in Austria's food sector have been trending upward. Another driver of food price differences is the value-added tax levied on food items, which is higher in Austria than in Germany and Italy.

Euro Cash in Austria, Ten Years On

Alexandra Koch,
Doris Schneeberger[1]

In the run-up to the euro launch, a number of key steps were taken to ensure the uninterrupted supply of notes and coins to the economy and the general public. After all, nearly 15 billion notes and 52 billion coins had to be delivered in due time in order to ensure their availability from January 1, 2002, onward in the participating countries. In Austria, the Oesterreichische Nationalbank shares the responsibility of supplying commercial banks with cash and of processing returned banknotes in accordance with ECB regulations – and thus of ensuring the quality of the euro and its counterfeit security – with an affiliated cash logistics company, GELDSERVICE AUSTRIA. When the financial crisis boosted the demand for cash, logistical reserve stocks enabled the Eurosystem to respond quickly. As a result, the volume of euro cash in circulation rose, as did U.S. dollar circulation. However, the overall value of euro notes and coins in circulation has consistently remained above that of the U.S. dollar since the end of 2006. The euro's established role as an international transaction currency has resulted in approximately one-quarter more banknotes being processed in Austria than the volume required for the national market.

JEL classification: M41
Keywords: currency in circulation, adjustment of banknotes in circulation, intra-Eurosystem balances, capital key

Box 1

Euro Cash Chronology[1]

July 1, 1987
The aim of monetary union is laid down in the Treaty establishing the European Community.
December 1995
The official names "euro" and "cent" are defined as the units of the new currency.
June 16 and 17, 1997
Agreement is reached on the common "European side" of euro coins.
December 31, 1998
Conversion rate set for participating currencies (Austria: EUR 1 = ATS 13.7603).
July 1999
Production of new notes and coins begins.
September 1, 2001, onward
Banknotes and coins are frontloaded to credit institutions and retailers.
December 15, 2001, onward
Frontloading of euro coins to consumers by banks.
January 1, 2002
The euro becomes legal tender in euro area countries.
March 1, 2002
The Austrian schilling loses its status as legal tender, but can still be exchanged for euro.
March 31, 2002
End of period in which banknotes from other euro area countries can be exchanged free of charge at the OeNB.

[1] *Europa – Gateway to the European Union (2011).*

1 Euro Cash

1.1 Launch of the Euro in Austria

As a Eurosystem central bank, the Oesterreichische Nationalbank (OeNB) is authorized to issue euro banknotes under the Statute of the ESCB and ECB (ECB, 2003). In the course of the euro launch, each national central bank

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(NCB) was required to cover its country's own initial demand for banknotes. The initial cash supply requirements of the countries participating in the changeover was estimated at about 15 billion banknotes (approximately EUR 633 billion) and more than 51 billion coins (approximately EUR 16 billion) at the end of 2001 (ECB, 2001). In the case of Austria, the banknotes and coins were physically produced at two subsidiaries of the OeNB: Münze Österreich AG and Oesterreichische Banknoten- und Sicherheitsdruck GmbH (OeBS), which produced 550 million banknotes valued at EUR 30.65 billion and 1.8 billion coins worth EUR 672.7 million for the euro changeover. These quantities covered the country's initial demand for euro cash (table 1) and ongoing supply requirements in 2002, as well as providing logistical stocks for unforeseen cash requirements (see also section 2.1).

Table 1

Euro Cash: Austria's Initial Demand in 2002

Banknotes		Coins	
	Pieces		*Pieces*
EUR 5	150 million	EUR 2	150 million
EUR 10	150 million	EUR 1	200 million
EUR 20	45 million	EUR 0,5	160 million
EUR 50	60 million	EUR 0,2	190 million
EUR 100	105 million	EUR 0,1	400 million
EUR 200	20 million	EUR 0,05	140 million
EUR 500	20 million	EUR 0,02	210 million
		EUR 0,01	350 million

Source: OeNB.

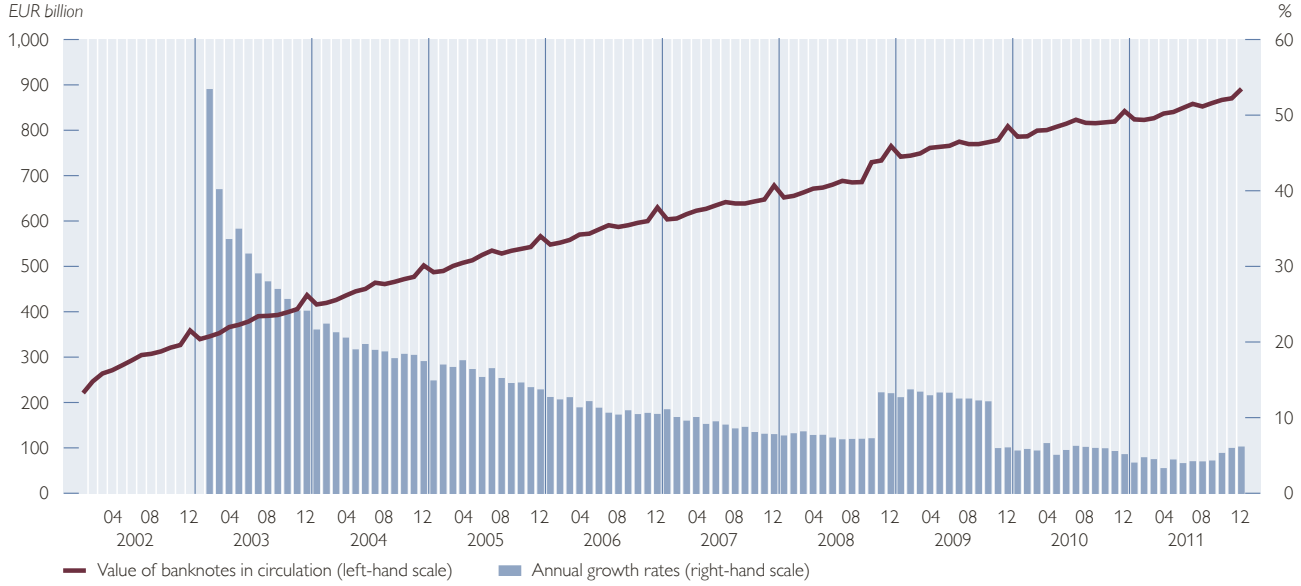
In line with the established initial cash requirement of EUR 633 billion, a total of 14.890 million banknotes were produced in the euro area. The country that required the largest number of notes was Germany (4.783 million), followed by Italy (2.440 million) and France (2.265 million). The euro area's overall demand for coins ultimately came to 52 billion units with a total value of EUR 15.75 billion. In order to produce the coins, about 250,000 tons of metal were processed at 16 European mints (ECB, 2002).

OeBS and Münze Österreich AG delivered the notes and coins directly to the OeNB's head office in Vienna, to the branch offices in Austria's provincial capitals, and to the cash centers physically connected to the branch offices and maintained by GELD-SERVICE AUSTRIA (GSA). GSA, a cash logistics and service company created in order to leverage synergies in cash handling between the OeNB and Austria's main commercial banks, was the most important operational platform in Austria's changeover to the euro. The goal of this measure was to create a "triple-win" situation: As the majority shareholder, the OeNB retains control over the quality of the cash in circulation, the banks do not have to maintain (smaller and thus more expensive) cash recycling centers, and the customers receive optimized service at moderate prices. GSA, the OeNB's cash offices and the country's main commercial banks thus formed the central operational platform for the introduction of euro notes and coins in Austria.

In order to ensure that sufficient euro notes and coins were available for the launch on January 1, 2002, shipments of cash to banks were already allowed from September 1, 2001, onward. In order to optimize the supply of coins to retailers and consumers, approximately 300,000 starter kits were provided for retailers (value: EUR 145.50; sold for ATS 2,000), and more than 5 million kits were distributed to consumers (value: EUR 14.54; sold for ATS 200). The starter kits were available at banks and post offices from December 15, 2001. In total, the front-

Chart 1

Value of Euro Banknotes in Circulation Inside and Outside the Euro Area (2002 to 2011)



Source: OeNB, ECB.

loading volume of notes and coins came to 75% (EUR 10.3 billion) of the average schilling circulation in the year 2000 (EUR 13.6 billion); this percentage was the highest among all euro area countries. This large volume was necessary due to payment habits in Austria, where cash is still widely used, as well as the fact that the euro changeover coincided with the winter holiday period, which is a popular time to visit Austria. Even in remote holiday destinations, tourists in Austria were able to pay in euro from January 1, 2002. Just one week after the launch, euro circulation had already exceeded 291 million banknotes (equivalent to 86% of schilling circulation). Two weeks after the changeover, the share of transactions conducted in euro had already reached 90%.

1.2 Development of Euro Cash Circulation

Since the end of the dual circulation period in Austria (February 28, 2002), the value of euro banknotes in circulation has climbed 262%, from EUR 246 billion to around EUR 890 billion at the end of December 2011. Chart 1 shows how the overall value of all euro banknotes in circulation (both inside and outside the euro area) has risen since the new notes and coins were introduced in January 2002 as well as the annual circulation growth rates. These growth rates declined gradually after the physical introduction of the euro and jumped sharply during the financial crisis (from late 2008, back to 2005 levels), only to return to precrisis levels thereafter.

In October 2008, banknotes in circulation shot up in the wake of the Lehman Brothers collapse. This additional demand for euro banknotes – to the tune of EUR 35 to 40 billion – was mainly driven by countries outside of the euro area. Up to now, the additional banknotes put into circulation have not returned to the Eurosystem NCBs.

In the year 2011, rapid circulation growth was observed in the case of the

Table 2

Share of Banknote Denominations in Circulation (end-2011) and Annual Growth Rates (based on value)

	EUR 500	EUR 200	EUR 100	EUR 50	EUR 20	EUR 10	EUR 5	Total
	%							
Share (value)	33.7	4.1	18.6	34.0	6.4	2.3	0.9	100.0
Share (units)	4.0	1.2	11.0	40.4	19.1	13.9	10.3	100.0
Growth rate								
2003	42.9	12.1	20.3	19.0	4.0	2.5	2.3	10.1
2004	28.4	5.7	13.5	12.4	1.3	0.9	2.3	14.9
2005	20.9	3.9	10.8	11.3	3.9	3.6	3.1	12.8
2006	13.2	2.7	9.6	12.5	8.2	7.9	4.7	11.2
2007	7.9	1.9	8.3	8.9	5.6	3.4	5.6	7.7
2008	17.1	9.3	14.2	10.6	6.1	3.3	3.8	12.7
2009	6.4	4.8	6.6	5.9	2.8	0.6	1.5	5.7
2010	2.1	1.3	5.4	6.7	2.3	–0.1	1.6	4.1
2011	4.1	0.4	6.4	8.9	3.7	1.7	1.5	5.8

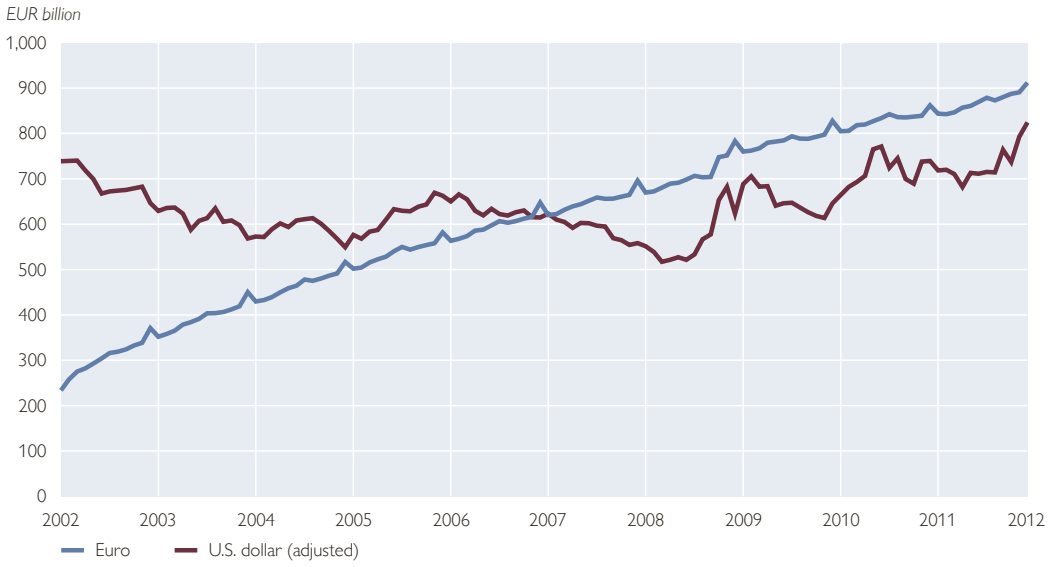
Source: OeNB, ECB.

50-euro banknote. This development can be partly attributed to high demand arising from the turbulence in Greece, where there is a clear preference for that particular denomination (table 2).

The demand for euro notes emanating from non-euro area countries serves to confirm that the euro is used throughout the entire world. In terms of the value of cash in circulation, the euro surpassed the U.S. dollar for the first time in 2006 (chart 2). Due to the strong position of other reserve currencies such as the euro, the U.S. dollar's rate of circulation growth continued to drop until August 2008, only to climb substantially in the course of the financial crisis. The U.S. government then

Chart 2

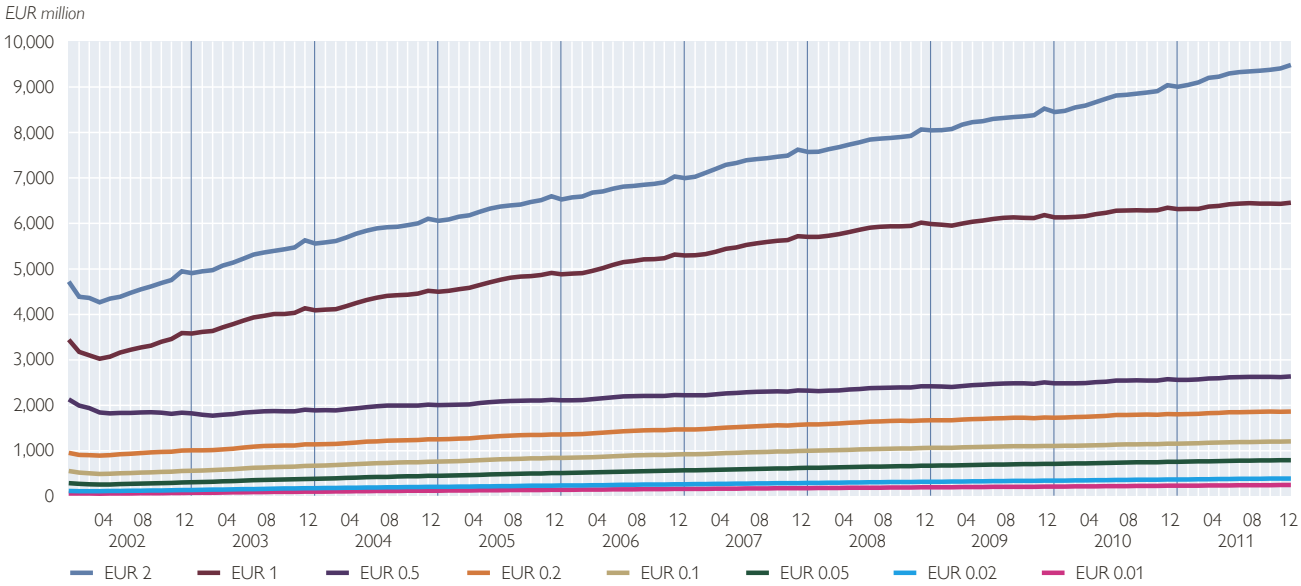
Cash in Circulation: Euro versus U.S. Dollar



Source: OeNB.

Chart 3

Euro Coins in Circulation



Source: OeNB, ECB.

took measures to defuse the situation. This pattern repeated itself until 2011, with non-U.S. demand for 100-dollar notes boosting circulation (Roseman, 2010). Euro cash circulation followed a similar pattern in the course of the crisis, rising significantly at first and then dropping to normal levels in 2009. What both reserve currencies have in common is that the additional banknotes released during the crisis are still circulating. At the end of 2011, global euro circulation amounted to approximately EUR 912 billion, compared to EUR 824 billion in the case of the U.S. dollar. Of those amounts, euro notes account for some 97% and U.S. dollar notes for 99%, respectively; however, only 25% to 30% of euro banknotes are used outside of the euro area, while the corresponding estimate for U.S. dollar notes is 50% to 70% (ECB, 2011).

The value of euro coins in circulation has roughly doubled since the end of the dual circulation period (end-February 2002), rising from EUR 11.4 billion to EUR 23.1 billion.

In terms of units, some 15 billion euro banknotes and 97.8 billion euro coins are currently in circulation, which translate into the following statistical averages:

– The average value of a circulating euro banknote is approximately EUR 59; the average value of a euro coin in circulation is 24 cents.
– In mathematical terms, there are 45 euro banknotes and 293 euro and cent coins in circulation for every citizen of the euro area.

Due to the single currency, it is no longer possible to provide circulation statistics at the national level. The OeNB estimates the actual amount of cash circulating in Austria at EUR 25 to 27 billion. This assumption is based on the initial volume issued, growth rates in withdrawals from cash dispensers, as well as the volume of cash supplied each year.

1.3 Development of Schilling Circulation

Some 470 million schilling banknotes and 3 billion schilling coins were taken out of circulation during the changeover to the euro. By the end of the dual circulation period (February 28, 2002), a majority of the schillings expected to return had been exchanged for euro. Even now, the OeNB still exchanges schillings for euro, free of charge. In addition to the OeNB cash desks, which are open five days a week, the OeNB's annual Euro-Tour in the summer months has also allowed people throughout Austria to exchange schillings for euro free of charge. The tour has now been carried out ten times. As a result of all different activities, some 98% of all schillings in circulation had been withdrawn from circulation by the end of 2011.

The last series of schillings valid before the introduction of euro notes and coins can be exchanged at the OeNB indefinitely. However, the preceding series are subject to different rules. In the year 2018, the last banknotes from the preceding series (1,000-schilling notes featuring Erwin Schrödinger; 500-schilling notes featuring Otto Wagner) will be called in. These notes will lose their validity if they are not exchanged at the OeNB by the end of the redemption period (April 20, 2018; see box 3). The value of schilling banknotes not returned (for banknotes not exchanged before the end of the respective redemption period equivalent to EUR 91.8 million) is transferred to the Austrian Federal Ministry of Finance.

Box 2

Austrian Schillings Discovered in Curious Places

Anecdotal evidence from the Euro-Tour gives an indication of where outstanding schillings might still be found:

Carinthia, 2005: Five meters below the surface of Lake Ossiach, a diver discovers an old wallet containing schilling notes.

Vorarlberg, 2006: A Bregenz resident finds ATS 20,000 hidden behind a painting – and forgotten – by the finder's mother.

Lower Austria, 2010: While clearing out her grandmother's house, a woman from the town of Vösendorf finds a secret compartment containing ATS 50,000.

Box 3

Schilling Banknotes with Limited Redemption Periods

Banknotes with a limited exchange period

ATS 1,000: Bertha von Suttner
August 30, 2005

ATS 100: Angelika Kauffmann
November 28, 2006

ATS 500: Josef Ressel
August 31, 2007

ATS 50: Ferdinand Raimund
August 31, 2008

ATS 20: Carl Ritter von Ghega
September 30, 2009

ATS 500: Otto Wagner
April 20, 2018

ATS 1,000: Erwin Schrödinger
April 20, 2018

2 Cash Logistics and Processing

2.1 Planning and Production

In general, 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. In addition, sufficient logistical stocks must be available at all times in order to cover unexpected increases in demand (as observed during the financial crisis) and seasonal fluctuations, especially during the holiday season at the end of the year.

Ultimately, the Governing Council of the ECB decides each year which denomination is to be produced in what quantities, allocating shares to individual NCBs under a decentralized pooling system that was first established 2002.[2] In this context, each NCB is responsible for producing selected denominations only, in line with the amount of capital it has transferred to the ECB (Austria had a capital key share of 2.775% at the end of 2011).[3] In this decentralized pooling system, the production costs are borne by the NCBs

[2] *For the introduction of the euro, the NCBs themselves were required to produce the initial supply of banknotes required for their respective countries.*

[3] *OeNB (2011).*

Table 3

Banknotes: Production Volume in 2011

Denomination	Number of notes	Value	NCBs commissioning production
	Million	*EUR million*	
EUR 5	1,714.80	8,574.00	DE, CY, ES, FR, IE, MT, LU, NL, SI, SK, FI
EUR 10	1,541.20	15,412.00	DE, GR, FR, **AT,** PT
EUR 20	536.60	10,732.00	CY, FR, MT, LU, NL, SI, SK, FI
EUR 50	2,169.10	108,455.00	BE, DE, ES, IT
EUR 100	×	×	×
EUR 200	×	×	×
EUR 500	56.20	28,100.00	**AT**
Total	**6,017.90**	**171,273.00**	

Source: ECB.

according to the share of banknote production assigned to them.

In order to ensure an efficient supply of cash, logistical stocks have been set up in all euro area countries. In addition, the decision was made in 2002 to set up strategic reserves for the Eurosystem (Eurosystem Strategic Stock – ESS; section 2.3). These reserves are intended for use in exceptional situations where the Eurosystem's logistical stocks are not sufficient to cover an unexpected increase in demand for banknotes or where the supply of banknotes is suddenly disrupted. These logistical and strategic stocks ensure that the NCBs are able to handle changes in demand for banknotes at all times, regardless of whether the demand originates inside or outside of the euro area (ECB, 2012a).

2.2 Controlling Availability

2.2.1 Supplying Cash at the European Level

As mentioned above, the production of banknotes is divided up in accordance with the capital key shares of the euro area NCBs. However, as not all banknote denominations are produced in all euro area countries, and as stocks of banknotes are accumulated or depleted 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.

However, cash is also subject to certain flows, which are influenced 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 payment habits and preferences. These cross-border flows result in national imbalances in cash circulation which cannot be accounted for completely in banknote production and distribution planning. 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 also legal tender throughout the euro area regardless of their national side, the phenomenon of cross-border flows and the resulting imbalances can also be observed in this case (albeit to a far lower extent). How-

ever, coin transports are largely restricted to compensating for regional imbalances.

2.2.2 Supplying Cash in Austria

In cooperation with GSA, the OeNB supplies Austrian banks with notes and coins as needed and ensures the quality of cash in circulation.

In 2011, 1.33 billion banknotes and 2.55 billion coins were put into circulation in Austria. Depending on their denomination, banknotes have an average lifespan of two to seven years and are returned to the OeNB or GSA an average of three to four times each year, where their fitness for circulation and authenticity is checked. In 2011, a total of 1.61 billion banknotes were processed throughout Austria.

With the help of cash processing devices, the used banknotes returned to the OeNB or GSA are counted and tested for authenticity, completeness and degree of soiling. If the minimum standards are met, the banknotes can re-enter the cash cycle. Depending on their quality and denomination, an average of just under 6 million banknotes are processed each day. Banknotes considered to be unfit are sorted out, invalidated and then destroyed under stringent security conditions.

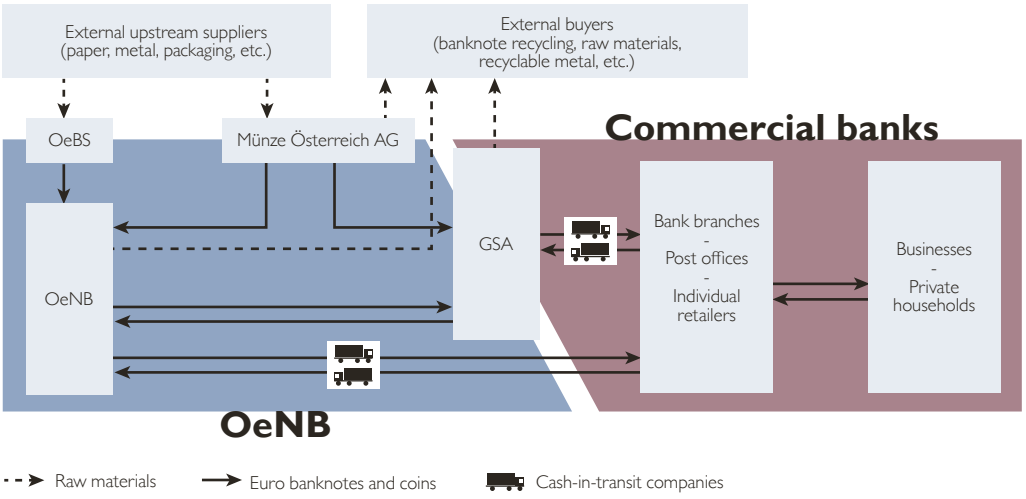
2.2.3 Decentralized Cash Recycling – OeNB Test Center

Cash recycling helps to preserve the high quality of the euro banknotes in circulation in Austria. These efforts serve to pursue two main objectives: Inspection activities enhance the banknotes' counterfeit security and at the same time only those notes which meet high quality standards are recirculated (section 2.2.2). This also means that it is easy for people to verify the authenticity of the banknotes in circulation.

Most cash is machine-tested for authenticity and fitness for circulation. Automated processing devices may only be used for this purpose if they have been tested and approved by an NCB. In line with the requirements of the ECB, the OeNB established a testing facility in Vienna in 2005 for the purpose of inspecting and evaluating

Chart 4

Cash Logistics in Austria



Source: OeNB.

authentication, counting and sorting devices.

Periodic updates are necessary in order to ensure that the processing devices are always at the cutting edge of development. In these efforts, the OeNB Test Center cooperates with international device manufacturers and distributors and conducts tests of new detection technologies for banknote testing. This cooperation is indispensable, especially with regard to the forthcoming second series of euro banknotes. The results are published on the web sites of the ECB and OeNB.[4] In 2011, a total of 132 devices were tested.

2.3 The OeNB's Role as a Cash Supply Hub in the Eurosystem

Thanks to Austria's location in the center of Europe, at the intersection of important trans-European transport axes, near emerging economic regions and densely populated areas (e.g. the Twin City Region around Bratislava and Vienna), the OeNB and its subsidiaries have established themselves as a cash competence and logistics center.

- The OeNB is one of the storage locations for strategic stocks in the euro area; for logistical reasons, these stocks are held by only a few NCBs.
- The OeNB's expertise was also called upon during the preparations for the introduction of the euro in Slovenia and Slovakia in order to ensure a smooth transition to the new currency. Both the initial supply as well as later shipments of euro banknotes to those two countries were handled by the OeNB.
- Moreover, for many central banks in Central, Eastern and Southeastern Europe (CESEE), the OeNB is an important point of contact in cash-related matters; this is evidenced by the active exchange of information between the OeNB and those banks.
- In particular, GSA has established itself as a partner for commercial banks and retail companies in neighboring regions, especially in Slovenia, Slovakia and southern Germany.

Due to the close interrelationships between Austrian banks in the CESEE region, a great deal of euro cash flows back into the euro area via Austria. Current estimates indicate that Austria processes some 25% more banknotes than are required for the national market.

2.4 Counterfeits in Austria

Shortly after the launch of the new currency, counterfeit euro notes also appeared in Austria. Numerous OeNB projects were initiated in order to preserve the currency's integrity and to strengthen public confidence.[5] For example, one of the central bank's duties is to ensure the quality of euro banknotes in circulation; this high quality makes it possible to verify the notes' authenticity quickly and easily. The resistance of euro banknotes to counterfeiting is ensured by integrated security features, and advances in these features will be incorporated in the new banknote series (section 2.5).

In 2011, a total of 606,000 counterfeit banknotes were removed from circulation throughout Europe. During that period, the number of counterfeit notes recovered in Austria came to 5,583. The most common counterfeit

[4] *www.oenb.at/testzentrum.*

[5] *47% of the Austrian population believe that the EU has also precipitated an increase in criminal activity (European Commission, 2012).*

banknote discovered in Austria in 2011 was the 50-euro note (33%), followed by the 100-euro note (29.3%) and the 20-euro note (24.7%). The Austrian share of counterfeit notes recovered throughout Europe amounts to 0.92%, meaning that Austria has one of the lowest counterfeit volumes in the euro area.

Austria's consistently low counterfeiting figures indicate that counterfeit euro notes are rarely accepted. Compared to 2011, the number of counterfeits dropped by 36.6%, to the second-lowest level since the launch of euro notes and coins in 2002. One of the main reasons for this result is the high level of knowledge the Austrian population has acquired with regard to the banknotes' security features.

2.5 Measures to Combat Counterfeit Euro Notes

A sound knowledge of the security features enables people to verify the authenticity of banknotes quickly. The most important and easiest way to check whether a banknote is genuine is based on the "feel – look – tilt" principle. This test does not require any technical devices. The OeNB uses a wide variety of communication channels to inform the population of this principle; another key purpose of these measures is to send a clear signal to counterfeiters.

Training for Currency Experts and Interested Parties

In one-hour training sessions, an OeNB employee explains how to check the security features on euro banknotes. Upon completion of the training, participants know how to check banknotes quickly and efficiently in everyday payment situations. In addition, participants are allowed to compare genuine banknotes with counterfeits and thus to ascertain the quality of genuine banknotes and their security features. This training seminar is offered throughout Austria and is open to all interested parties, especially those who handle cash in their jobs. Participants are required to register in advance.[6] Since the launch of euro notes and coins in the year 2002, 3,393 training sessions have been held with a total of 70,307 participants.

Cooperation with Radio and Television Broadcasters

The probability that a private individual will encounter a counterfeit note is very low, but if such a note does end up in someone's wallet, its value is not reimbursed to that person. Therefore, it is particularly important to pay attention to payment activities when business is especially brisk.

Above all, this means checking the security features on euro banknotes. Especially during the holiday season, the OeNB focuses on the general public and uses the mass media to support its information activities on this topic. In cooperation with various radio broadcasters, OeNB employees explain the security features of euro banknotes in radio interviews. The Austrian population also makes heavy use of television to obtain information (IFES, 2011). In order to account for this tendency, the OeNB used short films for the first time in 2011 (weekdays at 6:55 pm on ORF 2) to demonstrate the "feel – look – tilt" principle.

[6] *www.oenb.at/bargeldschulung.*

Euro-Shop-Tour

In the course of its Euro-Shop-Tour in 2011, the OeNB provided retail employees with information directly at the workplace. In total, the tour covered around 2,400 shops in all nine federal provinces of Austria. In this way, the security features of euro banknotes were explained to more than 2,500 cashiers.

Euro-Bus and Fairs

In addition, the OeNB also provides information on the euro's security features during the Euro-Tour in the summer months and at the fairs in which the OeNB participates. As people are never too young to learn about such an important topic, the OeNB has also organized a Euro-Kids-Tour since 2008, visiting primary schools throughout Austria and playfully demonstrating the security features to young children.

The Second Series of Euro Banknotes

Although the number of counterfeit banknotes is very low, the Eurosystem makes every effort to remain one step ahead of counterfeiters and to enhance the notes' resistance to counterfeiting on an ongoing basis. For this purpose, a second series of euro banknotes will be introduced in the coming years (ECB, 2012c). The new series will retain the key design features of the first series and include security features which – like those used in the first series – are easy to recognize and difficult to imitate. The first denomination of the new banknote series is scheduled for issue in the next few years. The other denominations will follow one by one and ultimately replace the original series of banknotes. The new banknotes will again incorporate design elements based on the "ages and styles of Europe" theme.

3 Summary and Outlook

Despite the widespread use of various payment methods such as cards, direct debiting and other forms of cashless payment, the use of cash is still on the rise. Cash is still the most commonly used retail payment instrument throughout the euro area;[7] in Austria, for instance, 80% of all transactions in Austria continue to be effected in cash.

Cash is still the most favorable payment method for small retail payments, and it has established itself as a secure form of payment with regard to fraud and counterfeiting. In emergencies, it remains the most important payment instrument, allows transactions without access to bank accounts or electronic payment services, and involves lower costs than other payment options (ECB, 2012a). Consumers also appreciate the ease of monitoring their expenditures when using cash (OeNB, 2010).

The importance of cash in times of crisis became obvious during the turbulence on the financial markets and the collapse of Lehman Brothers in October 2008. Especially at such uncertain times, people tend to rely more on cash, especially high-denomination banknotes. In order to meet demand inside and outside the euro area, the ECB holds logistical and strategic reserves; Austria is one of the Eurosystem's storage locations for its strategic stocks and – as the cash supply hub for the region – also contributes to supplying cash to CESEE countries.

The single European currency is regarded in a positive light by a vast majority of the Austrian population[8] and ensures security for individuals and

[7] *Capgemini, RBS, EFMA (2011).*

[8] *See also Fluch and Schlögl in this issue.*

businesses. In the course of harmonization, the different formats, systems and business practices in cashless payment services will be standardized in Europe as well. Now that a single currency area has been established, a standardized euro payments area (SEPA – Single Euro Payments Area) is being created, and participating countries are required to implement these standards by February 2014. In order to ensure the smooth and efficient operation of payment systems, a combination of various payment instruments with different features and advantages is necessary; the importance of cash in this system will remain high for a long time to come.

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Euro Cash in Central, Eastern and Southeastern Europe

Doris Ritzberger-Grünwald, Thomas Scheiber[1]

A considerable part of the euro banknotes issued since 2002 is in circulation in Central, Eastern and Southeastern European (CESEE) countries. This can be attributed to the fact that numerous economic agents resorted to currency substitution in a parallel safe haven currency during the crisis arising in the course of their countries' transition to a market economy. On the other hand, euro cash holdings are related to some countries' upcoming accession to the European Union, which will oblige them to adopt the euro.

Although countries have caught up economically, the degree of euroization in CESEE countries has hardly receded over the past years. According to surveys conducted by the Oesterreichische Nationalbank (OeNB), economically significant amounts of euro cash are primarily held by households in Southeastern Europe, which – unlike households in Central Europe – use euro cash as a store of value and partially as a means of payment in addition to their respective local currency.

Policies introduced in CESEE countries to stabilize economies after the outbreak of the financial and economic crisis in 2008 have ultimately increased the public's confidence in the security of its savings deposits. The recent drop in euro cash holdings can therefore be attributed not only to the depletion of euro cash reserves during the crisis to finance necessary expenditures. It also seems to reflect a medium-term tendency to shift portfolios from (euro) cash to (euro) deposits.

JEL classification: D14, E41, G11, G20, O16, N14
Keywords: dollarization, euroization, currency substitution, household finance, transition crisis, survey data

Since the introduction of the first euro banknotes, the value of euro banknotes in circulation has quadrupled from EUR 221 billion (January 2002) to EUR 884 billion (January 2012). In terms of value, approximately 25% (ECB, 2011) to 40% (Augustin, 2011; Bartzsch et al., 2011a, 2011b) of all euro banknotes are in circulation outside the euro area, to a considerable part in CESEE countries.

The demand for foreign currency cash in CESEE countries goes back many years, long before euro banknotes were even issued. On the one hand, the use of a foreign currency (Deutsche mark, Austrian schillings, euro or U.S. dollars) as a secondary currency shows many similarities to dollarization in Latin America. On the other hand, the different institutional framework conditions in Europe require us to consider new explanations. Political declarations of intent and partly completed accession negotiations pave the way for CESEE countries' integration into the European Union in the medium or long term. Therefore, these countries will eventually be obliged to join the Economic and Monetary Union (EMU) and to introduce the euro.

Economic agents' use of a parallel safe haven currency (de facto dollarization or de facto euroization[2]) has far-reaching economic consequences.[3] (1) A high foreign currency share in mone-

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[2] *As opposed to de jure euroization, when the euro is introduced as legal tender – either unilaterally, as in the case of Kosovo and Montenegro, or multilaterally, as in case of an accession to EMU.*

[3] *An analytical overview of macroeconomic and macrofinancial risks of dollarization can be found in Levy-Yeyati (2006). Pann et al. (2010) discuss the different risks of foreign currency loans for financial stability, focusing particularly on the CESEE region.*

Refereed by: Manfred Fluch, OeNB

tary aggregates reduces the effectiveness of monetary policy instruments in controlling output and inflation. (2) Seigniorage, the profit made issuing banknotes in the local currency, shifts from national central banks (NCBs) to those issuing the parallel currency. (3) A large share of foreign currency loans increases credit risk by adding an element of exchange rate risk. (4) High levels of household cash holdings withdraw money from the economic cycle that could be much more productive if it were provided as loans for investments. (5) Any capital imports used to compensate this lack of capital result in current account deficits and have a destabilizing effect on the financial markets. (6) Finally, large cash holdings in foreign currency tend to entail nondeclared payments, which means that governments lose part of their tax revenues.

Apart from these economic considerations, a certain procedure has to be followed to officially become an EMU member (de jure euroization). To fulfill the convergence criteria, a country must have a national currency and a capital market in its currency. Hence, the Eurosystem keeps stressing that a high degree of euroization does not constitute a "shortcut" for the adoption of the euro.[4]

Against the background of the macroeconomic implications and risks for the stability of the financial markets, the amount of data available on the degree of de facto euroization was very limited. In particular, reliable data on the share of euro cash in total cash in CESEE countries was lacking. To fill this gap, the OeNB has been conducting semiannual surveys in ten CESEE countries since fall 2007. The collected data from individual interviews not only help us draw a map of euroization (cash, deposits and loans); they also allow us to infer causal relationships regarding households' use of foreign currencies and in particular the euro. This paper predominantly focuses on euro cash held by households. Information on foreign currency deposits and loans may be found in the numerous other OeNB publications on this topic.

Box 1

OeNB Euro Survey

As a preparation for launching euro banknotes, the OeNB had commissioned semiannual surveys on the use of foreign currencies in five countries close to Austria (Croatia, the Czech Republic, Hungary, Slovakia and Slovenia) between 1997 and 2007. The underlying goal was to (1) assess the amount of Deutsche mark, Austrian Schillings and U.S. dollars in circulation in these countries, and (2) to establish a realistic forecast of the demand for euro banknotes in these countries. One particularly interesting question was whether households and businesses in Austria's partially strongly dollarized neighboring countries would exchange their Deutsche mark and Austrian schilling cash hoards for euro, U.S. dollars or local currencies, or place them in bank accounts.

[4] *This is a problem that countries with a high degree of de facto euroization face (e.g. Croatia), as do countries with de jure euroization (Kosovo, Montenegro). In the latter, a lack of sound institutions has given rise to the introduction of the Deutsche mark and subsequently the euro as legal tender, while at the same time the Eurosystem insists that the respective countries comply with the official accession procedure.*

In fall 2007, the OeNB decided to expand both the circle of countries (five EU Member States: Bulgaria, the Czech Republic, Hungary, Poland and Romania; five (potential) candidate countries: Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia and Serbia), and the number of questions, striving to explain different aspects of the euroization phenomenon in these countries. Ever since, the OeNB Euro Survey has been conducted twice a year (in May/June and in October/November). A sample of 1,000 interviewees (representing the population aged 15 and older) per country and survey is used. Data are obtained from face-to-face interviews. For further details on the OeNB Euro Survey, see Dvorsky et al. (2008) and ceec.oenb.at. The website also shows selected results and a list of publications on the topic.

Section 1 of this paper examines how the euro came to CESEE countries. Section 2 draws a current map of euroization for CESEE countries and discusses changing motives for holding euro cash. Section 3 looks at household portfolio decisions and summarizes the results of the first analytical findings of the OeNB Euro Survey project. In section 4, current economic-political developments and their implications for the use of euro cash are examined: (1) the recent crisis on the global financial markets, and (2) the call for capital markets in national currencies. Section 5 provides a summary as well as an outlook.

1 How Did the Euro Come to the CESEE Region?

Foreign currency use is not a new phenomenon in CESEE countries. Many of these countries have a long history of parallel currencies. In analogy to what happened in the countries of Latin America in the second half of the 20th century, macroeconomic crises arising before, during or after the transition from planned economies to market economies triggered the use of foreign currency. Hyperinflation, banking and currency crises as well as debt crises went hand in hand with this transition. In all these cases, rationally acting households and businesses tried to avoid the erosion of the (external) value of their national currency and sought a safe haven in a parallel currency (Dean and Feige, 2004). By opting for currency substitution, economic agents essentially imported price and foreign currency stability, i.e. economic framework conditions that their national institutions were no longer providing to a sufficient extent.

In the 1990s, the CESEE region went through numerous banking crises (table 1). Changing over from a centralist, one-dimensional banking system to a two-tier banking system turned out to be a difficult process in many countries (i.a. Albania and Croatia). Undercapitalized banks holding a large number of defaulted loans garnered a poor financial reputation. Subsequently, private investors withdrew their deposits, and bank runs became commonplace. Although numerous banks were "rescued" (either by receiving capital injections from the government or by being sold to foreign investors), ultimately, several loss-generating banks were closed (19 banks in Bulgaria alone). Newly installed deposit insurance systems were able to save small investors from loss, but in many cases confidence levels in the banking system were permanently affected.

Concurrently with the banking crises, there was a series of depreciations and there were periods of hyperinflation, which led to a massive deterioration of purchasing power of the national currencies. Periods of hyperinflation beset Bulgaria, Poland and Romania as well as the countries of former Yugos-

Table 1

Overview of the Banking, Currency, and Hyperinflation Crises

	Banking crisis	Currency crisis	Hyperinflation	Highest annual inflation rate during the hyper-inflation period
				%
Czech Republic	1996			×
Hungary	1991			×
Poland	1992		1989–1991	585
Bulgaria	1996	1996	1991, 1996–1997	1,248
Romania	1990	1996	1992–1993	243
Albania	1994	1997		×
Bosnia and Herzegovina	1992		1992–1993	×
Croatia	1998		1992–1993	1,497
FYR Macedonia	1993		1992–1993	1,664
Serbia (Yugoslavia)		1995, 1998, 2000	1992–1994	352,412,743,467,369

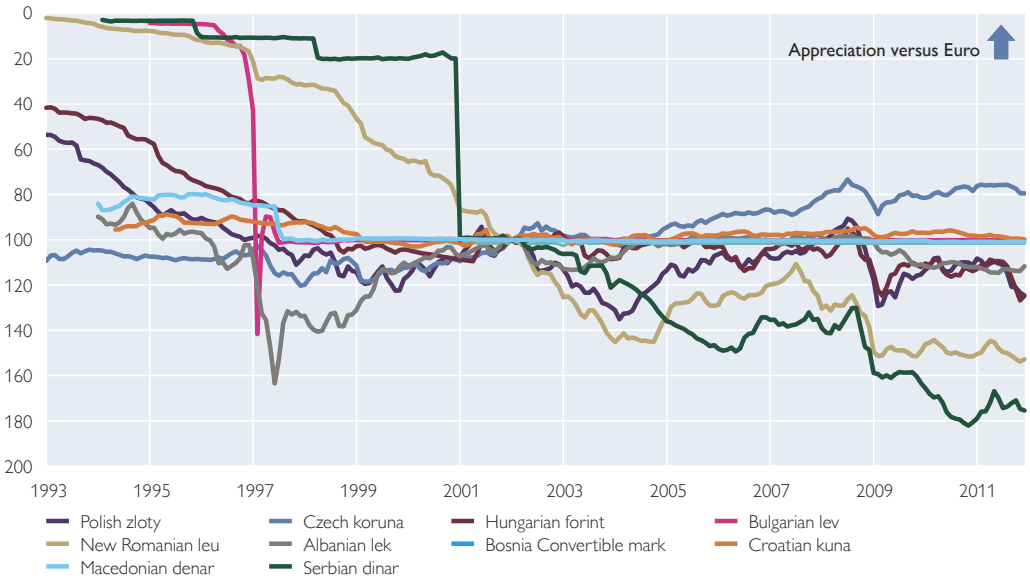
Source: Laeven, L. and F. Valencia (2008), NCBs.

lavia. In the constituent Republic of Serbia, hyperinflation brought forth extremely high inflation rates between 1992 and 1994. Currency crises led to massive depreciations in Albania, Bulgaria, Romania and Serbia (chart 1). In Serbia, the dinar was devalued three times between 1996 and 2000[5] and has been losing further purchasing power since 2003. Bulgaria's currency experienced a similarly drastic drop in value. Not until the Bulgarian lev was linked

Chart 1

Exchange Rate against the Euro

Local currency/EUR, index 2002 = 100 (monthly average)



Source: The Vienna Institute for International Economic Studies database, Eurostat, Thomson Reuters, National Bank of Yugoslavia.

[5] *The Serbian dinar (official exchange rate) depreciated by 70% against the Deutsche mark in November 1996, by 45% in April 1998 and by another 80% in December 2000.*

Table 2

Inflation Reduction since 1993

	1993 to 1996	1997 to 2001	2002 to 2006	2007 to 2011
	Average annual inflation rate in %			
Czech Republic	12,2	6,0	1,5	2,6
Hungary	23,3	12,3	4,8	5,3
Poland	28,9	9,9	1,9	3,5
Bulgaria	88,1	261,5	5,6	5,7
Romania	120,3	68,8	13,1	6,1
Albania	14.4[1]	11,6	3,0	3,1
Bosnia and Herzegovina	x	7,3[2]	2,3	2,9
Croatia	438,8	4,9	2,4	2,9
FYR Macedonia	121,2	2,6	1,3	3,1
Serbia	89.5[3]	64,3	13,9	9,0

Source: The Vienna Institute for International Economic Studies database, National Bank of Yugoslavia, National Bank of the Republic of Macedonia.

[1] *Value refers to 1994 to 1996.*
[2] *Value refers to 1998 to 2001.*
[3] *Value refers to 1995 to 1996.*

to the Deutsche mark and subsequently to the euro did it stabilize. Finally, the (new) Romanian leu has been losing ground since the beginning of the 1990s.

However, macroeconomic crises were not the only determinants in this game. More or less politically driven actions or a lack of corporate governance came into play as well. During the civil war in former Yugoslavia, for example, private foreign currency accounts were frozen because the government lacked foreign exchange assets. Many owners of such accounts have, to this date, not been reimbursed. Ultimately, this means that they have been expropriated. In Albania, Bulgaria and the FYR Macedonia, the population's confidence in a stable banking system fulfilling its promises was undermined when the pyramid schemes broke down.

These phases marked by a loss in confidence in the local currency coincided with the gradual opening of the CESEE economies, in particular the economies of the countries of former Yugoslavia. Throughout this process, the population was increasingly exposed to the Deutsche mark but also the Austrian schilling. Tourism, which had started to flourish along the Adriatic coast in the 1970s, as well as remittances migrant workers sent home, brought large amounts of foreign currency into the region. Generally, these payments were not exchanged for local currency. On the contrary, a kind of "secondary market" came into existence. Tourist services were offered and paid in Deutsche mark, real estate and durable consumer goods were increasingly traded in Deutsche mark as well.

Up to now, this pattern has hardly changed. After the introduction of euro banknotes and coins on January 1, 2002 (cash changeover), Deutsche mark cash holdings were, for the most part, directly exchanged for euro cash holdings (Stix, 2002). Only a small part of the cash held in Deutsche mark was transferred to euro or local currency deposits after the introduction of the euro. This behavior is consistent with what we have experienced in dollarized economies: Once people have lost confidence in the stability of their own currency and in their banking system, this trust

can hardly be regained. Although the economies may have become more stable[6] (table 2) and prospects better, the degree of dollarization hardly recedes even decades after the experienced crisis. Economic agents proceed to hold and use foreign currency. This phenomenon reflects persistence and hysteresis effects but also the existence of positive network externalities if the secondary currency has proved to be a trustworthy means of payment (Feige, 2003; Reding and Morales, 2004).

Having euro cash holdings and transacting other economic activities in euro are also linked to the population's current expectations regarding their country's future accession to the euro area. In principle, all EU Member States are contractually obliged to introduce the euro in the medium term; and even countries that are still far from joining the European Union consider themselves potential members of the euro area. The latest summit decisions on the EU's enlargement strategy have, in fact, supported this view.

However, the current sovereign debt crisis in some euro area countries has dampened enthusiasm for a speedy euro introduction. A number of governments have adjourned their officially declared accession date or postponed it by many years.[7] According to the Flash Eurobarometer (European Commission, 2011), there has also been a shift in public attitude: The share of respondents believing that the euro would not be adopted *"within the next five years or would never"* be introduced has generally been increasing since the year 2010; in the Czech Republic and in Hungary it even exceeded 50% of all respondents in May 2011. In Latvia and Lithuania, on the other hand, the introduction of the euro in neighboring Estonia on January 1, 2011, has spurred optimism. Bulgaria, a country with a currency board firmly tying the lev to the euro, is optimistic as well. Almost half of the Bulgarian respondents expect the euro to be introduced no later than in two to three years.

2 Current Map of Euroization and Degree of Currency Substitution

The OeNB Euro Survey provides direct as well as indirect evidence on the use of euro cash: direct evidence on the dissemination and the amount of euro cash held; indirect evidence in the form of opinions stated by respondents on preferred portfolio composition and perceived (payment) behavior.

2.1 Dissemination of Euro Cash and Changing Motives for Holding Euro Cash

It is generally very common to hold euro cash in CESEE countries (chart 2). Euro cash holdings are particularly widespread in FYR Macedonia and Serbia, where, before the outbreak of the financial and economic crisis, 43% (FYR Macedonia) and 41% (Serbia) of all respondents claimed to hold euro cash. In Albania, Croatia and the Czech Republic, the share came to between 28% and 32%. In the remaining countries, levels were significantly lower at 9% and 16% of all respondents. However, since the beginning of the financial crisis (September 2008) the degree

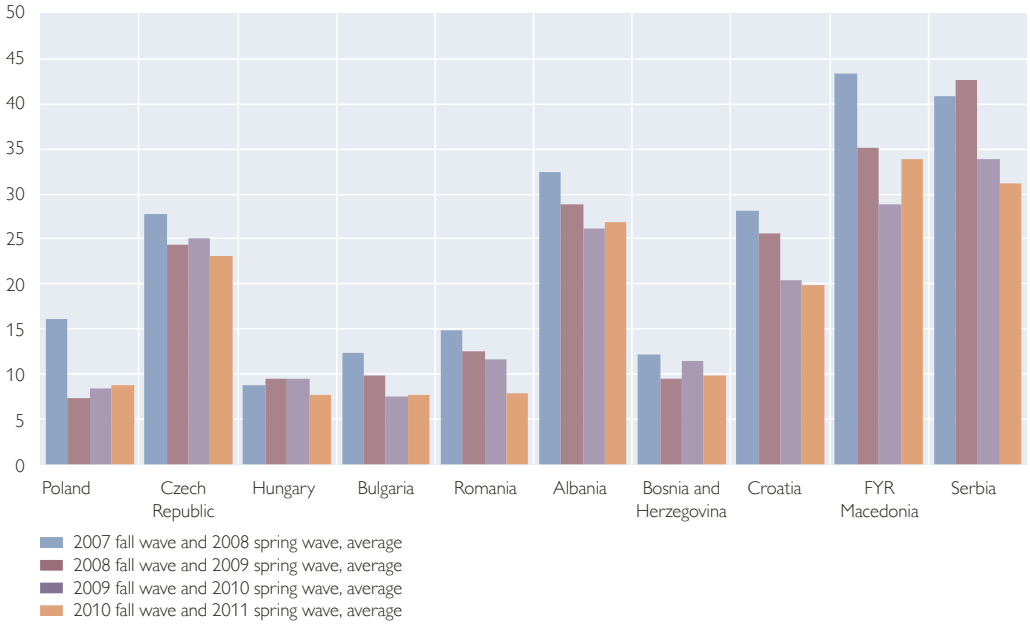
[6] *Note the different macro stabilization policies: The Baltic countries, Bosnia and Herzegovina as well as Bulgaria stabilized their currencies by introducing fixed exchange rate regimes. Albania, FYR Macedonia and Croatia manage their exchange rates against the euro. The Czech Republic, Hungary, Poland, Romania and Serbia have floating exchange rate systems, but their central banks pursue explicit inflation targets.*

[7] *The latest results of the OeNB Euro Survey also show that the relative advantage the euro had over local currencies in terms of household confidence has strongly melted since May/June 2010 (see ceec.oenb.at).*

Chart 2

Dissemination of Euro Cash Holdings

% of respondents



Source: OeNB Euro Survey.

Note: All "don't know/no answer" replies have been excluded.

of euro cash dissemination has clearly dropped in eight out of ten countries. Levels remained stable merely in Bosnia and Herzegovina as well as Hungary.

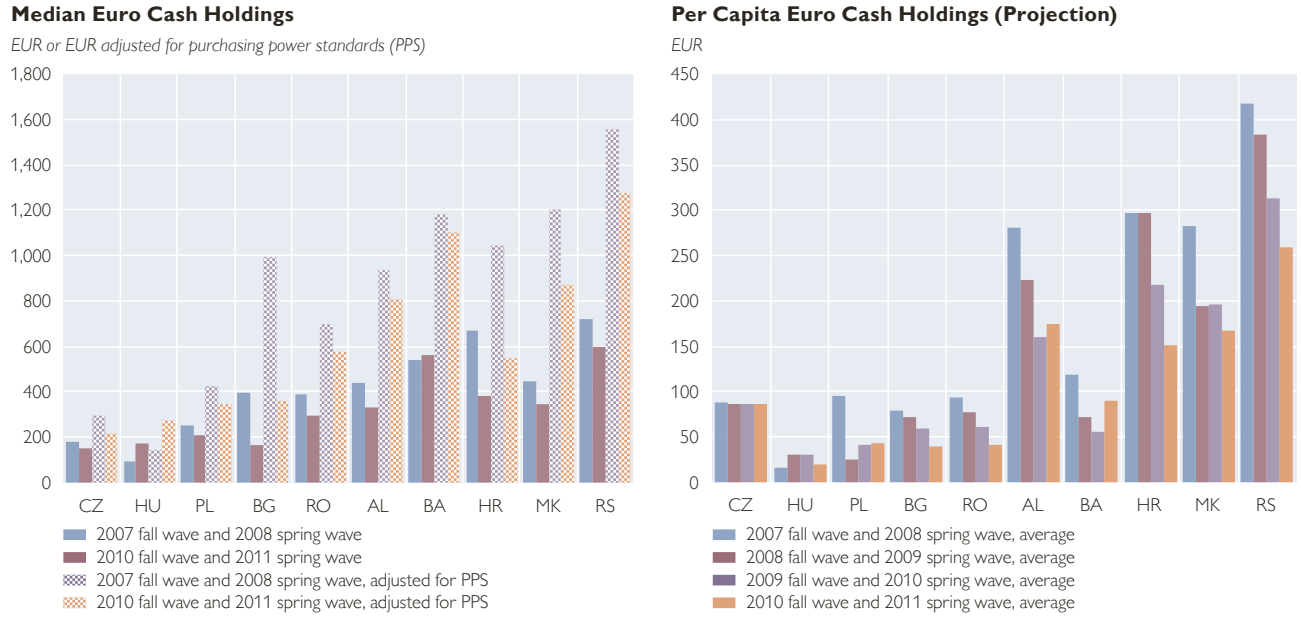
Cash fulfills various functions: Among other purposes, it serves as a store of value (hoarding) and as a general means of payment (transaction motive). Depending on the region, these two functions are more or less relevant (Dvorsky et al., 2008). In Central and Eastern Europe (CEE; the Czech Republic, Hungary and Poland), euro cash is held primarily to make payments when traveling abroad. However, in Southeastern Europe (SEE; Albania, Bulgaria, Bosnia and Herzegovina, Croatia, FYR Macedonia, Romania, Serbia), euro cash is predominantly used as a store of value. The latest survey results have shown that this regional pattern is still valid (Beckmann et al., 2011). According to Stix (2004), the store of value motive had been more important than the transaction motive in CEE before 2002, when people were holding Deutsche mark and Austrian schilling notes and coins. Hoarding foreign currencies became less common when these countries' economies started to prosper, the banking system developed, and the population gained confidence in its local currency. At the same time, motives changed. Foreign currency cash holdings were increasingly used to make payments abroad, which is the predominant motive to hold foreign currency cash in advanced economies as well.

2.2 Amounts of Euro Cash Held

The regional divide between the dominant motives "payments abroad" versus "hoarding" are also reflected, as one would expect, in the amounts of euro cash held. While precrisis median

Chart 3

Amounts of Euro Cash Held by Individuals



Source: OeNB Euro Survey.

Note: Values are based on categorical replies. Median values were calculated using linear interpolation between class limits. Purchasing power adjustments are based on the PPS exchange rates provided by The Vienna Institute for International Economic Studies database. Per capita values are extrapolated for the entire population aged 14 years and over. For details, see Scheiber and Stix (2009).

values were at EUR 90 to EUR 255 in CEE, SEE values ranged from EUR 390 to EUR 720 (chart 3, left panel). After adjusting these values for purchasing power standards – i.e. taking into account local price levels – it becomes evident that these are economically significant amounts households in SEE have been hoarding "under their mattresses," so to speak. [8]

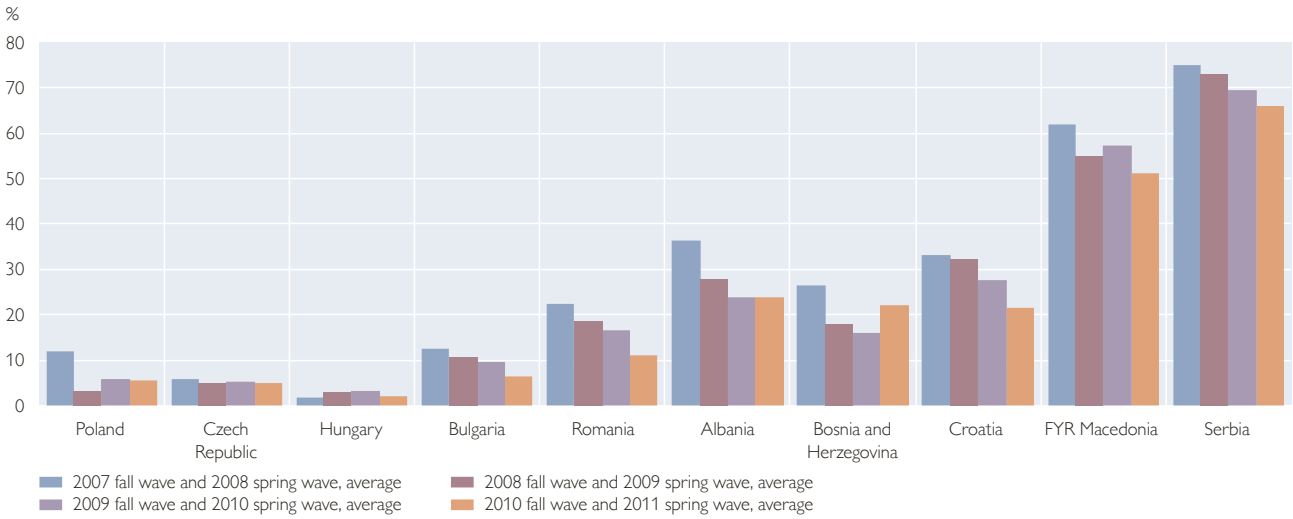
The results of the OeNB Euro Survey show that, in the wake of the financial and economic crisis in the CESEE region, not only the degree of dissemination but also the amount of euro cash held per capita decreased (chart 3, right panel). The drop in per capita amounts was particularly severe in those countries that featured substantial withdrawals from savings accounts in fall 2008 (Albania, Bosnia and Herzegovina, Croatia, Serbia). A possible explanation for this somewhat counterintuitive phenomenon is given by Dvorsky et al. (2010): Households that had taken their money out of the bank in fear of bankruptcy put some of it back in their savings accounts after the impending crisis was averted. However, some of the withdrawn money was spent to maintain a living at a time when incomes were declining and jobs were lost. The reduction in the projected amounts of euro cash held in the last two years seems to be linked to the crisis-related withdrawal of deposits also in the other SEE countries.[9]

[8] *The ratio of euro cash (median) to the average gross monthly income averages 20% in CEE and 69% in SEE.*

[9] *This is consistent with the OeNB's cash logistics developments (Augustin, 2011; Krsnakova and Oberleithner in this issue): Net inflows of euro banknotes from CESEE countries via the Austrian banks' subsidiaries in these countries have partly been above average since spring 2009.*

Chart 4

Currency Substitution Index



Source: OeNB Euro Survey.

Note: Currency substitution index = ratio of euro cash to euro cash plus national currency in circulation. For details on the calculation see Scheiber and Stix (2009).

2.3 Degree of Currency Substitution by Country

Although per capita euro cash holdings have subsided recently, non-EU countries still display a significant degree of currency substitution. The currency substitution index measures the relative weight of euro cash in an economy's total cash in circulation. This is projected from OeNB Euro Survey results. In FYR Macedonia and Serbia, for instance, this index is above 50% (as measured by the monetary aggregate M0). Thus, the amount of euro cash in circulation has exceeded the amount of local currency in circulation (chart 4). This is particularly notable as respondents' statements regarding the amount of cash held are subject to underreporting due to the sensitive nature of the question. Depicted values are therefore likely to represent the lower bound of actual euro cash holdings.

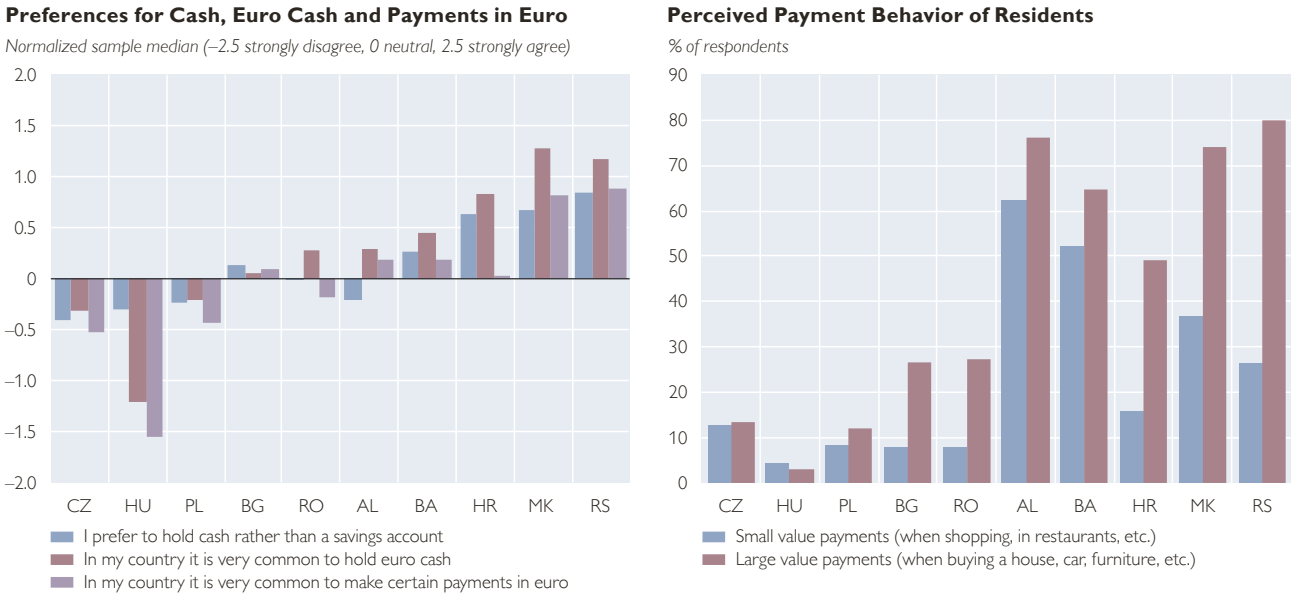
The currency substitution index shows the following geographic pattern: A very high degree of de facto currency substitution is found in FYR Macedonia and Serbia, and a medium degree of around 20% in Albania, Bosnia and Herzegovina as well as Croatia. In contrast, in EU Member States the rather low or very low degree of currency substitution measured since the beginning of the financial crisis in September 2008 has continued to recede and is around 10% or even lower. However, one thing holds true for all countries: currency substitution is generally on the decrease. There is a long-term trend away from euro cash to (euro) deposits (Beckmann et al., 2011).

2.4 Indirect Evidence: High Cash Preference and Payment Behavior

The sensitive nature of the OeNB Euro Survey's direct questions to be answered by households may give rise to some doubt in the reliability of the results. Thus, indirect questions on the degree of agreement with general statements, common behavior of fellow citizens, or own preferences are an important additional source of information. Replies to control questions confirm

Chart 5

Preferences and Perceived Payment Behavior



Source: OeNB Euro Survey 2007 fall and 2008 spring.

Note: The respondents' degree of agreement or disagreement with the respective statements was assessed on a scale of 1 to 6. For calculating the mean values, all "don't know" and "no answer" replies were excluded. The questions to determine perceived payment behavior was "When you think about the past six months: Have you noticed residents making payments in euro in your country?"

the above statements made on regional differences in the use of euro cash in CESEE countries (chart 5, left panel). Results show a clear preference for holding cash versus deposits for Bosnia and Herzegovina, Croatia and particularly for FYR Macedonia and Serbia. Furthermore, the majority of respondents in Southeastern European countries – above all in FYR Macedonia and Serbia – agrees with the statement that it is very common to hold euro cash. However, euro cash is not just hoarded; it is literally in circulation. In particular in non-EU countries, the majority of respondents states that (1) it is very common in their country to make certain payments in euro, and that (2) they have observed fellow citizens making payments in euro in the last six months (chart 5, right panel). Apparently, euro cash is used especially to pay for major investments.[10]

Anecdotal evidence for Southeastern Europe has revealed that real estate and cars are often paid for in euro and that some purchases and rental prices are indexed to the euro. Frequently, even the prices displayed on these goods are quoted in euro. In Albania, Bosnia and Herzegovina, and – to a lesser extent – in FYR Macedonia and Serbia, consumers seem to make some smaller purchases in euro as well, e.g. furniture, electrical and electronic devices.

The majority of respondents holding euro cash in FYR Macedonia and Serbia state that they use the euro as a unit of account for certain purchases;

[10] *This is remarkable insofar as payments in foreign currency have been prohibited by law in Croatia, FYR Macedonia, Serbia, and, since 2010, in Bosnia and Herzegovina. In reality, people often find creative ways of getting around this ban.*

to a smaller degree (an average of about 27%), this behavior can also be found in other SEE countries.

OeNB Euro Survey data show that a high degree of currency substitution in a country correlates positively with both a preference for cash among respondents ($r = 0.86$; $R^2 = 0.74$) and the observed frequency of euro payments made in a country by its residents ($r = 0.87$; $R^2 = 0.76$). The former correlation indicates a complex interaction of cash preference and euroization. The latter one suggests positive network externalities.

3 Which Factors Determine Household Portfolio Decisions?

As discussed in section 1, economic crises (triggered by the transition process or by wars) have led to currency substitution in CESEE countries. Despite an overall stabilization of the economies and the partly strong economic growth, some SEE countries still feature a high degree of currency substitution. How can the differences in euro cash holdings among countries be explained? What are the determinants of household demand for euro cash?

Household portfolio composition is based on the interplay of two elements: the cash versus deposits decision and the foreign currency versus local currency decision. The underlying preferences for these decisions are determined by various (supply- and demand-side) factors that influence a person's subjective assessment of return and risk. Recent literature underlines the central role confidence (in the security of deposits, in the stability of banks, or in positive economic developments) plays in households' financial decisions (Stix, 2011; Coupé, 2011; Beck and Brown, 2011; Guiso et al., 2004). Furthermore, there is evidence that past periods of crises have a lasting effect on household preferences (Mudd et al., 2010; Osili and Paulson, 2008; Stix, 2010).[11]

In a first step, Scheiber and Stix (2009), using bivariate correlation, examined whether differences among countries in cash euroization can be explained with arguments cited in the literature on dollarization. The authors use three variables of euroization: the degree of euro cash dissemination, the currency substitution index, and the indirect variable "In my country it is very common to hold euro cash." The following factors have been identified as important determinants for explaining differences among countries: governance quality, confidence in the banking system, a history of deposit confiscation (primarily in FYR Macedonia and Serbia), access to banking services, and the frequency of euro payments (network effects). Current inflation levels, past perceived inflation, remittances and income in euro hardly correlate with the three dependent variables or have no impact on them at all.

At the respondent level, there is a significant correlation between a strong cash preference and euro cash holdings (Stix, 2011). Euro cash is considered a safe haven asset and is used by households in SEE as a store of value. Microeconomic estimates show that a lack of confidence in the banking system (in particular a perceived lack of deposit security) is a key factor in explaining

[11] *This phenomenon is also explained with hysteresis (Reding and Morales, 2004). This means that economic agents – because of an earlier period of crisis they experienced and the subsequent loss of confidence in the banking system or in the local currency – consider it quite likely that their economy could be hit by another crisis.*

households' strong preference for cash in SEE. The recollection of past banking crises aggravates this effect. Furthermore, weak institutions, e.g. the poor quality of jurisdiction[12] or tax collection,[13] as well as a low penetration of banks constitute significant factors for explaining the strong preference for cash.

These findings confirm earlier research results on euroization in the region (Kraft, 2003; Ritzberger-Grünwald and Stix, 2007; Stix, 2010): The degree of persistence in the use of euro cash in SEE can primarily be explained by factors related to previous economic crises experienced by respondents. This limits the scope of economic policies aimed at confining euroization. Macroeconomic stabilization measures in themselves are insufficient to regain economic agents' confidence.

4 Current Economic Policy Developments

Finally, apart from the above-mentioned fundamental and rather long-term considerations based on OeNB Euro Survey results, two current developments and their implications for the use of euro cash shall be examined: the recent global economic and financial crisis and the call for capital markets in national currencies.

4.1 The Impact of the Recent Economic and Financial Crisis

First, the public's confidence in the banking system, in particular in the security of deposits, and their relative confidence in their national currency are the key to the portfolio choice of households.

The outbreak of the financial and economic crisis in fall 2008 clearly showed how highly sensitive households are to portfolio issues. Particularly in SEE, the increased degree of uncertainty aggravated prevalent behavior patterns and induced a swift adaptation of portfolios: the flight to cash went hand in hand with a flight to euro holdings. According to the OeNB Euro Survey, between 5% (Hungary) and 22% (Albania) of respondents holding savings shifted their portfolios accordingly between fall 2008 and fall 2011: In the wake of the crisis, they withdrew savings from accounts and changed the currency composition of their holdings.

Interestingly enough, households adjust their portfolios at different speeds under different economic conditions: While they switch into what they consider safer assets relatively quickly in times of acute crisis, they are hesitant to revise their decisions when the economy has stabilized.

Second, the recent decline in currency substitution, i.e. lower levels of foreign currency cash holdings versus local currency cash holdings, seems to be linked not only to euro cash reserves that households spend as a substitute for decreased income due to the crisis.[14] In an environment of uncertain inflationary and exchange rate developments on the one hand and increasing confidence in the banking system on the other hand, portfolios may well shift from euro cash to euro deposits, possibly

[12] *Measured as respondents' confidence in courts.*

[13] *Measured as respondents' agreement with the statement that in their country, it is very common that people pay cash to avoid taxes.*

[14] *The number of euro banknotes in circulation dropped in particular in SEE, as the issued euro banknotes partially returned to the euro area via the banking system, i.e. via the Austrian banks' subsidiaries in these countries (Augustin, 2011; Koch and Schneeberger as well as Krsnakova and Oberleithner in this issue).*

leaving an economy's general degree of euroization unchanged (Feige, 2003). Beckmann et al. (2011) have published evidence for such a shift on an aggregate level in SEE. In the case of Croatia, the degree of euroization even rose as a result of an above-average increase in euro deposits.

4.2 Promoting Savings Deposits – An Economic Policy Goal

In the long term, increased financial integration, economic convergence, and access to banking services for larger parts of the population might change motives for holding euro cash in Southeastern Europe – as they have in the Czech Republic, Hungary and Poland. Instead of being a store of value, the euro may eventually be kept only for traveling and for shopping in the euro area. What used to be held as euro cash would then be paid into savings deposits and thus serve productive economic ends.

In a next step, these savings should ideally no longer be held in euro but in local currency. Thus, the predominant amount of foreign currency loans granted in some countries could be reduced substantially. This, in turn, would eliminate the currency risk involved. Several international institutions including the IMF and the EBRD have been calling for a reduction in foreign currency lending, primarily to stabilize local financial markets, but also to make them less dependent on capital imports.

To get this process started, economic policies enhancing confidence in the banking system and the local currency need to be introduced. This requires a cautious fiscal policy, reliable prudential supervisory systems, and, last but not least, comprehensive deposit insurance systems.

5 Summary and Outlook

A considerable share of the euro banknotes issued since 2002 is in circulation in CESEE countries. On the one hand, crises triggered by the transition to a market economy caused economic agents to resort to a parallel currency they considered secure and stable. On the other hand, euro cash holdings are related to the upcoming EU accession of some countries and the subsequent obligation to introduce the euro.

Although the CESEE countries have caught up economically, the degree of euroization has hardly receded over the past years. According to OeNB surveys, economically significant amounts of euro cash are predominantly held by households in Southeastern Europe. In FYR Macedonia and in Serbia, the amount of euro cash in circulation exceeds the local currency in circulation in terms of value. Disparities in euro cash holdings reflect the magnitude of a crisis as well as different motives for holding euro cash. While households in the Czech Republic, Hungary and Poland primarily keep euro cash for traveling and shopping abroad, the euro is used as a store of value and partially as a secondary means of payment in SEE countries.

Numerous economic agents still consider it possible to experience a crisis similar to one they have gone through in the past. However, the financial and economic crisis in fall 2008 did not necessarily confirm their expectations: Governments intervened to guarantee liquidity as well as bank solvency, and deposit insurance systems were expanded. Nevertheless, some CESEE currencies depreciated significantly. At the beginning of the financial and economic crisis, there was a relatively rapid shift toward assets that were considered secure (such as euro- or U.S. dollar-denominated assets),

while the stable years leading up to the crisis had not been marked by a significant decrease in euroization. However, this overall rise in euro cash holdings was only short term and rather moderate.

The recent drop in euro cash holdings seems to be related not only to households' depletion of euro cash reserves in times of crisis to finance necessary expenditures, it also reflects a medium-term trend to restructure household portfolios away from (euro) cash to (euro) deposits. This phenomenon can be interpreted as a slow recovery of confidence in the banking system or as a result of easier access to banking services for larger parts of the population in Southeastern Europe.

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The Euro – Public Opinion in the Ten Years after the Euro Changeover

Manfred Fluch,
Sabine Schlögl[1]

Public sentiment indicators available for the period from 2002 through 2011 provide a clear profile of public opinion on the euro for Austria and partly also for the euro area. Essentially, the period following the introduction of euro banknotes and coins falls into two distinct phases during which two opposing sentiments prevailed: During the first phase, satisfaction with, and acceptance of, the euro rose to a high level until 2009, and during the second phase, the sovereign debt crisis and its consequences caused pro-euro sentiment to decline from 2010, culminating in a critical assessment during the height of the crisis in the summer and fall of 2011. Survey ratings dropped from a high positive sentiment of Austrian respondents on the euro, nearly 80%, in 2009 to approximately 60% in fall 2011. The decline in confidence in the euro appears to have been caused by EU and national policymakers struggling with crisis management rather than by the euro itself. As the runaway public debt and financial speculation are seen as the cause of the crisis, most Austrians and euro area citizens agree with financial and economic policy measures targeted at strengthening Economic and Monetary Union (EMU) in the long run. Although the euro faces great challenges, a clear majority of Austrians (and of other euro area citizens) are convinced that the euro is here to stay.

People in Austria and in the euro area reported hardly any difficulties in the day-to-day use of euro cash. Some respondents are still disposed to comparing euro with schilling or other former currencies in the euro area, above all for exceptional purchases. Those surveyed overwhelmingly agree that they have personally benefited from the euro: price transparency, easier and cheaper travel, and lower costs for payment transactions are considered undisputed advantages of the single currency.

Even if euro inflation has been low in the long run, people continue to associate the introduction of the euro with a rise in prices. The share of respondents who see the euro as very stable and expect it to remain so diminished noticeably in 2011 as a consequence of higher inflation. Whereas at the end of 2007 almost 80% of those surveyed considered the euro stable, this figure had fallen to just over 40% at the end of 2011. Fears of higher inflation along with a loss in the value of savings ranked as Austrians' biggest concerns at the turn of the year 2011/2012.

JEL classification: E50
Keywords: confidence in the euro, euro cash, Austria, euro area

This contribution provides information about public opinion on the euro in Austria and partly also in the euro area as a whole. The study draws on survey data from the European Commission, the Oesterreichische Nationalbank (OeNB), the Österreichische Gesellschaft für Europapolitik (ÖGfE – Austrian Society for European Policy) and various polling institutions (see overview below).

Apart from routine question to gauge confidence, satisfaction, opinions on stability, functions, pros and cons, etc., questions on topical issues related to the euro – such as the financial, economic and sovereign debt crises – were posed during the surveys. This contribution makes use of continuous and longitudinal analyses as well as ad hoc surveys.

Similarly to a review of public opinion five years after the introduction of the euro (Fluch et al., 2007), this article analyzes a range of questions (see the relevant section for more details):

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Regular Surveys about Euro Sentiment

Survey	Commissioned by	Market Research Institute	Sample	Topics/Features	Region	Frequency
OeNB Barometer survey	OeNB	Institut für empirische Sozialforschung GmbH (IFES)	2,000 persons aged 15 and above, face-to-face interviews	Euro cash, euro stability, confidence in the euro, confidence in institutions, etc.	Austria	every quarter since 1992
Standard Eurobarometer	European Commission	in Austria: Das Österreichische Gallup Institut Dr. Karmasin Ges.m.b.H.	1,000 face-to-face interviews in every country	generally: Europeans and the EU, selected euro-specific topics	all EU Member States and candidate countries	every half year since 1973
Flash Eurobarometer	European Commission	in Austria: SPECTRA Marktforschungs GmbH	1,000 face-to-face interviews in every country (respondents aged 15 and over)	satisfaction with the euro, handling euro cash, people's feel for euro cash, advantages and disadvantages of the euro, etc.	all euro area countries	annually since 2002
ÖGfE survey	Österreichische Gesellschaft für Europapolitik	Sozialwissenschaftliche Studiengesellschaft (SWS) and Gesellschaft für Marketing GesmbH (OGM)	varies, between 500 and 1,000 interviews conducted by phone	confidence in the euro and specific EU and euro-related topics	Austria	ad hoc surveys

Source: OeNB, European Commission, ÖGfE.

- How has public satisfaction with the euro and euro cash developed since 2002 in Austria and in the euro area? How does the general public see the Eurosystem's performance in fulfilling the price stability mandate? How high is public satisfaction with the OeNB and the ECB/ESCB as institutions responsible for monetary policymaking (section 1)?
- How do Austrians judge the causes of the crisis and the role European institutions play in overcoming the crisis: Whose fault was it, and who gets the public's vote of confidence in being able to handle the economic and financial crisis most successfully? Which fears does the public have? Which measures does the public consider of overriding importance in reforming economic and financial systems in the EU and in EMU (section 2)?
- What do Austrians and euro area citizens think the future holds in store for EMU and the euro (section 3)?

1 Initial High Confidence in Euro but Noticeable Change in Public Opinion amid Debt Crisis

A number of public opinion indicators allow the range of opinions among Austrians on the euro and euro cash to be mapped over the past decade. Two periods emerge: Between 2002 and 2008, the euro gained increasingly broad acceptance; the confidence values steadily improved until 2008. In 2009, this trend continued despite the crisis and the recession. When the government debt crisis became acute, the trend in sentiment shifted: from 2010 and especially in 2011, pro-euro sentiment contracted. The following analysis depicts these two periods in detail.

Table 1

Economic Indicators for Austria

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	%									
GDP growth	1.7	0.9	2.6	2.4	3.7	3.7	1.4	–3.8	2.3	3.3
Inflation rate	1.7	1.3	2.0	2.1	1.7	2.2	3.2	0.4	1.7	3.6
Unemployment rate	4.2	4.3	4.9	5.2	4.8	4.4	3.8	4.8	4.4	4.1
	% of GDP									
Current account ratio	2.7	1.7	2.2	2.2	2.8	3.5	4.9	3.1	2.7	2.4
Export ratio	48.7	48.2	51.5	53.8	56.4	58.9	59.3	50.4	54.0	57.2
Fiscal balance	–0.7	–1.5	–4.5	–1.7	–1.6	–0.9	–0.9	–4.1	–4.4	–3.6
Government debt ratio	66.7	65.8	65.2	64.6	62.8	60.2	63.8	69.5	71.8	72.0

Source: OeNB, Statistics Austria, Federal Ministry of Finance.

1.1 Pro-Euro Sentiment Rises until 2008

Austrians and the euro area population became familiar with the euro and the new cash fairly quickly and were soon comfortable using it. Apart from its practical advantages, the single currency also appears to have had a positive impact on the Austrian economy (tables 1 and 2). Austria's economy consistently grew about ½ percentage point faster than the euro area economy. Employment increased and unemployment stayed low, remaining one of the lowest rates in the euro area. With an annual rate of inflation of some 2%, Austria maintained purchasing power. Austria's export ratio accelerated in an environment of stable exchange rates, and the current account balance has switched from a deficit to a surplus since 2002. Austria's international trade links as measured by direct investment[2] quadrupled. With the exception of 2008, progress in budget consolidation was also made during this first period: Until 2007, deficit ratios were reduced, and the debt ratio was cut to just over 60% of GDP.

Moreover, the euro benefited from asserting itself as an international currency. The euro's exchange rate against the U.S. dollar generally moved within a bandwidth of 1.2 to 1.4 USD/EUR from 2004. Euro cash in circulation in the euro area expanded sharply. From 2002, the number of banknotes in circulation nearly doubled; the number of coins in circulation almost tripled (Koch and Schneeberger in this issue). The value of euro cash in circulation widened from some EUR 230 billion in 2002 to EUR 912 billion in 2011.

The confidence indicators determined by the European Commission every September in Flash Eurobarometer surveys reflect these developments and present fairly positive survey results for the euro.

- From 2002 to 2008, the share of Austrians who considered the euro a good thing went up from 52% to 75%. By fall 2008, the percentage of persons who considered the euro a bad thing for Austria had shrunk to 13% from 25% in 2002 (table 2).
- People's feel for euro prices developed satisfactorily overall. The overwhelming majority calculates in euro for daily purchases, and only a small minority still thinks in terms of Austrian schilling prices. Mental benchmarking in euro has taken comparatively longer for large

[2] *More precisely, Austrian inward and outward direct investment as a percentage of GDP.*

Table 2

Survey Indicators for the Euro

	Austria					Euro Area				
	2002	2006	2008	2009	2010	2002	2006	2008	2009	2010
	% of the population									
The euro is …										
a good thing	52	62	75	79	69	54	48	71	70	67
a bad thing	25	24	13	10	17	32	38	16	16	17
The euro and European identity …										
the euro has strengthened European identity	21	15	20	20	18	18	19	22	23	22
the euro has not changed European identity	74	81	79	79	80	80	78	77	76	77
Value feel for purchases: When prices are low, I calculate										
in euro	39	69	61	67	72	42	57	59	65	69
in the currency my country used to have	36	20	23	18	16	32	22	22	19	16
Value feel for purchases: When prices are high, I calculate										
in euro	6	22	32	35	43	13	29	35	43	48
in the currency my country used to have	46	55	47	40	35	58	40	39	32	29
The euro...										
makes it easier to compare prices	×	57	72	74	74	×	46	66	66	64
makes travel cheaper and easier	×	52	53	52	56	×	30	46	51	48
reduces banking charges for cross-border payments	×	28	41	38	34	×	25	30	33	29

Source: European Commission (Flash Eurobarometer, various issues).

Note: The 2011 issue of the Flash Eurobarometer was not available at the editorial close of this contribution (March 26, 2011).

amounts, though: While the majority of people calculate in euro, more than one-third still use schilling prices in their minds. Of course, these schilling prices are misleading, as they should be adjusted by a cumulative inflation rate of more than 20%. Unadjusted, they are unsuited as a benchmark and send out incorrect price signals.

– 74% of the respondents to the 2010 survey considered that the euro made it easier to compare prices, 56% recognized the advantages of not having to pay currency exchange fees when traveling in the euro area and of being able to pay uniformly, for instance by using debit cards, across the euro area. However, respondents have not become fully aware of the advantage the euro has brought in lowering cross-border banking charges. At the same time, the impression continues to prevail that the euro has led to price increases for consumers,[3] reflecting in particular above-average increases in the prices of some daily purchases and services.

– In a relatively short period, the euro became a symbol of a unified Europe with monetary integration, but the euro did not strengthen the European identity. The indicators exploring individuals' feelings of European identity have been low since 2002, in Austria and in the euro area alike.

[3] *As this impression has not been influenced by the crisis, the most recent values of 2011 are provided here. A survey conducted by market, a polling institute located in Linz, Austria, in December 2011, shows even higher approval ratings for the euro among Austrians (93% noted the euro's impact on the ease of travel, 75% cheaper payment transfers). Conversely, only 28% of respondents thought that the euro had made prices more stable.*

Box 1

Most People Had No Difficulties Handling Euro Cash

Ten years ago, euro cash was introduced in 12 EU Member States. Today, Austrians have become quite comfortable using the euro for payments. Daily use of euro banknotes and coins has made the currency a matter of course. As expected, the situation was different at the outset, but as time went by, people became familiar with using the euro and had absorbed more information about the new currency. Whereas 46% of Austrians still had problems with the euro in 2002, this share had shrunk to just over 25% in 2006. (Flash Eurobarometer, various issues).

Handling Euro Notes and Coins

	Austria					Euro Area				
	2002	2006	2008	2009	2010	2002	2006	2008	2009	2010
	% of the population									
Handling euro coins is										
very easy or easy	66	68	77	76	69	69	74	78	75	72
hard or very hard	34	29	22	23	29	29	24	19	23	25
Handling euro banknotes is										
very easy or easy	90	93	98	95	92	93	94	95	91	90
hard or very hard	10	5	1	3	4	6	4	4	7	6

Source: European Commission (Flash Eurobarometer, various issues).

Note: The 2011 issue of the Flash Eurobarometer was not available at the editorial close of this contribution (March 26, 2011).

Respondents throughout the euro area also had fewer and fewer difficulties using euro cash over time. Whereas 69% of respondents found it easy to use the eight different euro coins in 2002, this percentage had grown to 78% by 2008 (European Commission: Flash Eurobarometer 2002 to 2010). Since then, the share has diminished slightly. Distinguishing and handling euro banknotes was unproblematic from the outset. When the new currency was introduced, more than 90% or those surveyed all across the euro area had no problem distinguishing between the seven different banknotes, no matter what their age or education level was.

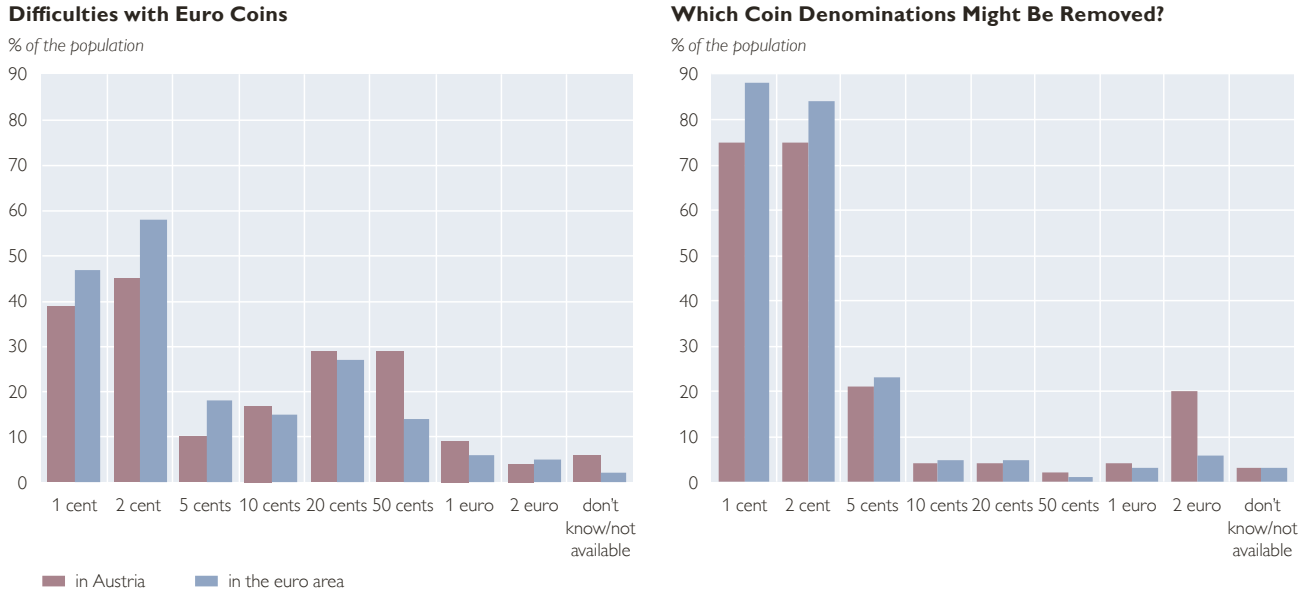
From 2002 to 2006, nearly half of the surveyed Austrians provided positive feedback on the number of coins, i.e. eight, of which the mix of denominations consists. By 2010, the balance of positive answers had risen to six out of ten persons, while just over one-third of respondents noted that there were too many coins.

Only the 1-cent and 2-cent coins still pose considerable handling problems for Austrians; this share has not changed very much since 2007.[1] Roughly 40% of respondents still had problems using the 1-cent coins; nearly half the respondents found the 2-cent coin problematic. Interviewees aged 55+ found it most difficult to use these coin denominations. Nearly 50% of this group of people (in Austria and in the euro area) still have problems handling the two small-denomination coins. The reason is probably that above all older people find it hard to distinguish between these two small coins and therefore run the danger of mistaking one for the other. These two coins are also the ones respondents in all age groups would do without most easily. Three-quarters of Austrian respondents – and almost 90% of euro area respondents – could live without the 1-cent coin. Much the same is true of the 2-cent coin. In the case of the larger denominations, the 2010 survey showed that a fairly large share, one-fifth of all Austrians surveyed, could do without the 2-euro coin, perhaps because it is comparatively large and heavy (chart 1).

[1] *See Fluch et al. (2007) for an analysis of developments from 2002 to 2006.*

Chart 1

Opinions on Euro Coins in 2010



Source: European Commission (2010), Flash Eurobarometer.

1.2 Euro Sentiment Continues to Improve during the Initial Crisis Period – But the Sovereign Debt Crisis Breeds Euroskepticism

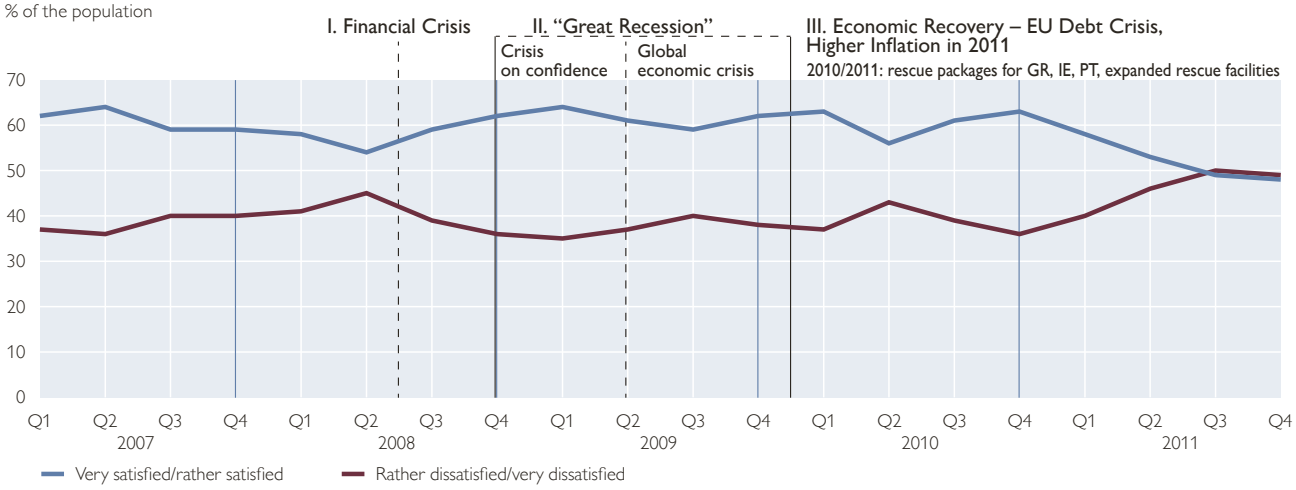
Following the outbreak of the economic and financial crisis in the U.S.A. in 2007 and its gradual spillover to Europe, confidence and demand for the euro even increased as market participants considered it a key currency and a protective shield against speculation, currency attacks and strong negative shocks. The set of monetary policy measures adopted by the Eurosystem along with economic policy programs at the EU and national level to overcome the recession improved euro sentiment.

In 2009, positive sentiment ("the euro is a good thing") was very high according to the European Commission's survey (2009, Flash Eurobarometer 279) both in the euro area and in Austria, even though the region was in the grip of a sharp recession. Nearly 80% of Austrian respondents gave the euro a vote of confidence in fall 2009. Only 10% – the lowest value since the introduction of the single currency – was convinced of the opposite. With these figures, Austria posted higher values than the euro area. The 2009 autumn wave of the European Commission's Standard Eurobarometer found 55% of the Austrians polled to believe that the euro had cushioned the crisis (35% disagreed). In the euro area, somewhat over 40% of respondents were persuaded that the euro had dampened the crisis; 45% disagreed.

However, according to the quarterly OeNB Barometer surveys, trust in the euro began to decline in 2010 as a consequence of the sovereign debt crisis in some euro area countries and sank perceptibly in the course of 2011 (chart 2). Significantly rising deficits and debt ratios in many euro area countries pushed up spreads on government bonds and put the euro under pressure. Before the initial rescue package for Greece was put together in May 2010, trust in the euro declined for a short time, but recovered once the bailout had been agreed.

Chart 2

Satisfaction with the Euro as a Currency in the Course of the Crisis



Source: OeNB, barometer surveys of the Institut für Empirische Sozialforschung (IFES) 2007 to 2011.

However, additional rescue packages for Ireland and Portugal, the sluggish response to the crisis on the part of European institutions, national policymakers' foot-dragging on pushing through and implementing reforms, the high cost of financing bailouts and the contradictory public statements of politicians reinforced respondents' skepticism toward the euro from the fourth quarter of 2010. In addition, people were apprehensive about inflationary tendencies and feared that inflation would erode their savings: in summer 2011, inflation came to just under 4% (whole-year inflation in 2011: 3.6%) and resulted in negative real interest on savings deposits. Factors depressing trust in the euro further were the renewed downturn on the horizon and diminishing trust in the banking system (in Austria, confidence in the banking system contracted from just under 80% in the third quarter of 2008 to 64% in the fourth quarter of 2011; OeNB Barometer, fourth quarter 2011). Whereas 63% of Austrians were still very or rather satisfied with the euro in the fourth quarter of 2010, this figure had progressively shrunk to 48% by the fourth quarter of 2011 (chart 2).

But this OeNB survey also indicated that the deterioration in confidence was attributable to the burgeoning debt ratios of some euro area countries and not to the euro and its currency functions (see also section 2). Evidently, numerous statements made by OeNB officials that the crisis was not a euro crisis but much rather a government debt crisis strengthened confidence in the euro.

The results of other polls conducted in 2011 confirmed the above survey results showing declining confidence in the euro and a somewhat critical attitude toward the currency.

– Regular surveys of the institution Österreichische Gesellschaft für Europapolitik (Austrian Society for European Policy) indicate a drop in euro confidence from 70% (great and very great confidence) in March 2010 to 61% in May 2010, further from 58% in September 2010 to 47% in June 2011, and finally to a low of 40% in December 2011.
– The September 2011 survey of the Österreichische Gesellschaft für

Europapolitik revealed that only 37% of Austrian respondents still believed that Austria had benefited from EMU and the euro. 48% were convinced that the opposite was true.

– According to the European Commission's annual Flash Eurobarometer, the satisfaction indicator fell by 10 percentage points in Austria, albeit from a high level: Compared with 79% at the end of 2009, only 69% of Austrian respondents considered the euro to be a good thing by the end of 2010 (table 2). By fall 2011, according to the results of the Standard Eurobarometer 76 (European Commission, 2011), the share of Austrians convinced that the euro was a good thing had plummeted further to around 60%. The decline in the euro area was less pronounced (from 67% to 64%).[4]
– The results of a poll taken by Linz-based pollster market in December 2011 were quite similar: Only 12% of the respondents over 16 had full confidence in the euro, and another 47% were rather confident about the euro. 13% stated that they had absolutely no trust in the euro.
– In June 2011, German surveys indicated strong doubts about the euro as well: According to a report by the German newspaper Frankfurter Allgemeine Sonntagszeitung, 71% of German respondents had no trust or little trust in the euro, only 19% fully trusted the euro. In July 2011, the German newspaper Handelsblatt reported that 44% of German respondents were concerned that EMU could fail.[5]

1.3 Satisfaction with Price Stability and Monetary Policymaking Institutions Declines during the Crisis

Continuing the analysis performed five years after the introduction of the euro (Fluch et al., 2007), the following section focuses on the period from 2007 to 2011 and provides information on Austrians' opinions about euro stability and the institutions responsible.

1.3.1 Doubts about Euro Stability Grow

The course of the crisis and inflation developments have had a visible impact on people's opinions about euro stability in the financial markets. According to the OeNB Barometer survey results, eight out of ten Austrians still gave euro stability high grades in the fourth quarter of 2007 – before the onset of the financial crisis and while inflation was at a low. This high share deteriorated steadily thereafter, especially from 2010, when the sovereign debt crisis began to spread and inflation rose in Austria and other countries. In the fourth quarter of 2011, only 39% of the persons surveyed considered the euro to have high or rather high stability in the financial markets, and nearly half of the respondents assumed the opposite.

Respondents' expectations about the short- and medium-term development of euro price stability were also queried and were quite similar: The OeNB Barometer survey showed that in the fourth quarter of 2007, more than 70% of Austrians were confident that prices were stable. This value was in line with the low rate of inflation in 2007 (2.2%). By contrast, in 2011, only four out of ten persons polled consid-

[4] *A further survey of 500 Austrians conducted by the Austrian news magazine NEWS in November 2011 indicated that only 34% of all Austrians would have voted in favor of introducing the euro in fall 2011; 61% would have opted for a return to the Austrian schilling.*

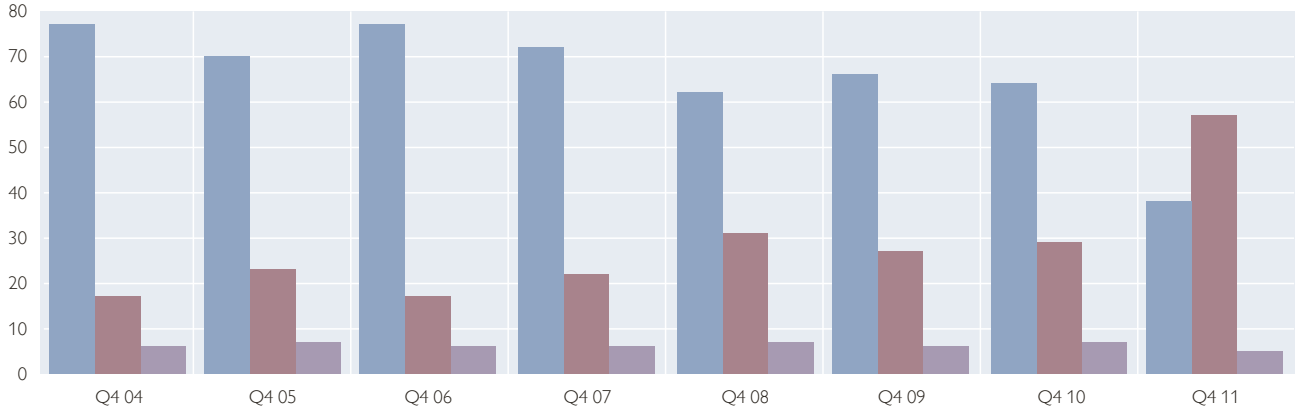
[5] *Frankfurter Allgemeine Sonntagszeitung (June 26, 2011); Handelsblatt (July 27, 2011).*

Chart 3

Austrians' Opinions

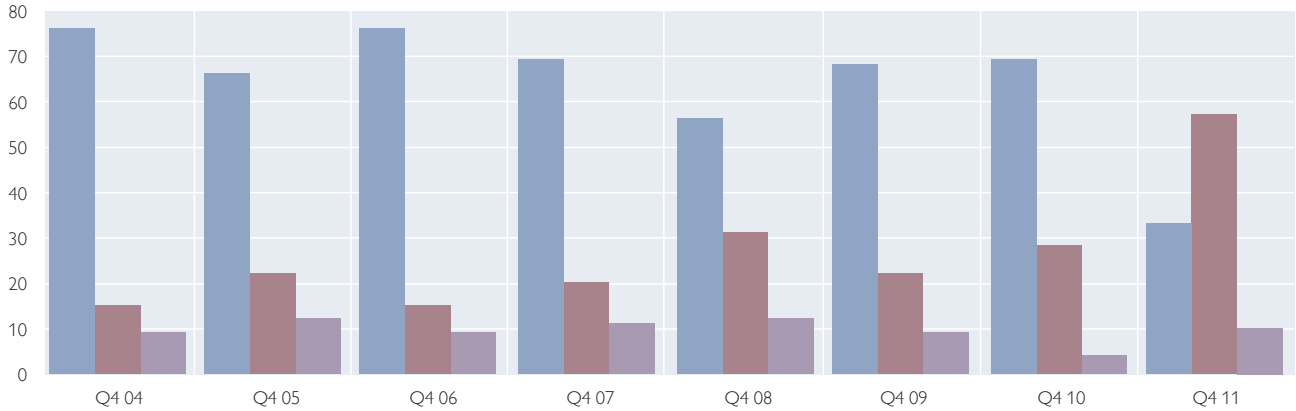
on the Current Price Stability of the Euro

% of the population



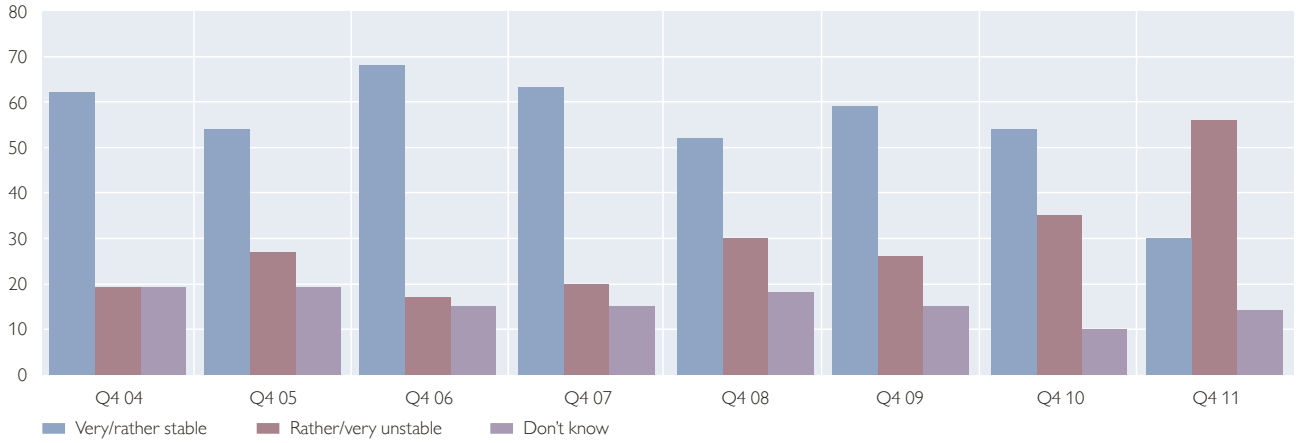
on Price Stability in the Next 12 Months

% of the population



on Price Stability in the Next 5 Years

% of the population



Source: IFES; OeNB Barometer survey 2004 to 2011. This question was not included in the surveys conducted before 2004.

ered price stability to have been maintained. With the rate of HICP price increases coming to 3.6% and the basket of weekly goods (containing selected foods, services and fuel) costing nearly 7% year on year, perceptions had changed. Furthermore, the price of the basket of daily purchases (mainly food) augmented by roughly 4%, also an above-average rate.

At the end of 2011, the opinions on the price stability outlook for the next 12 months and the next five years were also sobering: In both cases, only one-third of the respondents in Austria were convinced that prices would be stable. In 2008, the last time inflation had heated up to nearly 4% in Austria, expectations had also been dampened, but by no means as much as at the end of 2011. Apparently, the protracted effects of the economic and financial crisis alongside the EU's hesitant response to the crisis weighed on expectations in the fourth quarter of 2011. Inflation and the lack of determination on the part of policymakers to address reforms seem to have made people more pessimistic about the future.

1.3.2 Trust in the ESCB and the OeNB to Provide for Stability Declines during the Crisis

Peoples' trust in the institutions in charge of maintaining price stability also diminished somewhat during the crisis, although the OeNB still enjoys a comparatively high degree of trust. According to the results of the OeNB Barometer survey, three-quarters of all Austrians displayed high or very high trust in the OeNB in the first quarter of 2007. This value sank over the following years; it stood at 56% at the end of 2011. Using a grading scale from 1 (excellent) to 5 (fail), people gave the OeNB the mark 2.0 at the beginning of 2007 for its ability to maintain currency stability. The grades given by respondents deteriorated somewhat in the course of the crisis, dropping to 2.7 at the end of 2011. Despite the decline in confidence, six out of ten Austrians remain convinced that the OeNB is an important monetary policy institution. This value stayed fairly stable even throughout the crisis years.

Because the ECB is far away and less well known to Austrians, this institution received much lower confidence marks from Austrian respondents. At the end of 2007, trust in the ECB stood at 38%; this share contacted to roughly 25% in the fourth quarter of 2011.

When asked how well they thought the ESCB had fulfilled its mandate to secure the stability of the euro, people responded as follows over time: In the course of 2007, roughly half of those surveyed answered "very well" or "well." From 2008 through 2010, less than half the persons interviewed awarded the top marks 1 and 2. By the beginning of 2011, this figure had gone down to 40%. Over the remainder of the year, the figure continued to plummet to only one-quarter of Austrian respondents satisfied or very satisfied with the ESCB's performance at the end of 2011. According to the results of the OeNB Barometer survey, 37% gave the ESCB an average rating (3), and one-quarter even gave the ESCB a 4 or a 5 (failing grade) for its achievements. Possible reasons confidence in the ESCB's fulfillment of its stability mandate dwindled in 2011 might be the rate of inflation, which ran to about 3% in the euro area, but perhaps also the non-standard measures (purchase of highly indebted countries' government bonds) that the Eurosystem took to stabilize the financial markets. Harsh media criticism of these measures may also have depressed confidence values. People's displeasure with the slow pace of

reforms by European institutions to overcome the crisis and to prevent further crises may have had an impact as well.

2 High Popular Approval for Reform Measures

2.1 The Crisis: What Were the Triggers, What Should Be Done, What Are Austrians Concerned About

In fall 2011, the OeNB Barometer survey was expanded to include questions directly related to the crisis. People were asked to supply their opinion of what had triggered the crisis, what they feared, and which measures they thought should be taken in the future.

This survey revealed that 83% of the respondents were convinced that more than anything else, financial speculation was the root of the economic and financial crisis. Therefore, nearly 90% of Austrians answering the survey called for greater regulation of speculative activity. In addition, 73% of respondents postulated that the power of U.S. rating agencies should be restricted. Also, the respondents strongly supported the need for all EU countries to take harmonized action.

The survey indicated, moreover, that it was not the euro per se that represented a problem as a means of payment and currency, but much rather the high sovereign debt of certain countries. A large majority of Austrian respondents expressed this opinion (85%). Nevertheless, Austrians were not of one mind about the role the euro is supposed to play during the crisis as the common currency of all 17 euro area countries: Some 40% agreed with the crisis-related statement added to the OeNB Barometer survey "If every country had its own currency, the financial crisis would be even more dramatic" – nearly 50% disagreed. At the same time, two-thirds were convinced of the euro's staying power (OeNB Barometer survey, fourth quarter of 2011; see also section 3).

Chart 4

The Austrian Public's Assessment of the Causes of the Crisis

Source: Additional questions in the 2011 OeNB Barometer survey.

62% of Austrian respondents voiced their greatest fear at the end of 2011 being that the euro could lose its value completely if monetary union "kept going the way it was." Hence, price stability is a key concern. While the forecasts for 2012 and 2013 available when the survey was conducted had expected inflation to ease, this prognosis did not suffice to completely alleviate peoples' fears.

At the end of 2011, 54% of respondents were concerned about their savings deposits. In addition to inflationary developments, the critical media reports about the economic health of the Austrian banking sector may have helped trigger these fears.

2.2 A Clear Majority of EU Citizens Calls for Economic Policy Reforms

Surveys taken at the EU level in 2011 (European Commission, 2011b, Standard Eurobarometer 75 and 76) also provide a clear picture of people's opinions on economic policy reform. The high approval ratings for reforms in the future among those polled clearly point toward the economic and financial policy deficits in the EU and EMU architecture (table 3). The surveys signaled a strong popular consensus on measures to improve economic policy coordination (at the EU level and at the national level), assigning a priority to activities to reduce high sovereign debt and to improve the functioning of financial markets. 70% to 90% of the respondents emphasized that such measures needed to be taken immediately.

Comparing Austrian polls with those of the EU-27 shows a higher percentage of "yes" answers to nearly all questions. The share of Austrian respondents advocating more strongly harmonized economic policy measures among EU Member States was also high, but lower than the EU average.

Queried about the institutions that are in a position to take the most effective measures to combat the impact of the crisis, Austrian respondents cited the EU first (23%), closely followed by

Table 3

Measures to Reform the Economic and Financial System
Spring (S) and fall (F) 2011

Economic policy measures	Austria		EU-27	
	S 2011	F 2011	S 2011	F 2011
	% of the population agree that the following is required			
Measures to reduce the public deficit and the public debt must not be delayed	81	84	77	84
Stronger coordination of economic policies among all the EU Member States	79	68	79	75
Stronger coordination of economic and financial policies between the euro area countries	79	68	78	75
Tougher rules on tax evasion and tax havens	92	90	89	88
A more important role for the EU in regulating financial services	72	65	73	71
Increasing transparency of financial markets	90	87	88	87
Closer supervision of hedge funds	86	84	76	72
Regulation of wages in the financial sector (i.e. traders' bonuses)	89	86	82	79
Introduction of a tax on financial transactions	83	79	65	64
Introduction of a tax on profits made by banks	84	79	82	81
Introduction of Eurobonds (European bonds)	×	52	×	44
Tighter rules for credit rating agencies	×	81	×	75

Source: European Commission (2011b, 2011), Standard Eurobarometer 75 and 76.

Table 4

Would you want Austria to retain the single currency?

	Yes, very much	Yes, rather so	No, not really	No, certainly not	No answer
	% of the population				
Total	20	41	19	11	9
Men	24	39	18	11	9
Woman	16	44	20	10	10
15 to 29 years	27	41	15	9	8
30 to 44 years	17	44	19	12	8
45 to 59 years	17	35	22	14	11
60 and over	19	45	18	7	10

Source: OeNB Barometer survey, fourth quarter of 2011.

the (Austrian) government and the IMF. The picture is quite similar for the EU-27 (European Commission, 2011a, Standard Eurobarometer 75).

The EU, and to some extent national policymakers, have meanwhile learned the lessons of the crisis and have implemented reforms. In November 2011, a number of measures were passed to improve economic governance in the EU. These steps include stricter budget rules and stepped-up surveillance of government budgets.[6] At the beginning of 2011, the new European supervisory architecture comprising the European Banking Authority (EBA), the European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA) became operational. Furthermore, the new Basel III framework for financial markets moved closer to implementation. The Basel III rules will significantly strengthen capital and liquidity requirements for banks. Moreover, steps to improve transparency of previously unregulated financial institutions, e.g. investment funds, hedge funds, rating agencies, have been initiated. Some countries passed comprehensive austerity programs. All of these measures are part of the effort to reinforce EMU's operation in the future and to safeguard and maintain the stability of the euro.

3 Yes to the Euro in the Future

Despite the sovereign debt crisis and the upcoming huge challenges facing countries in dealing with its resolution, the surveys of fall 2011 corroborate euro area and Austrian respondents' support for the euro.

According to the European Commission's Standard Eurobarometer 76 (2011), public support for the euro and EMU came to 64% of the euro area population in fall 2011, whereas 29% were against the euro. The values for Austria were somewhat lower: At the end of 2011, the same survey counted 58% of Austrians for EMU and the euro, 36% against.

Additional surveys gauging Austrians' attitude toward the future of the euro are available. According to the OeNB Barometer survey, in the fourth quarter of 2011, a clear majority, 61%, was convinced that the euro would remain

[6] *In its series of quarterly "Monetary Policy & the Economy" bulletins, the OeNB published a special issue in the fourth quarter of 2011 entitled "EU Governance Reformed." This special issue contains numerous contributions detailing the key economic and fiscal policy reforms.*

in place in Austria (table 4); just under one-third were rather skeptical. Men are somewhat more optimistic than women, and almost 70% of young Austrians expect the euro to endure. This picture is confirmed by the fact that only 34% of Austrian respondents wish to exit EMU as soon as possible, whereas 49% want to remain in EMU. Moreover, a large majority (67%) of Austrians in the fourth quarter of 2011 expected that the euro would still be around in five years; 21% expect the opposite to be the case. In the third quarter of 2011, the same question had still attracted a higher share of pro-euro answers (74% versus 16%).

In the eurocritical survey mentioned earlier (NEWS, November 2011), 59% of Austrians polled believed that the euro was here to stay.

In the survey conducted by Linz-based pollster market (December 2011), 67% answered the question "Will we still be paying in euro in 10 years; will the euro still be here?" with "yes," 24% with "no."

The conviction that the euro was here to stay was even clearer for the survey conducted by the Österreichische Gesellschaft für Europapolitik in December 2011: 78% of Austrians queried thought the euro would continue to be in place in the long run.

This very positive overall assessment of euro may be interpreted as a token of trust in the euro and its services for the economy and the population in the 13 years in which it has been the single accounting currency and the 10 years in which the euro has been around as cash and as a means of payment.

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How Euro Banknotes in Circulation Affect Intra-Eurosystem Balances

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The cash changeover to the euro created the need to present banknotes in circulation in an innovative manner to allocate them adequately across the balance sheets of the Eurosystem central banks. The solution adopted was to undertake regular accounting adjustments of the circulating banknotes. This article presents the relationships between the relevant balance sheet items – primarily intra-Eurosystem balances arising from such adjustment and the liability constituted by banknotes in circulation – and provides insights into the origins of this mechanism and its legal basis. The value of euro banknotes in circulation, as now reported by 18 Eurosystem central banks (i.e. including the ECB), has risen consistently over the last ten years and now stands at around EUR 900 billion.

JEL classification: M41
Keywords: banknotes in circulation, adjustment of banknotes in circulation, intra-Eurosystem balances, capital key

Before the cash changeover to the euro, today's euro area central banks used to report in their balance sheets all the banknotes that they had placed in circulation minus any banknotes they had taken out of circulation. Section 1 compares how they reported "banknotes in circulation" before the rollout of euro banknotes, how they accounted for them in the cash changeover year, and how they treat them now. Moreover, this section explains how the amount of banknotes in circulation is backed and describes the relevant legal framework.

The changeover to the euro created the need to establish a mechanism that would allow the amount of banknotes issued in the euro area as a whole to be shown adequately in the balance sheets of all Eurosystem central banks. The challenging aspect in this regard was the fact that euro banknotes circulate beyond the euro area and that they can be returned to any Eurosystem national central bank (NCB), regardless of whether they were issued by that NCB.

To ensure a smooth allocation of banknotes in circulation, the Governing Council of the ECB adopted a set of rules that provides for intra-Eurosystem adjustments of euro banknotes in circulation. Section 2 contains a detailed description of how the monthly adjustment mechanism works in practice, while section 3 provides an overview of the accounting features that the Eurosystem created in this regard. Developments in the value of euro banknotes in circulation are described in section 4, while section 5 sums up and presents conclusions.

1 Banknotes in Circulation in a Central Bank's Balance Sheet

The value of the banknotes in circulation in a given currency area, excluding the value of coins in circulation, is the fundamental liability in a central bank's balance sheet (Handig and Holzfeind, 2007).

As of 1999 the central banks of the future euro area prepared for the cash changeover (Koch and Schneeberger in this issue) and corresponding balance sheet adjustments. Accordingly, the item "banknotes in circulation" that the Oesterreichische Nationalbank (OeNB) disclosed in its annual accounts for 1999 no longer showed the full amount of Schilling banknotes in circulation

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but the amount of banknotes issued by the OeNB minus those banknotes that had been returned to other Eurosystem central banks and were being held there prior to being transferred back to the OeNB.[2] This procedure ensured the uniform presentation of all banknotes in circulation across the euro area in the consolidated balance sheet of the ESCB.

The technical solution underlying this procedure was to create intra-ESCB balances ("intra-Eurosystem balances") as a counterpart to banknotes in circulation. As soon as another euro area NCB accepted a Schilling banknote, it recorded the equivalent euro amount as an intra-ESCB claim on the OeNB. The OeNB, in turn, reduced the sum total disclosed under banknotes in circulation by the same amount.

1.1 Presentation of Banknotes in Circulation

Euro banknotes in circulation are reported as "liability item 1" in the balance sheets of the euro area NCBs and the ECB.

In the cash changeover year, each NCB reported national banknotes (expressed in euro) and euro banknotes in parallel. In the subsequent year, each NCB followed the harmonized balance sheet format and has since disclosed euro banknotes only (tables 1 and 2).

Table 1

Banknotes in Circulation in the OeNB's Balance Sheet as at December 31, 2002

	EUR
Euro banknotes in circulation (liability item 1.1)	9,608,309,200.00
Schilling banknotes in circulation (liability item 1.2)	629,195,257.54
Banknotes in circulation (liability item 1)	10,237,504,457.54

Source: OeNB.

Table 2

Banknotes in Circulation in the OeNB's Balance Sheet as at December 31, 2003

	EUR
Euro banknotes in circulation	11,691,232,000.00
Banknotes in circulation (liability item 1)	11,691,232,000.00

Source: OeNB.

Before the changeover to the euro, each NCB disclosed in its balance sheet the banknotes it had issued minus those it had taken out of circulation. The changeover to the euro created the need for a new accounting regime also with regard to banknotes in circulation.

Within the euro area, banknotes in circulation increase whenever the OeNB or another NCB places banknotes in circulation (e.g. by supplying them to a commercial bank). Conversely, banknotes in circulation decrease whenever banknotes are taken out of circulation and deposited with the OeNB or another NCB (e.g. when banknotes are delivered to an NCB by a security firm).

1.2 Backing of Banknotes in Circulation

To ensure the value of the currency, banknotes in circulation need to be "backed," i.e. collateralized by corresponding assets in the central bank's balance sheet.

Under the Nationalbank Act, every single schilling banknote in circulation needed to be backed by means of selected OeNB assets until Decem-

[2] *Article 49 of the Protocol (No 4) on the ESCB/ECB Statute (Official Journal of the European Union, 2010; OJ C 83, p. 230).*

ber 31, 1998. Specifically, all banknotes issued by the OeNB plus sight liabilities in the OeNB's accounts needed to be fully backed by gold and foreign currency reserves unless backed by federal debt. This was meant to ensure smooth payment transactions with nonresidents and secure the value of the currency.[3]

When the euro was introduced – initially (in 1999) as an accounting currency – the provision about the backing of schilling banknotes in circulation had to be removed from the Nationalbank Act. While the European System of Central Banks and of the European Central Bank (ESCB/ECB Statute) does not contain a corresponding provision, euro banknotes in circulation are backed by underlying assets, even if they are not backed 1:1 by gold and/or foreign currency.

Box 1

Legal Framework

The ECB Guideline on the legal framework for accounting and financial reporting in the ESCB (Accounting Guideline) provides a framework for the balance sheets of all NCBs in the ESCB. Its provisions pertaining to the reporting and recording of banknotes in circulation and their allocation must be applied by all Eurosystem NCBs as part of the joint financial reporting system.

Banknotes in circulation are allocated in accordance with the banknote allocation key on the basis of ECB Decision ECB/2010/24[1] and Article 49 of the ESCB/ECB Statute. The term "banknote allocation key" is explained as follows in Article 1 of the Accounting Guideline:

Banknote allocation key

The percentages that result from taking into account the ECB's share in the total euro banknote issue and applying the subscribed capital key to the NCBs' share in such total.[2]

Annex IV of the Accounting Guideline defines banknotes in circulation and intra-Eurosystem balances, on the basis of Article 12, as follows:[3]

Asset item 9.4: Net claims related to the allocation of euro banknotes within the Eurosystem

For the NCBs: net claim related to the application of the banknote allocation key, i.e. including the ECB's banknote issue-related intra-Eurosystem balances, the compensatory amount and its balancing accounting entry.[4]

For the ECB: claims related to the ECB's banknote issue.

Liability item 1: Banknotes in circulation

a) Euro banknotes, plus/minus adjustments relating to the application of the banknote allocation key.

b) Banknotes denominated in national euro area currency units during the cash changeover year.

Liability item 10.3: Net liabilities related to allocation of euro banknotes within the Eurosystem

For the NCBs: net liability related to the application of the banknote allocation key, i.e. including the ECB's banknote issue-related intra-Eurosystem balances, the compensatory amount and its balancing accounting entry.

[1] *Official Journal of the European Union, 2011c (Decision ECB/2010/24).*

[2] *Official Journal of the European Union, 2011d (Decision ECB/2010/29).*

[3] *Official Journal of the European Union, 2011a (Guideline ECB/2010/20).*

[4] *Official Journal of the European Union, 2011b (Decision ECB/2010/23).*

[3] *Paragraph 62 of the Nationalbank Act, Federal Law Gazette No. 50/1984, as published in Federal Law Gazette I No. 60/1998.*

2 Adjustment of Euro Banknotes in Circulation for Accounting Purposes

Within the euro area, the Governing Council of the ECB (which comprises the members of the Executive Board of the ECB and the governors of the euro area NCBs) has the exclusive right to authorize the issuance of banknotes.[4] Both the ECB and the NCBs are entitled to issue euro banknotes. In practice, euro banknotes are issued by all euro area NCBs, but not the ECB. Technically, the ECB would thus not have been in a position to disclose banknotes in circulation in its balance sheet. In order to avoid such a scenario, it was agreed that the ECB should, as a rule, report 8% of total banknotes in circulation in its balance sheet (a percentage that has been left unchanged as the euro area has grown). The remaining 92% is to be presented in the balance sheets of the NCBs in proportion to their paid-up shares in the capital of the ECB (section 3.3). Those shares constitute the banknote allocation key on the basis of which euro banknotes in circulation are now adjusted on a monthly basis (i.e. on the last working day of every month) in the balance sheets of the Eurosystem central banks.

2.1 How Are NCBs' Shares in Euro Banknotes in Circulation Calculated?

The various euro area NCBs regularly report to the ECB how many banknotes they have put into and taken out of circulation. The ECB subsequently allocates each Eurosystem NCB its share in the total value of euro banknotes in circulation (shown under "Unadjusted banknotes in circulation" in table 3) on the basis of the banknote allocation key. These are the shares of "banknotes in circulation (liability item 1)" that NCBs disclose in their balance sheets.

The difference between the net amounts of banknotes put into circulation by the individual NCBs and the amounts of banknotes allocated to them on the basis of the banknote allocation key gives rise to intra-Eurosystem balances. If the unadjusted share of banknotes in circulation is higher than the allocated share, that NCB reports a corresponding net liability arising from the allocation of euro banknotes in circulation within the Eurosystem. If the allocated share is higher than the unadjusted share, this gives rise to a net claim.

The total intra-Eurosystem balances represent the overall impact of the adjustment. They comprise the proportionate liabilities resulting from the ECB's (8%) share in euro banknotes in circulation, combined with the proportionate claims/liabilities resulting from the allocation of the remaining 92% of euro banknotes in circulation to the various NCBs. The ECB's share is allocated by dividing its 8% – here, around EUR 71 billion – among the various NCBs on the basis of the capital key (shown under "Adjustment resulting from ECB share" in table 3). The column headed "Adjustment resulting from NCBs' shares" is derived by subtracting the column headed "Adjustment resulting from ECB share" from the column headed "Total intra-Eurosystem balance."

On the last working day of every month, the Eurosystem central banks adjust their balance sheets to reflect the amount of banknotes in circulation as calculated on the basis of the banknote allocation key (liability item 1) and

[4] *Article 16 of the Protocol (No 4) on the ESCB/ECB Statute (Official Journal of the European Union, 2010; OJ C 83, p. 237).*

Table 3

Adjustment of Banknotes in Circulation at End-2011

Central bank of	Unadjusted banknotes in circulation	Banknote allocation key	Banknotes in circulation (liability item 1)	Total intra-Euro-system balance	Eurosystem capital key	Adjustment resulting from ECB share	Adjustment resulting from NCBs' shares
	EUR	*%*	*EUR*		*%*	*EUR*	*EUR*
Belgium		3.18950	28,342,790,060	16,354,345,340	3.46660	–2,464,416,949	
Germany		24.89950	221,263,928,860	–170,489,441,885	27.06469	–19,240,354,177	
Estonia		0.23550	2,092,718,940	1,501,975,830	0.25582	–181,864,542	
Ireland		1.46050	12,978,411,940	–15,389,015,630	1.58738	–1,128,474,565	
Greece		2.58350	22,957,704,380	–18,437,110,570	2.80818	–1,996,344,353	
Spain		10.91850	97,024,848,180	26,453,929,795	11.86786	–8,436,889,160	
France		18.69850	166,160,106,580	77,322,436,905	20.32457	–14,448,782,288	
Italy		16.43100	146,010,466,680	–7,553,481,615	17.85981	–12,696,583,463	
Cyprus		0.18000	1,599,530,400	551,945,625	0.19565	–139,090,815	
Luxembourg		0.22950	2,039,401,260	–69,994,510,855	0.24968	–177,495,729	
Malta		0.08300	737,561,240	–130,048,930	0.09032	–64,211,391	
Netherlands		5.24400	46,599,652,320	27,278,180,115	5.69983	–4,052,023,284	
Austria	–10,112,724,375	2.55300	22,686,672,840	32,799,397,215	2.77503	–1,972,773,083	34,772,170,298
Portugal		2.30150	20,451,773,420	21,820,551,620	2.50163	–1,778,411,703	
Slovenia		0.43250	3,843,316,100	2,476,939,950	0.46991	–334,061,796	
Slovakia		0.91150	8,099,844,220	859,119,135	0.99099	–704,496,501	
Finland		1.64850	14,649,032,580	3,484,706,245	1.79204	–1,273,966,199	
ECB	–	8.00000	71,090,240,000	71,090,240,000	0.00000	71,090,240,000	–
Total	888,627,841,710	100.00000	888,628,000,000	158,290	99.99999	–0	158,290

Source: ECB, OeNB.

Note: With the exception of data for the OeNB and the ECB and the respective totals, data for the columns "Unadjusted banknotes in circulation" and "Adjustment resulting from NCBs' shares" are not shown.

Table 4

Banknotes in Circulation in the OeNB's Balance Sheet as at December 31, 2011

	EUR	
Banknotes actually put into and taken out of circulation by the OeNB (unadjusted banknotes)		–10,112,724,375.00
ECB's 8% share of banknotes in circulation	–1,972,773,083.00	
Claims related to the allocation of euro banknotes within the Eurosystem	34,772,170,298.00	
Net claims related to the allocation of euro banknotes within the Eurosystem[1]		32,799,397,215.00
Banknotes in circulation (liability item 1)		22,686,672,840.00

Source: OeNB.

[1] Counterpart in asset item 9.4 "Net claims related to the allocation of euro banknotes within the Eurosystem".

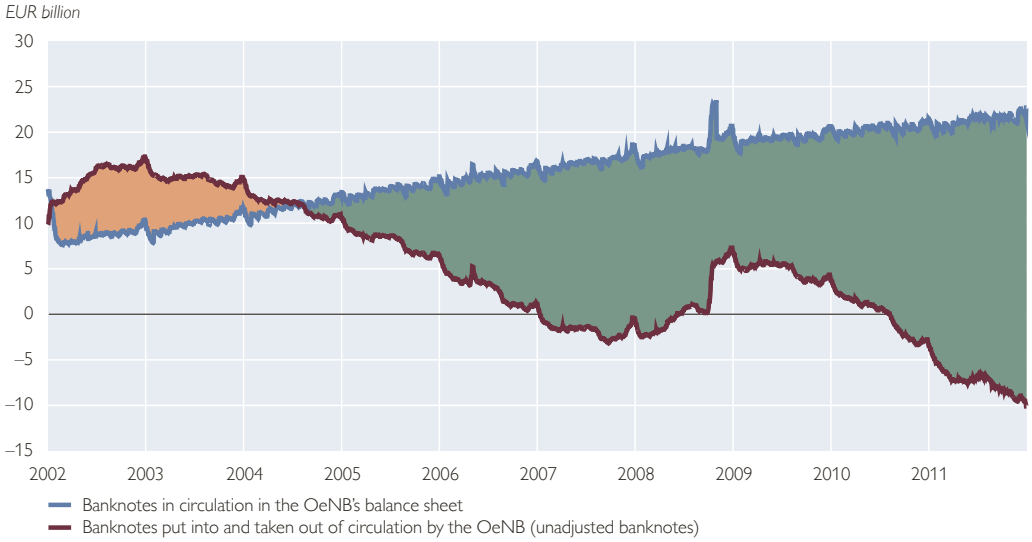
the corresponding intra-Eurosystem balances (asset item 9.4/liability item 10.3).

The final annual adjustment of banknotes in circulation is disclosed in the balance sheet of the respective year (table 4 for the OeNB's share of banknotes in circulation on December 31, 2011).

Chart 1 plots (i) the unadjusted amount of banknotes in circulation recorded by the OeNB, i.e. the euro banknotes it has put into circulation minus those it has taken out of circulation, against (ii) the amount of banknotes in circulation attributed to the OeNB on the basis of the adjustment of banknotes in circulation, as reported in the balance sheet of the OeNB. The former has been lower than the latter since mid-2004 and displays a negative trend, meaning that, in value terms, more banknotes are returning to the OeNB than are being issued. This is primarily on account of Austria's geographical position, tourism receipts, the interdependence of banks at the international level and the fact that Austria's banks are active players in Central, Eastern and Southeastern Europe (Schneeberger and Süß, 2007).

Chart 1

Banknotes in Circulation in the OeNB's Balance Sheet Relative to Unadjusted Banknotes



Source: OeNB.

Depending on which of the two different shares of banknotes in circulation is higher, the OeNB thus reports either interest-bearing intra-Eurosystem claims (green shading in chart 1) or liabilities (orange shading in chart 1).

3 Special Banknote Accounting Features of the Eurosystem

This section will explain the special features of the Eurosystem as regards the adjustment of banknotes in circulation. This primarily concerns intra-Eurosystem balances and the interest on such balances, the compensatory amount and the adjustment of the capital key.

3.1 Intra-Eurosystem Balances

Intra-euro area transactions give rise to intra-Eurosystem balances reported in the balance sheets of the corresponding central banks. Such balances can be found on both the asset and the liability side of the balance sheet, yet balances of the same kind (e.g. balances related to the allocation of euro banknotes in circulation within the Eurosystem) can never be shown on both sides at the same time, as data are always reported on a net basis. Moreover, the central banks' balances cancel each other out, so they do not appear in the Eurosystem's consolidated weekly financial statement.

Table 5 lists all intra-Eurosystem claims and liabilities reported in the NCBs' balance sheets, including the two items "net claims/liabilities related to the allocation of euro banknotes within the Eurosystem," (section 2) that are used for the adjustment of banknotes in circulation. These two items are, under the Accounting Guideline, to be presented in a harmonized manner – as asset item 9.4 and liability item 10.3 respectively – in the balance sheet of every Eurosystem central bank.

The net claims/liabilities resulting from the allocation of euro banknotes in circulation within the Eurosystem carry interest, which is calculated on a daily basis. The interest rate applied is the current marginal interest rate in

Table 5

Intra-Eurosystem Balances

Asset item 9 Intra-Eurosystem claims	Liability item 10 Intra-Eurosystem liabilities
Asset item 9.1: Participating interest in ECB	Liability item 10.1: Liabilities equivalent to the transfer of foreign reserves[1]
Asset item 9.2: Claims equivalent to the transfer of foreign reserves	Liability item 10.2: Liabilities related to the issuance of ECB debt certificates
Asset item 9.3: Claims related to the issuance of ECB debt certificates[1]	Liability item 10.3: Net liabilities related to the allocation of euro banknotes within the Eurosystem
Asset item 9.4: Net claims related to the allocation of euro banknotes within the Eurosystem	Liability item 10.4: Other liabilities within the Eurosystem (net)
Asset item 9.5: Other claims within the Eurosystem (net)	

Source: OeNB.

[1] Relevant only for the annual accounts of the ECB.

the main refinancing operations (MRO rate).[5] An intra-Eurosystem claim results in the NCB earning interest, while an intra-Eurosystem liability results in interest expense. These are reported as part of the net interest income in the NCB's profit and loss account. In 2011, this scheme resulted in the OeNB generating interest income totaling EUR 365 million. As the Eurosystem shares responsibility for the banknotes in circulation and as the circulating banknotes constitute a closed system, the total interest income and expense within the Eurosystem cancel each other out.

Under a decision by the Governing Council of the ECB, the ECB's seigniorage – interest income derived from banknotes in circulation – that stems from its technical 8% share in the euro banknotes in circulation is due, in full, to the NCBs of the Eurosystem in the year that it is generated. Such income is distributed provisionally at the beginning of January of the following year.[6] Before the end of every financial year, the Governing Council of the ECB decides whether, and to what extent, the ECB's income derived from banknotes in circulation should be retained, so that the income distributed does not exceed the ECB's net annual income for the year.

The Governing Council of the ECB may decide to allocate all or part of that income to the ECB's provision for exchange rate, interest rate, credit and gold price risks (risk provision). Income distributed to NCBs is reported as income from participating interests in the profit and loss account. Since the introduction of euro banknotes, all or part of the ECB's seigniorage has been distributed for the 2002, 2008, 2009 and 2011 financial years. In all other financial years, ECB income derived from interest on banknotes in circulation has been retained by the ECB and used to cover expenses or to build up the ECB's risk provision.

3.2 Compensatory Amounts

Prior to the introduction of the euro, each NCB earned income on its own currency and determined its own issu-

[5] *Official Journal of the European Union, 2011b (Decision ECB/2010/23, Article 4).*

[6] *Official Journal of the European Union, 2011c (Decision ECB/2010/24).*

ance level. The value of the banknotes that used to circulate in the various countries differed considerably from amounts to be allocated to the respective NCBs in line with the capital key, on account of the differing levels of demand in those countries. The allocation of seigniorage on the basis of the banknote allocation key following the changeover to the euro was thus going to significantly change the income of individual NCBs. The solution with a view to smoothing out the effects stemming from historical imbalances was to implement a system of compensatory amounts in the first five years following the changeover year.

The compensatory amounts are calculated as the difference, for each NCB joining the Eurosystem, between the average daily value of national banknotes in circulation over a 24-month period[7] and the average value calculated on the basis of the banknote allocation key. The resulting difference is used to offset the impact of the banknote allocation key for a total of five years in progressively lower amounts, which may be positive or negative and sum to zero at the level of the Eurosystem. As of the sixth year following the year of the cash changeover, seigniorage is allocated exclusively on the basis of the banknote allocation key.

Every new accession to the euro area reactivates the system of compensatory amounts. At the time of writing, four compensatory amounts are being applied. These relate to the introduction of the euro in Estonia (in 2011), Slovakia (in 2009), Cyprus and Malta (in 2008), and Slovenia (in 2007). These adjustments will cease to be applied at the end of 2016, 2014, 2013 and 2012, respectively.

3.3 Adjustment of the Capital Key

The capital key represents the weighted share of each NCB in the ECB. Its calculation[8] is based on two components:

- 50% of the share of the respective Member State in the population of the Community in the penultimate year preceding the establishment of the ESCB;
- 50% of the share of the respective Member State in the gross domestic product at market prices of the Community as recorded in the last five years preceding the penultimate year before the establishment of the ESCB.

The percentages are rounded up or down to the nearest multiple of 0.05 percentage points. The statistical data used for the calculation are provided by the European Commission in accordance with rules[9] laid down by the Governing Council of the ECB. The adjusted capital key applies with effect from the first day of the following year.

The capital key is adjusted at regular intervals and whenever a new Member State accedes to the European Union or Eurosystem. The adjustment is calculated in the same way in both cases (in line with the provisions of the ESCB/ECB Statute).

The regular adjustment of the capital key takes place every five years. The first such adjustment took place in 1999, and the most recent was in 2009, when the OeNB's share in the subscribed capital of the ECB was adjusted

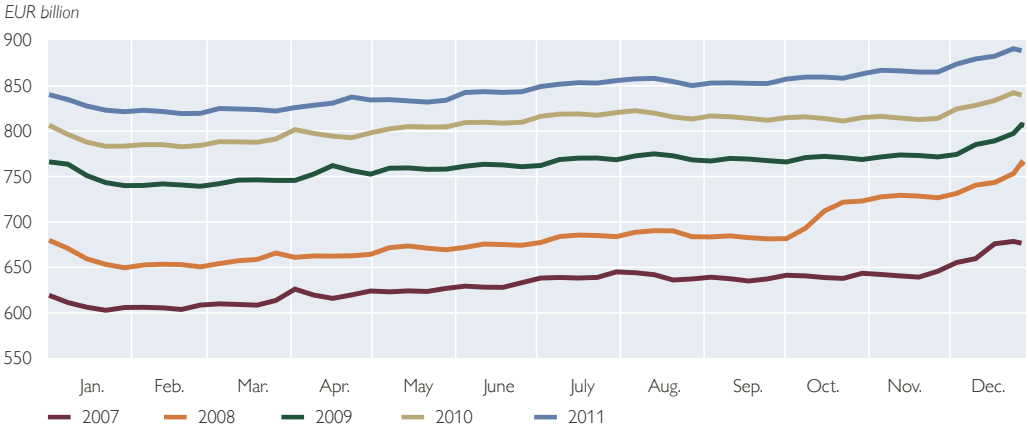
[7] *The beginning of the two-year reference period is the 30th month prior to the cash changeover date.*

[8] *Article 29 of the Protocol (No 4) on the ESCB/ECB Statute (Official Journal of the European Union, 2010; OJ C 83, p. 242).*

[9] *Procedure pursuant to Article 42 of the Protocol (No 4) on the ESCB/ECB Statute (Official Journal of the European Union, 2010; OJ C 83, p. 247).*

Chart 2

Value of Euro Banknotes in Circulation: A Five-Year Overview



Source: ECB (consolidated weekly financial statement of the Eurosystem).

to stand at 1.94170%. Following Eesti Pank's entry into the Eurosystem in 2011, the OeNB's share in the capital of the ECB paid up by Eurosystem NCBs is now 2.77503% (OeNB, 2011).

4 Developments in Euro Banknotes in Circulation

The euro is widely used as means of payment throughout the world, not just in Austria. Five years after the cash changeover, seven out of ten Austrians were convinced that the euro was a stable currency (Fluch et al., 2007). In 2011, 58% of Austrians were positively disposed towards the euro (Fluch and Schlögl in this issue).

One sign of the high degree of acceptance in respect of the euro is the fact that the value of euro banknotes in circulation has increased by an average of around 13% per year over the last ten years. In value terms, euro banknotes in circulation overtook U.S. dollar banknotes in circulation as early as 2006 (Koch and Schneeberger in this issue). At end-2006, the value of euro banknotes in circulation stood at EUR 628 billion, while that of U.S. dollar banknotes in circulation was equivalent to EUR 595 billion. The value of euro banknotes in circulation increased by a factor of 3.2 between their introduction in 2002 and end-2011.

Chart 2 indicates annual developments in the value of euro banknotes in circulation over the last five years, demonstrating the consistent increases observed in the value of euro banknotes in circulation since the cash changeover in 2002.

This chart clearly shows the fluctuating demand for cash, which may be attributable to various factors. Reasons include seasonal demand for cash (on account of holidays, Christmas, etc.) as well as demand for cash stemming from particular events (e.g. the global financial crisis). A dramatic increase can be seen in the value of euro banknotes in circulation in autumn 2008 following financial market turbulence (chart 2). This led to the value of banknotes in circulation increasing markedly in 2008. Annual developments then returned to normal in the years that followed.

Chart 3 presents consolidated data on the value of banknotes in circulation at the level of the Eurosystem relative to the size of the consolidated balance sheet of the Eurosystem. Between 2002

and 2011, banknotes in circulation represented (on the respective balance sheet dates) between 32% and 57% of the total size of the consolidated balance sheet of the Eurosystem, thereby playing a substantial role in the Eurosystem balance sheet. At end-2011 the total value of euro banknotes in circulation was EUR 889 billion, while the size of the consolidated balance sheet of the Eurosystem was EUR 2,736 billion.

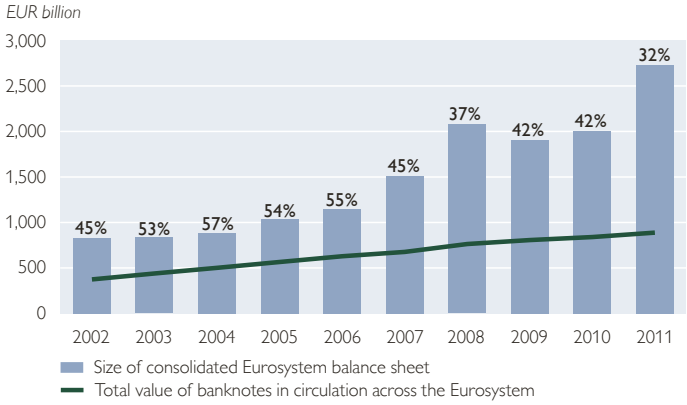
5 Summary and Conclusions

The introduction of the euro created the need to develop a new regime for reporting the amount of banknotes in circulation as a whole in the euro area as a liability in the balance sheets of the individual Eurosystem NCBs. Before the changeover to the euro, the NCBs simply reported the precise value of the banknotes in circulation they had placed in circulation, minus the banknotes they had removed from circulation. Apart from that, no adjustment was necessary, as the national banknotes could only be redeemed by the issuing central bank.

When euro cash was introduced in the euro area – which more and more EU Member States have since joined – an innovative solution for presenting banknotes in circulation in the balance sheets of Eurosystem central banks was called for, because euro banknotes can be returned to any Eurosystem NCB, regardless of which euro area NCB issued them in the first place.

Chart 3

Euro Banknotes in Circulation Relative to the Eurosystem's Balance Sheet



Source: ECB (consolidated weekly financial statement of the Eurosystem).

To provide for an adequate allocation of banknotes in circulation among the Eurosystem central banks, the Governing Council of the ECB established an adjustment regime which smooths out any irregular patterns resulting from the migration of banknotes, both as regards the reporting of banknotes in circulation in NCBs' balance sheets and as regards NCBs' income (Handig and Holzfeind, 2007).

The value of euro banknotes in circulation has steadily risen over the last ten years and stood at around EUR 900 billion at end-2011. The success of the euro is also evident from the Eurosystem's financial statements. In 2002, euro banknotes in circulation were reported in the balance sheets of 13 Eurosystem central banks; today, they are reported by 18 central banks.

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Understanding TARGET2: The Eurosystem's Euro Payment System from an Economic and Balance Sheet Perspective

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TARGET2 – the Trans-European Automated Real-time Gross settlement Express Transfer System 2 operated by the Eurosystem – provides for the efficient settlement of cross-border payments in euro and is thus a key infrastructure component of European monetary union. TARGET2 claims and liabilities in the accounts of the euro area central banks have recently become a subject of public debate. However, TARGET2 balances by definition constitute intra-Eurosystem balances and are as such an integral part of the decentralized implementation of the single monetary policy. Considerable claims and liabilities can arise for various reasons, many of which are related to the normal functioning of the euro area and do not require an economic policy response. Changes in TARGET2 balances also do not imply any direct changes in the risk exposure levels of national central banks. At the same time, there is no denying that the Eurosystem is facing major challenges in its monetary and liquidity policy. TARGET2 balances are indeed currently high owing to the financial crisis, given the need to provide liquidity aid to the European banking system. Yet as soon as such liquidity aid is no longer necessary, following appropriate economic policy measures such as recapitalizing banks or measures to restore confidence in government solvency, TARGET2 balances will also decline.

JEL classification: E58, F32, F33
Keywords: TARGET2, banknotes, central bank balance sheet, ECB, Eurosystem

TARGET2 is a cross-border settlement system jointly operated by the Eurosystem that has been designed to handle large value transactions denominated in euro in an efficient and reliable manner. As such, it is a key infrastructure component of European monetary union (EMU) that operates smoothly in the background and has thus gone largely unnoticed by the general public until recently. Amid the financial and economic crisis that emerged in late 2007, the TARGET2 claims and liabilities of the national central banks (NCBs) of the euro area countries have risen sharply. These claims and liabilities were, and are still, widely debated, yet the discussion has often been misleading and has often led to incorrect conclusions being drawn.[2] This study describes the key functions of TARGET2 and uses illustrative examples to make the technical details accessible and broaden the current discourse.[3]

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[2] *The debate, which was largely conducted in the daily press, on electronic forums and via brief bank and research institute bulletins, also prompted questions in the Nationalrat, the lower house of the Austrian parliament. An up-to-date and comprehensive presentation of the argument that TARGET2 balances served to finance the current account deficits of Greece, Ireland, Portugal and Spain and that central bank lending operations in Germany were in turn cut back is found in Sinn and Wollmershäuser (2011) and summarized in the introduction to ifo Schnelldienst (2011).*

[3] *Most of the studies aimed at clarifying misunderstandings in the public debate closely follow the structure of Sinn's arguments in an attempt to try to refute them, and thus do not explain the basics of how TARGET2 works and what role it plays. A brief description of TARGET2, which does not cover economic policy implications, is found in Deutsche Bundesbank (2011b). Aspects of economic policy are examined in the study by Ulbrich and Lipponer (2011). Bindseil and König (2011) systematically describe TARGET2 in connection with monetary policymaking in the euro area. Jobst (2011) shows that in a monetary union net balances can arise for very different reasons, irrespective of the current crisis.*

Refereed by:
Ernest Gnan,
OeNB

1 Why Do Central Banks Operate Payment Systems?

In modern economies, a vast amount of goods, services and financial products are transacted day in, day out. A basic requirement for the functioning of the economy is that these transactions are settled smoothly and securely. Settlement systems also play a key role in the implementation of monetary policy. To achieve their monetary policy objectives, central banks modify the terms under which they provide central bank liquidity to, or withdraw central bank liquidity from the banking system (ECB, 2011a). As a result, short-term and longer-term interest rates as well as other financial market prices fluctuate, influencing consumption, investment and, ultimately, inflation. The first stage in this monetary transmission mechanism is the interbank market. Like central banks' monetary policy operations, transactions in the interbank market are settled via large-value payment systems. To ensure the efficient implementation of monetary policy decisions, it is therefore paramount that payment and settlement systems function smoothly. Consequently, most central banks not only play an active role in ensuring the quality, availability and counterfeit security of banknotes in circulation but also participate in, operate and/or supervise systems for settling cashless payments.

2 What Is TARGET2?

At the inception of monetary union, the Eurosystem faced the challenge of having to quickly merge the legacy currencies' money markets into a single integrated money market. Integration required a uniform infrastructure for settling large value transactions between Member State banks and financial institutions. The Eurosystem assumed responsibility for developing and operating the necessary infrastructure.

As a European settlement system, TARGET2 – like its predecessor TARGET[4] – has been complementing the Eurosystem's operational framework for the implementation of monetary policy since end-2007 and, like monetary policymaking, falls within the responsibility of the Governing Council of the ECB.[5] The system handles euro transactions made primarily between approximately 4,500 credit institutions and other financial institutions which are eligible to participate directly or indirectly through other participants, as well as payments resulting from Eurosystem transactions. Euro payments transferred to a participating commercial bank are credited to the current account that it holds with its home NCB. The use of TARGET2 is mandatory for all transactions with the Eurosystem; moreover, TARGET2 is also used for settlement purposes in many other payment systems (Kokkola, 2010). For the Eurosystem, centralized settlement furthermore provides insights into demand-related interbank liquidity flows in money and capital markets as well as nonbank (customer) transfers within the euro area.

TARGET2 offers commercial banks specific advantages. Payments are made to NCB accounts, which means they are particularly secure. The amounts transferred are not subject to any upper

[4] *The euro payment system TARGET was first launched as a fully decentralized framework in 1999 and subsequently replaced in 2008 by TARGET2, which is based on a single shared platform (SSP) operated by a small number of NCBs. For details on structure, participants, terms and conditions, and costs etc., see Kokola (2010).*

[5] *An overview of TARGET2's legal basis established by the Governing Council of the ECB can be found at www.ecb.int/ecb/legal/1003/1349/html/index.en.html (as retrieved on March 7, 2012).*

limits, neither for domestic nor for cross-border payments. Another advantage is that the payments are carried out immediately and irrevocably[6] without netting subsequent offsetting transactions. Finally, the uniform cost structure for identical services ensures a level playing field in all participating countries.

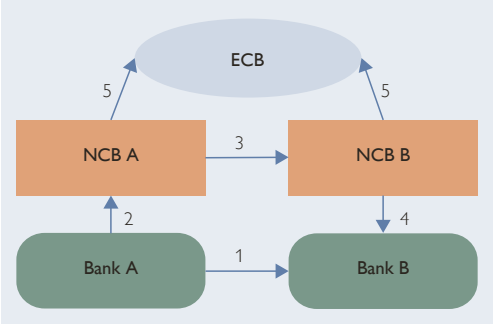
3 How Does the Settlement of TARGET2 Transactions Work?

Every TARGET2 transaction involves two banks and/or two central banks. Every commercial bank is assigned to one of the central banks of the Eurosystem (18 altogether, including the ECB), which jointly use TARGET2. Every transfer of funds gives rise to TARGET2 claims of the receiving bank and TARGET2 liabilities of the sending bank. Since the transfer takes place between two central banks accounts, the sending bank must have sufficient balances in its current account with its home central bank or take out intraday credit, in the form of an adequately collateralized overdraft, in line with the applicable guideline (ECB, 2011a). These balances may have arisen from monetary policy refinancing operations, from payments received or from deliveries of banknotes.

How do cross-border transactions and settlements operate in detail (chart 1)? Bank A (with home NCB A) transfers funds to bank B (with home NCB B) via TARGET2 by means of a S.W.I.F.T.[7] payment message (1). Based on this transaction and following the receipt of the S.W.I.F.T. message, the central banks process the transaction as follows:

Chart 1

Transaction Process via TARGET2



Source: OeNB.

- NCB A debits the current account of bank A (2) and
- reports a liability towards the receiving NCB B.
- NCB B reports the claim on NCB A (3) and credits the amount to the current account of bank B (4).

At the end of the day, the transfers give rise to a net asset or liability position of each NCB against the other NCBs, depending on how large the bilateral transactions have been. To facilitate accounting, each NCB offsets all its bilateral claims and liabilities into a single net asset or a liability position vis-à-vis the ECB, which assumes the role of a central clearing house (5). Technically, the resulting net balance vis-à-vis the ECB is being carried forward on a daily basis rather than being settled through an actual transfer of assets. The sum total of all the balances (net assets or liabilities) of the 18 Eurosystem central banks is zero, as these balances simply reflect the cross-border flows of available euro liquidity within a closed system. The existence of net balances between the NCBs and the ECB is a consequence of the specific decentral-

[6] *Settlement Finality Directive (98/26/EC).*

[7] *The Society for Worldwide Interbank Financial Telecommunication is a global provider of secure financial messaging services (www.swift.com).*

ized organization of payments in the euro area. If the euro area had only a single central bank, all transaction participants would hold their accounts at this central bank where all transactions would sum to zero (in such case chart 1 would be a lot simpler, showing neither the intermediate level nor steps 3 and 5).

As already mentioned, it is bank A or B that initiates a transaction and decides to route it through TARGET2, for any number of reasons, such as in order to transfer money, bundle liquidity within a company, pay invoices on behalf of customers or settle proprietary open financial transactions, pay interest, repay loans or engage in interbank lending (e.g. for closing liquidity gaps owing to different bidding behaviors in monetary policy operations).

4 What Constitutes Intra-Eurosystem Balances and How Do They Relate to TARGET2?

Net TARGET2 balances between the NCBs and the ECB constitute intra-Eurosystem balances, as they represent claims and liabilities within the Eurosystem. Eurosystem payment transactions and monetary policy operations are organized under the principle of decentralization, i. e. although their standard terms and conditions are set by the Governing Council of the ECB, the actual operations are carried out by NCBs. This is also a reason why claims and liabilities arise between the NCBs and the ECB.

This fact is best illustrated by comparing the balance sheet of a single central bank with the balance sheets of a decentralized system of central banks. A central bank provides liquidity by issuing banknotes and by crediting current accounts held by commercial banks with their central bank. To put money into circulation, the central bank purchases assets such as gold and foreign exchange, or issues collateralized loans to banks. In the central bank's balance sheet, these assets (gold, securities, loans) are offset by corresponding liabilities (from a central bank perspective, money issued by the central bank represents a liability).[8]

In the euro area, however, things get a little bit more complicated. If a commercial bank borrows money from the Eurosystem, it does not do so from the ECB but from one of the NCBs. Claims on the bank for the lifetime of the transaction will therefore show up on the balance sheet of this NCB. The same applies to banks' current account balances with the Eurosystem. By contrast, banknotes issued by an NCB are not stated on that NCB's balance sheet at their issuance value; much rather, the sum total of banknotes in circulation is allocated to all the NCBs and the ECB according to a specific key (Handig and Holzfeind, 2007; Krsnakova and Oberleithner in this issue). The result is that claims (net assets and net lending) and liabilities (banknotes and current account balances held by commercial banks at NCBs) now no longer tally for individual Eurosystem NCBs. In the balance sheets, the difference between assets and liabilities will show up as claims or liabilities within the Eurosystem (intra-Eurosystem balances). In addition to the net TARGET2 position, the latter comprise in particular the adjustment of banknotes in circulation, which represents the difference between the banknotes physically issued by (minus those redelivered to) a given NCB and the share of all circulating

[8] *For a detailed description of a central bank balance sheet, see e. g. Jobst (2009). A description of TARGET2 balances within central bank balance sheets can be found in Bindseil and König (2011), as well as in Jobst (2011).*

euro banknotes that has been assigned to that NCB (Krsnakova and Oberleithner in this issue). After taking all corresponding intra-Eurosystem balances into account, the assets and liabilities of each Eurosystem NCB will again offset each other exactly.

The reasons why intra-Eurosystem balances increase or decline or why other balance sheet components such as outstanding loans fluctuate can be extremely diverse. The balance sheets of two NCBs may in fact be very similar for fundamentally different reasons. For illustrative purposes, here are three examples taken from the recent past, representing three instances in which considerable liabilities were built up within the Eurosystem.

The first example concerns the Bank of Greece (BoG). The BoG has recorded a steady outflow of funds via TARGET2 since 2008. This means that more central bank funds were transferred via Greek banks to the rest of the euro area than in the opposite direction. As Box 1 shows, the reason for this phenomenon was probably capital flight from Greece: Greek investors transferred some of their assets to the rest of the euro area, and foreign investors withdrew funds from Greece. In this process, the relevant balance sheet positions of the BoG changed as follows: owing to the transfers, the BoG built up a negative TARGET2 balance vis-à-vis the ECB. Greek banks, which held fewer deposits at the BoG owing to their cross-border transfers, had to replenish these deposits, raising loans through the Eurosystem's monetary policy operations for this purpose. These loans are shown in the BoG's balance sheet, where they represent the counterpart of the negative TARGET2 balance.

The second example concerns the Deutsche Bundesbank. Before 2007, German banks, rather than Greek banks, were major recipients of Eurosystem loans.[9] Unlike the Greek banks they did not transfer significant amounts to other euro area countries but their banknote demand significantly exceeded domestic requirements. German banks appear to play an important role in distributing euro banknotes both within and outside the

Box 1

TARGET2 and the Balance of Payments in the Case of Greece

The public debate on TARGET2 associated the negative TARGET2 balances of some countries with their current account deficits. For instance, Greece imported EUR 84 billion more goods and services than it exported in the period from 2008 to 2010, while almost the same net amount flowed out of Greece via TARGET2 during the same period. Does this mean the Greek current account deficit was financed via TARGET2?

The current account is part of the balance of payments, which reflects all economic transactions that occur between residents and nonresidents in a given period. Per definition, the balance of payments is always balanced, as the value amount of, say, a delivered car and the payment for this car must tally. In this sense, each payment received from abroad (in this case, through TARGET2) "finances" an outgoing payment (in this case, for goods and services). However, the more interesting question is, whether there is indeed a causal relationship between changes in the current account and the TARGET2 balance. This can only be answered empirically.

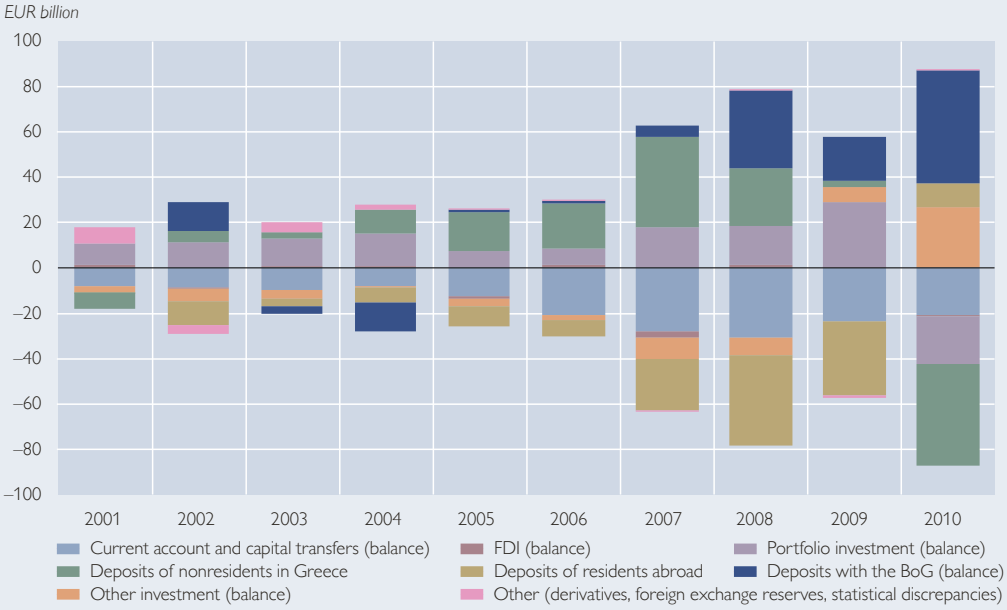
[9] *Although the Deutsche Bundesbank holds only 27.1% of the ECB's capital, the percentage share of German banks in the Eurosystem's refinancing operations consistently exceeded 55% until 2007 and was therefore twice as high (Jobst, 2011).*

Buiter et al. (2011) show that, unlike for Greece, current account deficits and TARGET2 balances do not tally for Ireland and Portugal. Bindseil and König (2011) examine both the monthly current account and the monthly changes in TARGET2 balances and show that neither series tallies with the other. Both examples would imply that the Greek current account deficit matches the deterioration of its TARGET2 balance by pure coincidence.

Additional information on the actual factors driving TARGET2 balances can be drawn from subcomponents of the balance of payments. Since 2001, Greece has imported more goods and services each year than it has exported (current account balance –). Until 2007, most of these additional imports were covered by securities purchases by nonresidents (portfolio investment balance +). The plus or minus sign following "Deposits of nonresidents in Greece" (+) and "Deposits of residents abroad" (–) means that Greeks built up deposits at foreign banks while nonresidents increased their deposits at Greek banks. Offsetting flows such as these would appear to be a byproduct of monetary union. Closer analysis of the more recent developments shows considerable fluctuations in the period from 2009 to 2010. While nonresidents continued to purchase considerable volumes of Greek securities in 2009, the portfolio investment balance moved into negative territory in 2010, i. e. Greeks had to redeem more securities than they could sell new ones abroad. At the same time, Greeks began to transfer more deposits abroad (deposits of residents abroad –) while nonresidents failed to increase their deposits at Greek banks further in 2009 and went as far as to withdraw almost EUR 50 billion in 2010 (deposits of nonresidents in Greece switched from + to –). These significant outflows were financed via the build-up of BoG liabilities toward the Eurosystem in the period from 2008 to 2010 (BoG deposits +). Specifically, the BoG built up TARGET2 liabilities as well as liabilities arising from the adjustment of banknotes in circulation in this period. In 2010 the cross-border liabilities of Greece increased further when it received the first tranche of the EU/IMF bailout package (other investment +).

The detailed analysis reveals that the steep increase in Greek liabilities toward the Eurosystem is not attributable to the Greek current account, but primarily to capital flight behavior of both Greeks and nonresidents. As Ireland exemplifies, a current account surplus would probably not have made any difference to these outflows (although current account deficits undoubtedly increase external financing requirements). Being aware of the underlying reasons for these anomalies is an important prerequisite for informed decisions on what kind of economic policy measures to take.

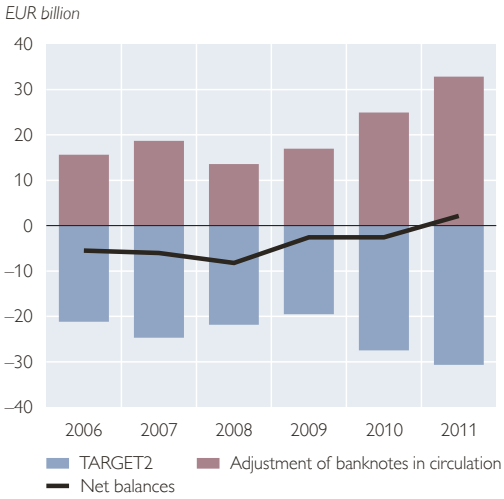
Greek Balance of Payments



Source: Eurostat, IMF.

Chart 2

Intra-Eurosystem Balances of the OeNB



Source: OeNB.

Note: The TARGET2 balance is adjusted for monetary policy operations in USD providing liquidity to commercial banks, which were settled as swaps between the ECB and NCBs via TARGET2.

euro area, e.g. with deliveries to Central and Southeastern Europe where euro banknotes and coins are in high demand (Deutsche Bundesbank, 2011a; Ritzberger-Grünwald and Scheiber in this issue). Like the BoG's balance sheet, that of the Deutsche Bundesbank showed an increase in loans to commercial banks and at the same time a negative intra-Eurosystem balance, yet not in the form of a negative TARGET2 balance as in Greece but in the form of a liability arising from the adjustment of banknotes in circulation. In other words, the balance sheets of the Deutsche Bundesbank then and the BoG today look similar, but for very different reasons.

The third example concerns the Oesterreichische Nationalbank (OeNB). The Austrian example is instructive, as it illustrates the relationship between the physical shipment of cash and the cashless transfer of central bank funds via TARGET2, which is also a result of Austria's appeal as a tourist destination.

For instance, cash withdrawn by a German holidaymaker from his local bank before traveling to Austria counts toward Eurosystem banknotes put into circulation by the Deutsche Bundesbank and at the same time reduces the balances on the respective bank's current account with the Deutsche Bundesbank. Technically, this transaction does not constitute the creation of money but the conversion of money from a cashless form (deposits held by the commercial bank at the Deutsche Bundesbank) to a cash form (liability of the Deutsche Bundesbank from putting banknotes into circulation).[10]

If this holidaymaker pays his expenses in Austria with cash withdrawn in Germany, the cash will end up at an Austrian commercial bank via the Austrian provider of goods or services. The Austrian bank, in turn, will pass on this money to the OeNB for processing.[11] The banknotes originally issued in Germany are thus returned to the Eurosystem via the OeNB. Since returned banknotes by definition do not constitute banknotes in circulation, the amount of Eurosystem banknotes in circulation has been reduced by Austria. By crediting the corresponding amount to the Austrian commercial bank's current account with the OeNB, the OeNB converts the money back from its cash form to a cashless form.

The commercial bank now holds larger deposits at the OeNB than is required for compliance with its minimum reserves requirements. It could reduce these deposits by repaying its

[10] *The money was in fact originally created when the Deutsche Bundesbank granted the commercial bank a loan within the framework of its refinancing operations or via the purchase of assets against central bank money issued by the Deutsche Bundesbank.*

[11] *For details on cash logistics, see Koch and Schneeberger in this issue.*

outstanding loans to the OeNB at the next opportunity. In this case, the amount of outstanding loans would fall on the OeNB's balance sheet, which would instead now show a claim on the ECB arising from the adjustment of banknotes in circulation. The banknotes in circulation and commercial banks' deposits on the liability side of the OeNB balance sheet would remain unchanged.

In fact however, the bulk of adjustment tends to take place via interbank transactions. Austrian banks use their deposits to purchase assets in Germany (either by lending or buying assets outright), thereby closing liquidity gaps that have arisen in Germany. These transactions are made via TARGET2. On the OeNB's balance sheet, this means loans to commercial banks remain the same while claims arising from the adjustment of banknotes in circulation cause the OeNB's TARGET2 liabilites to rise. As chart 2 shows for Austria, ultimately considerable balances may therefore arise in the adjustment of banknotes in circulation and in TARGET2. Interestingly enough, the two balance sheet items develop symmetrically.

Several conclusions about how changes in the intra-Eurosystem balances may or may not be interpreted can now be drawn from these three examples. First, intra-Eurosystem balances arising from TARGET2 transactions of credit institutions and intra-Eurosystem balances arising from the adjustment of banknotes in circulation are each driven by market demand and cannot be managed by NCBs. They represent the cross-border flows of central bank euro liquidity as provided or absorbed by monetary policy operations. At any rate, they do not represent additional euro liquidity. Second, TARGET2 balances and balances from the adjustment of banknotes in circulation within the Eurosystem should be considered together. This is essential particularly for the assessment of Austria's TARGET2 balance. Third, the fact that these balances may be significant is plain to see. At end-2010, liabilities arising from TARGET2 amounted to EUR 90 billion for the BoG and almost EUR 30 billion for the OeNB. At end-2010, the Deutsche Bundesbank owed the ECB almost EUR 160 billion from banknotes in circulation. However, the most important conclusion that can be drawn from these three examples is that considerable claims and liabilities can arise for very different reasons. The fact that intra-Eurosystem balances may come about through different reasons means above all that intra-Eurosystem balances as such are not meaningful indicators for undesirable developments. TARGET2 balances simply reflect various possible reasons rooted in the real economy and the financial sector. This is why economic policy measures, if needed, must address the underlying reasons.

5 What are the Implications of TARGET2 Balances for the Risk and Profit of NCBs?

From a financial reporting perspective, intra-Eurosystem balances are used to map economically relevant euro liquidity flows as settled between two Eurosystem central banks. At the same time, however, they also form the basis for income pooling within the Eurosystem (Handig and Holzfeind, 2007; Krsnakova and Oberleithner in this issue).

A central bank's profit is derived from the income earned on its assets (lending and outright purchases) less the operating costs and any possible interest paid on its liabilities. As previously shown, banknote migration and transfers in TARGET2 result in assets

being shifted between NCBs. To ensure the fair allocation of monetary income (pursuant to Article 32 of the ESCB/ECB Statute) among the Eurosystem NCBs, the Governing Council of the ECB decided to remunerate the intra-Eurosystem balances at the prevailing rate for the Eurosystem's main refinancing operations. The monetary income generated jointly by the Eurosystem NCBs is allocated on the basis of their proportional shares in the ECB's fully paid-up capital (Krsnakova and Oberleithner in this issue).

Just as income from monetary policy operations is distributed, any losses incurred (if, say, a bank should not repay a refinancing transaction and if the collateral to be realized should not fully cover the outstanding amount) are also borne jointly, irrespective of whether the loss originally arose at one or other of the NCBs.[12] Intra-Eurosystem balances, by contrast, do not constitute monetary policy operations, which means NCBs do not incur any risks arising from these balances, which represent claims on and liabilities toward the ECB (clearing house) in the balance sheet sense of the term. To this extent, the shift of TARGET2 balances over time and between individual Eurosystem member states cannot represent an indicator for new risk positions of individual NCBs, as the latter always bear monetary policy-induced risks in a joint fashion.

This phenomenon is best illustrated by using two hypothetical examples. Let's assume an NCB has issued a large volume of loans to banks in its country in its monetary policy operations and built up a negative TARGET2 balance at the same time. What will happen if one or more of the commercial banks cannot meet its obligations, and if the collateral realized should not fully cover the outstanding amount? Since the loss is incurred within the framework of monetary policy operations, it would be jointly borne by the Eurosystem.[13] Thus, the NCB that issued the loans in line with Eurosystem rules is allocated only the percentage of the loss that corresponds to its share in the capital key, while the rest is divided up between the other NCBs according to their shares in the capital key.[14] Since the loss was orginally incurred at a specific NCB, the other NCBs in the Eurosystem credit this NCB with the share to be borne by them via TARGET2. The result is a decrease in both this NCB's claims arising from monetary policy operations on its country's commercial banks and its TARGET2 liabilities. However, the loss occurs only once – in monetary policy operations with the banking system and not in TARGET2.

What would happen in the theoretical case of a country withdrawing from EMU? Exiting EMU is not provided for in the EU treaties and so is not governed by them (Athanassiou, 2009). Accordingly, this attempt of an answer is very speculative, but the scenario should not differ fundamentally from the previously described case. If a country were to exit EMU, its commercial banks may no longer be able to meet their euro liabilities: while they may be able to obtain funding in the new national currency from their central bank, they may not be able to obtain euro liquidity from their central bank

[12] *All Eurosystem loans to commercial banks must be collateralized (ECB,2011a).*

[13] *Under the rules stipulated by the Governing Council of the ECB, autonomous liquidity assistance independently provided by NCBs to temporarily illiquid, albeit solvent, financial institutions is not included.*

[14] *The share of loss borne by the OeNB and Deutsche Bundesbank are 2.8% and 27.1%, respectively. The fact that the OeNB's TARGET2 balance is negative and that of the Deutsche Bundesbank is positive is irrelevant.*

and they may have difficulties to fund themselves in euro on the private capital markets. Thus they may not be able to repay the maturing monetary policy operations in euro. Since these operations were transacted under the common rules of the Eurosystem, the losses would be allocated on a pro rata basis. Claims arising from monetary policy operations and claims toward the central bank of the withdrawing country in TARGET2 would fall accordingly. As in the aforementioned example, the loss would be incurred in the monetary policy operations with the banking system and not in TARGET2.

6 Conclusions

With TARGET2, the Eurosystem has got an efficient cross-border settlement system for large value transactions in euro in place. Thus, TARGET2 is a key infrastructure component of European monetary union. Intra-Eurosystem balances, which have recently become a subject of debate, are an integral part of the implementation of the single monetary policy under the principle of decentralization. The resulting claims and liabilities may be significant, and the reasons for their build-up can be many and varied. TARGET2 balances cannot be restricted when monetary policy operations are implemented under the principle of decentralization.

Contrary to some opinions raised, TARGET2 balances do not increase the exposure of central banks. The only meaningful source of information on the risks that the Eurosystem incurs in implementing the single monetary policy is the Eurosystem's consolidated weekly financial statement. Those risks are allocated among the participating NCBs according to their relative shares in the ECB's paid-up capital. If the single monetary policy were centrally implemented and the Eurosystem had only a single balance sheet (e.g. that of the ECB), intra-Eurosystem balances would not exist. However, the risks of monetary policy operations would be the same as under the principle of decentralization. Since the balance sheet items of individual Eurosystem NCBs can fluctuate for very different reasons, the individual balance sheets do not provide any meaningful information on the monetary policy of the euro area as a whole. This is why the Eurosystem publishes only one consolidated weekly financial statement.

In monetary policy terms, no separate importance should be attached to the amount of TARGET2 balances. At the same time, there is no denying that the Eurosystem is facing major challenges in its monetary and liquidity policy. The generous provision of liquidity through the Eurosystem's refinancing operations, to which recourse has been particularly large in some euro area countries as is evident from the balance sheeets of their NCBs as well as from their TARGET2 balances, does represent risks to the Eurosystem – but it does so in the same way as all monetary policy operations do. However, providing ample liquidity is one of the core responsibilities a central bank has got in times of financial crisis (Jobst, 2009; ECB, 2011b). The Governing Council of the ECB has taken these risks in the expectation of averting greater damage to the financial system as well as to growth and price stability in the future. At the same time, it is clear that the Eurosystem's liquidity aid can only be a temporary measure, until confidence in the banking system and the full functionality of the interbank market have been restored through appropriate political and banking measures. Once this point has been reached, TARGET2 balances can be expected to decline as well.

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The Pass-Through of Commodity Prices to Consumer Prices of Selected Products

Fabio Rumler[1]

This contribution analyzes the pass-through of various commodity prices to consumer prices of selected products in Austria. For this purpose, consumer price microdata for the period from 1996 to 2009 are mapped to the underlying disaggregated commodity prices. The duration and extent of the pass-through are found to vary considerably across products. While changes in crude oil prices turned out to have a quite substantial and quick effect on the consumer prices of super gasoline and diesel, the pass-through was rather weak for bread (bread rolls) and meat (beef steak). Of all products analyzed here, natural gas had the slowest price response, as its retail price is still partly government-controlled in Austria.

Since the introduction of euro banknotes and coins in January 2002, the pass-through has increased significantly for most products under review, but we cannot infer a clear casual relationship from this result as other factors might also be responsible for the observed increase in the pass-through. In addition, the pass-through to retail prices is found to be stronger for cost hikes than for cost cuts for fuel and meat products (notably beef steak). This confirms the result of an asymmetric pass-through for fuel products found in earlier studies.

JEL classification: E11, C33
Keywords: pass-through, micro prices, commodity prices, consumer prices

For the purpose of this study, the pass-through is defined as the change in consumer prices that can be attributed to a prior change in commodity prices. The speed and extent of the pass-through is determined by the stages of the pricing chain (producer prices are affected more quickly than consumer prices) and by the structure of the downstream production and distribution chain (it matters whether a product is processed further, and through which channels it will be sold).

Insights into the pass-through are relevant from a monetary policy perspective, as it can serve as an additional measure of price rigidities, providing further insights into how long it may take for macroeconomic shocks to affect inflation. Analyzing the pass-through is also relevant from a structural policy perspective, as it sheds light on the influence of the structural characteristics of the retail market (e.g. different pass-through according to product groups, regions, types of sales outlets) on the transmission of shocks.

This contribution provides an empirical investigation of the extent of, and lag in, the transmission of international commodity prices (e.g. of wheat, milk, meat, crude oil and natural gas) to the prices of selected consumer goods in Austria. The analysis includes only products (i) that contain the respective commodities in large proportions and (ii) whose prices closely depend on the underlying commodity prices. The following food and energy products were chosen: pork cutlet, beef steak, whole milk, eggs and bread rolls as well as super gasoline, diesel fuel, natural gas and firewood. In addition to estimating the extent and duration of the pass-through to the retail prices of these products, I analyze the potential impact of the introduction of euro cash in Austria and the effect of three other factors on the pass-through: region, type of outlet and sign of the adjustment (after a cost hike or cut).

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1 Pass-Through of Commodity Prices at the Microlevel – Theoretical Considerations

So far, the pass-through of commodity prices to consumer prices has not been studied extensively for Austria. Fritzer et al. (2008) compare various subaggregates of HICP food price components with the corresponding subcomponents of the producer price index, but their analysis is purely descriptive. The Eurosystem's Structural Issues Report 2011 (ECB, 2011) also uses macrodata to estimate the pass-through of import and producer prices to the consumer prices of nonenergy industrial goods and food. Due to a lack of adequate data, though, Austria is not covered in the analysis on food prices. Fernández-Amador et al. (2010) focus on the Austrian dairy market and find considerable asymmetry in the pass-through of price changes to consumer. Most studies available to date – also at the international level – rely on disaggregated macrodata to analyze the pass-through. Microdata have been used only rarely for this purpose.[2]

Microdata are advantageous in that they allow for a more accurate mapping of consumer prices to the underlying commodity prices than aggregated price indices do. In addition, estimations based on microdata make it possible to control for heterogeneity. At the same time, it is important to be aware of the fact that estimates of the long-term pass-through based on microdata will likely be lower than estimates based on macrodata, for a number of reasons. First, price rigidities at the microlevel may delay the transmission of price changes to the consumer level for several months (see Rumler et al., 2011, for evidence on Austria). Second, consumer goods are relatively far away from commodities along the production chain. Therefore, commodity prices have a much larger impact on producer prices than on consumer prices, which they affect only indirectly and with a lag (Hahn, 2003). And finally, the pass-through to consumer prices is, by definition, smaller than the exchange rate pass-through to import prices, as the cost share of commodities in the final product is usually below 100%, and changes in commodity prices thus only affect part of the product's input cost.

According to the relevant literature, the extent of the long-term pass-through to consumer prices depends above all on the structure of the retail industry. While the degree of competition plays a crucial role, the sign of the correlation between competition and the price pass-through is as yet unclear (section 3.3). The common assumption is that the transmission of cost shocks to consumer prices is stronger in a competitive environment, given that businesses find it much harder to absorb such a shock when profit margins are small.

Other determinants of the pass-through are the tax structure, macroeconomic developments and the type of cost shock we look at. For instance, a quantity tax causes the pass-through of commodity prices to decline, whereas the VAT does not affect it at all. In addition, we can expect pass-through to be higher when economic conditions are favorable and inflation is elevated, as companies are more likely to pass on price increases in that situation than in a low inflation environment. Finally, empirical evidence shows that different types of shocks have different effects on

[2] *Exceptions are Cao et al. (2011), Berner (2011) and Gopinath et al. (2010), who use microdata to analyze the exchange rate pass-through for Canada, Germany and the U.S.A., respectively.*

costs and that the extent of the pass-through to consumer prices varies accordingly. According to Hahn (2003), consumer prices in the euro area are affected the most by import price shocks (excluding crude oil), followed by exchange rate shocks and oil price shocks.

For data reasons, this contribution analyzes only the role of the degree of competition (albeit indirectly) and of macroeconomic developments.

2 Empirical Approach

2.1 Data: Consumer Price Microdata Are Mapped to Commodity Prices

To estimate the commodity price pass-through to consumer prices, I map price changes at the microlevel[3] with changes in the underlying commodity prices. I choose only consumer products whose prices are highly dependent on commodity price developments and which can be clearly assigned to the underlying commodity (e.g. milk). It is also important for the selected products to be as homogeneous as possible such that product characteristics are not the main explanatory factor of different price developments.

Another factor in the choice of products was the availability of the respective commodity price data at the producer level. Based on these criteria, above all food and energy products qualified for this analysis. The food commodity prices were taken from Statistics Austria's database of producer prices for agricultural and forestry products, which covers monthly price data for a wide range of agricultural products and their subcategories from 1998. The energy commodity prices are based on international crude oil and natural gas prices. A total of nine consumer products are used in this analysis: pork cutlet, beef steak, eggs, whole milk and bread rolls as well as super gasoline, diesel fuel, natural gas and firewood. A list of the individual products and the corresponding commodities as well as details on data availability and data sources can be found in table 1A of the annex.

For each of these products, I compiled a panel of monthly price observations for the period from 1996 to 2009, based on data from various sales outlets in 20 cities and towns across Austria.[4] The total number of observations ranges from 27,000 (eggs) to around 3,000 (natural gas).

2.2 Estimation Method: Panel Regression with Random Effects

I use a microeconometric panel regression with random individual effects to estimate the commodity price pass-through to consumer prices for each product. The magnitude of prices changes at the microlevel is explained by contemporaneous and lagged developments in the underlying commodity prices and other control variables. I estimate the following general linear model for each of the nine products $j = 1,...,9$:

$$\Delta p_{jit} = \alpha_j + \sum_{\tau=0}^{n} \beta_{j\tau} \Delta ppi_{jt-\tau} + \gamma_{j1} X_{jit} + \\ + \gamma_{j2} Y_{jt} + \gamma_{j3} Z_t + \varepsilon_{jit} \quad (1)$$

where Δp_{jit} denotes the log difference of consumer prices for product j in retail outlet i for the period from t to $t-1$, Δppi_{jt} stands for the log difference of the

[3] *The data stem from the CPI/HICP price survey compiled by Statistics Austria and were provided in anonymized form.*

[4] *Amstetten, Baden, Bregenz, Dornbirn, Eisenstadt, Feldkirch, Graz, Innsbruck, Kapfenberg, Klagenfurt, Krems, Linz, Salzburg, St. Pölten, Steyr, Villach, Wels, Vienna, Wolfsberg, Wiener Neustadt.*

commodity price mapped to product j (in line with table 1A in the annex) for the period t to $t-1$, and ε_{jit} is an i.i.d. error term which includes random individual effects. Vectors X_{jit}, Y_{jt} and Z_t contain control variables that are either product-specific and thus observed for each product at the microlevel (X_{jit}), or product-specific but observed over time only (Y_{jt}), or the same for all products and observed over time only (Z_t). Examples of these variables are dummies for the city or town in which the price observation was made (X), a dummy for prices observed since the introduction of euro cash in Austria in 2002 (Y) and the aggregate inflation rate to control for macroeconomic developments (Z).

In this model, the estimator for the long-term pass-through (LTPT) of the relevant commodity prices to the consumer prices of product j is defined as the sum of the coefficients of the contemporaneous and all lagged commodity price changes:

$$LTPT_j = \sum_{\tau=0}^{n} \hat{\beta}_{j\tau} \qquad (2)$$

with the long-term pass-through being estimated for both six and twelve lags, that is, $n = 6$ and $n = 12$. This choice was made to account for product-specific differences in the price adjustment frequency and the assumed differences in the duration of the pass-through. Fuel prices, for instance, are adjusted very often, so that the pass-through is most likely completed after six months. In contrast, the price of natural gas is adjusted much less frequently, and the pass-through can be expected to take longer. The results presented below confirm differences in the duration of the pass-through.

For reasons of data availability, I use different estimation periods for the individual products. Data on the commodity prices associated with food products and firewood are available from 1998; the estimation horizon is therefore from January 1998 to December 2009 for these products (with the exception of eggs, for which producer prices are available only from 1999). For super gasoline and diesel, the estimation horizon is January 1996 to December 2009. Given the shorter availability of the import price index for natural gas, the estimation period for this product is January 1999 to April 2009.

3 Results

3.1 Pass-Through Is Fastest for Fuel and Strongest for Eggs, Firewood and Fuel

In addition to contemporaneous and lagged commodity price changes, the base specification includes only the aggregate inflation rate as a control variable. It serves to control for the macroeconomic environment and has a similar effect in the estimation as time-fixed effects. Table 1 shows the estimation results for the specification in which the pass-through is assumed to take six months at most, while table 2 shows the results for twelve months.

The results highlight that the duration of the pass-through varies across products. Both the level of significance and the size of the coefficient provide information on the duration of the pass-through. For super gasoline and diesel, for instance, the pass-through of crude oil prices is completed already after the second month, even though the subsequent lagged values are still significant. The long-term pass-through after six months is thus hardly different from that after twelve months. In contrast, for natural gas, further lags are also significant, and the long-term pass-through rises from 0.15 after six months to 0.27 after twelve months.

Table 1

Estimation Results for the Base Specification (6 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
C	–0.002 ***	–0.001 *	0.001	0.005 ***	0.003 ***	–0.010 ***	–0.011 ***	0.002	0.002 *
ΔPPI	0.036 **	0.001	0.068 ***	0.153 ***	0.008 *	0.117 ***	0.101 ***	0.029	–0.055
ΔPPI(–1)	0.105 ***	0.032	0.047 ***	0.039 ***	0.009 **	0.158 ***	0.171 ***	0.007	0.235 ***
ΔPPI(–2)	–0.022	0.007	0.008	0.002	0.000	0.027 ***	0.045 ***	0.003	0.100 *
ΔPPI(–3)	0.035 *	0.005	0.001	–0.085 ***	–0.003	–0.009 ***	0.038 ***	0.068 ***	0.008
ΔPPI(–4)	0.086 ***	–0.027	0.008	0.052 ***	–0.002	–0.020 ***	–0.021 ***	0.002	0.087 *
ΔPPI(–5)	0.018	0.028	0.009	0.141 ***	0.006	–0.033 ***	–0.019 ***	0.081 ***	0.047
ΔPPI(–6)	0.009	0.046 **	0.048 **	–0.038 ***	0.004	–0.009 ***	0.017 ***	–0.039 **	0.015
ΔHICP (yoy)	0.179 ***	0.166 ***	0.038	–0.188 ***	–0.018	0.658 ***	0.739 ***	0.000	–0.080 *
LTPT	0.266 ***	0.091 ***	0.189 ***	0.264 ***	0.023 ***	0.230 ***	0.332 ***	0.152 ***	0.438 ***
Observations	15,444	15,104	19,158	16,517	16,697	12,542	12,556	1,803	3,954
Groups	136	138	265	230	376	106	106	35	58
R^2	0.08	0.2	0.05	0.02	0.01	0.44	0.55	0.04	0.07

Source: Author's calculations.

*Note: *** significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. LTPT stands for long-term pass-through.*

The extent of the pass-through, too, varies considerably by product. After twelve months, the long-term pass-through was strongest for eggs (0.47) and energy products like firewood (0.44) and diesel fuel (0.33). The fact that these values are below 0.5 confirms the expectation mentioned in section 1 that the pass-through should be substantially below 100% in an analysis based on microlevel consumer data. The long-term pass-through was

Table 2

Estimation Results for the Base Specification (12 Months)

Produkte	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
C	–0.002 **	–0.001	0.002 ***	0.002 ***	0.004 ***	–0.009 ***	–0.013 ***	0.005 ***	0.002 *
ΔPPI	–0.003	0.001	0.086 ***	0.163 ***	0.010	0.122 ***	0.104 ***	0.042	–0.070
ΔPPI(–1)	0.119 ***	0.023	0.069 ***	0.013	0.012 ***	0.153 ***	0.174 ***	0.018	0.227 ***
ΔPPI(–2)	–0.032	0.033	0.033 **	0.012	0.003	0.018 ***	0.041 ***	0.016	0.121 **
ΔPPI(–3)	0.032	–0.021	0.030 **	–0.083 ***	–0.001	–0.003	0.046 ***	0.080 ***	0.003
ΔPPI(–4)	0.069 ***	–0.030	0.026	0.045 ***	–0.006	–0.025 ***	–0.026 ***	0.010	0.055
ΔPPI(–5)	0.022	0.051 **	0.025	0.122 ***	0.006	–0.030 ***	–0.016 ***	0.083 ***	0.037
ΔPPI(–6)	0.012	0.039	0.059 ***	–0.043 ***	0.006	–0.016 ***	0.007 **	–0.022	0.041
ΔPPI(–7)	–0.041 **	–0.036 *	0.040 **	–0.003	–0.002	0.048 ***	0.052 ***	–0.047 ***	–0.110 *
ΔPPI(–8)	–0.008	0.043 *	0.024	0.035 **	–0.003	–0.020 ***	–0.029 ***	–0.065 ***	–0.043
ΔPPI(–9)	–0.008	–0.059 **	0.034 **	–0.062 ***	0.004	–0.035 ***	–0.031 ***	0.068 ***	–0.076
ΔPPI(–10)	0.020	0.012	0.021	0.019	0.000	–0.036 ***	–0.018 ***	0.024	–0.044
ΔPPI(–11)	0.003	0.071 ***	0.018	–0.031 **	0.006	0.030 ***	–0.027 ***	–0.009	0.083
ΔPPI(–12)	0.002	–0.021	0.008	–0.056 ***	0.014 ***	0.030 ***	0.006 **	0.070 ***	0.048
ΔHICP (yoy)	0.206 ***	0.160 ***	–0.098 ***	–0.059	–0.031	0.602 ***	0.916 ***	–0.209 ***	–0.042
LTPT	0.187 ***	0.105 ***	0.472 ***	0.132 ***	0.049 ***	0.236 ***	0.283 ***	0.268 ***	0.273 **
Observations	14,643	14,296	17,904	15,183	13,305	11,908	11,922	1,593	3,657
Groups	136	137	222	228	367	106	106	35	58
R^2	0.12	0.15	0.06	0.14	0.06	0.73	0.86	0.07	0.1

Source: Author's calculations.

*Note: *** significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. LTPT stands for long-term pass-through.*

lowest for bread rolls (0.05) and beef steak (0.1). While the low pass-through for bread rolls is in line with expectations (given the manufacturing steps required to process wheat into bread), the result for beef steak is rather surprising, especially in light of the much stronger pass-through for pork cutlet (0.27). All in all, the results show that the pass-through is relatively strong for products with a close link to the underlying commodity (e.g. eggs, firewood or fuel) and rather weak for products with further processing stages (e.g. bread products).

3.2 Pass-Through Has Increased Following the Introduction of Euro Cash

To test for the impact of the introduction of euro cash in January 2002 on the commodity price pass-through, I included a dummy variable for the post-introduction period and interaction terms between this dummy and the contemporaneous and lagged commodity price changes. If the interaction terms taken together are significant, this would indicate that the adoption of the euro had a statistically significant influence on the pass-through. The results are summarized in tables 2A and 3A of the annex; only significant results are reported, together with the sign of the effect (+ or –).

The results show that the pass-through of crude oil prices to the retail price of super gasoline and diesel was significantly stronger after the introduction of euro cash (for both estimation horizons). The same goes for beef steak. For eggs, whole milk and firewood, however, the commodity price pass-through increased significantly for only one of the two horizons. Since 2002, the pass-through effect has increased at least somewhat for most products under review, and it has not declined significantly for any of them.

Still, based on these results, no conclusive statement can be made about the isolated effect of the euro adoption on the pass-through, as the estimation does not control for a number of possible other factors that might explain the increase in the pass-through after 2002. Such factors can be related to the data collection method or they can be of a purely statistical nature. For instance, ongoing improvements in the collection of data – like taking into account quality changes, better coverage of seasonal products and the inclusion of online prices – may have contributed not only to raising the frequency of price changes (Rumler et al., 2011), but also to an increase in the pass-through observed. In addition, for some products (e.g. energy products), the higher pass-through may be entirely attributable to statistical effects owing to the rise in commodity prices: For products that are subject to a quantity tax, a rise in net prices automatically leads to a higher pass-through, as the fixed tax share in the product's gross price declines. The surge in crude oil prices in 2007 and 2008 may thus have contributed to the rise in the pass-through for super gasoline, diesel and natural gas.[5]

3.3 Stronger Pass-Through of Meat Prices in Smaller Shops

The degree of competition in a market is an important determinant of the extent of the pass-through, but the precise nature of the correlation between the two has not been determined con-

[5] *However, an alternative estimation of the crude oil price pass-through to net prices (instead of gross prices) for super gasoline and diesel confirms the result of a significantly higher pass-through following the introduction of euro cash.*

clusively. Most empirical studies find evidence that more competition leads to a stronger pass-through, as companies are forced to pass on price changes when profit margins are low (Nakamura et al., 2011, for the U.S.A.; Francois et al., 2008, for selected EU countries; Weiss, 1995, for Austria). In contrast, Berck et al. (2009) for the U.S.A. and Bertola et al. (2010) for euro area countries based on survey data both find evidence that the pass-through of cost shocks is stronger in low competition markets. Their explanation is that companies find it easier to pass on cost changes in such an environment. When competition is strong, by contrast, they aim at reducing cost factors (e.g. labor costs) instead of raising prices.

This contribution can provide only an indirect analysis of the link between competition and pass-through, as no competition measures are observed at the microlevel. The data used here contain information on the type of outlet in which the products were sold. It seems plausible that competition is stronger in larger sales outlets, e.g. supermarkets or discounters, than in small shops. The data on food products cover the following types of sales outlets: retail warehouse, supermarket, discounter, corner shop, specialist store (e.g. butcher's shop) and market (e.g. farmers' market).[6]

The estimation period for this analysis is shorter, as Statistics Austria started collecting the relevant data only in 2006. I included additional dummies for the different types of sales outlets and interaction terms between the types of outlets and the producer price changes. The results are summarized in tables 4A and 5A of the annex. They show that the pass-through for meat products (pork cutlet and beef steak) is significantly stronger in corner shops than it is in supermarkets. In addition, there are indications that the pass-through for meat products is weaker in discounters than in supermarkets; these results are, however, not observed consistently across both estimation horizons. By contrast, the pass-through for eggs seems to be significantly stronger in (typically large) retail warehouses and discounters than in supermarkets and, even more so, specialist shops. For the other products under review, no clear pattern emerged regarding the type of shop. This means that also the evidence from this analysis is mixed: While the pass-through for meat products turned out to be stronger in small shops than in supermarkets, it was the other way around for eggs.

3.4 Limited Regional Differences in the Pass-Through

Another estimation focuses on potential regional differences in the commodity price pass-through in Austria. For this purpose, I included additional dummy variables for the 20 cities and towns listed in footnote 4 as well as interaction terms between them and the commodity price changes (using the same approach as with the types of sales outlets). The results show hardly any regional differences in the pass-through of food prices (tables 6A and 7A of the annex). Only in two towns (Feldkirch and Krems) was the pass-through for pork cutlet and eggs significantly lower than in Vienna. The results for fuel products are often inconsistent across the estimation horizons (six and twelve months) – with the exception of Bregenz, where the pass-through for

[6] *Such an analysis is not feasible for energy products, as the respective data cover only one or a few types of sales outlets.*

super gasoline and diesel was significantly weaker than in Vienna. In most cities and towns under review (except Salzburg, Graz and Klagenfurt), the pass-through for natural gas was significantly stronger than in Vienna.

3.5 Asymmetric Pass-Through for Fuel and Beef Steak

The model framework I used is also suited to analyzing a widely-discussed question: Is the pass-through of cost hikes significantly stronger than that of cost cuts? I reestimate the base specification with an additional dummy for commodity price hikes and interaction terms between them and the commodity price changes. If the interaction terms taken together turn out to be significant, this means that the pass-through of commodity price hikes is significantly higher than that of commodity price cuts.

The results suggest that the pass-through is indeed asymmetric for super gasoline and diesel (tables 8A and 9A in the annex). Companies in this industry obviously pass on higher costs more readily than they pass on cost savings. While the pass-through seems to be asymmetric for beef steak, too, it is not for the other meat product under review (pork cutlet).

Earlier studies have already pointed to asymmetry in the pass-through for fuel (PVM Vienna, 2005; BWB, 2008; Jaenicke, 2010). However, the interpretation of this result must take into account that, for the reasons listed in section 1, the long-term pass-through is far from complete for fuel products (0.33 for diesel and 0.23 for super gasoline).[7] This implies that the slightly stronger pass-through of cost hikes is likely attributable also to factors other than fuel retailers' pricing policies, such as the existence of stronger downward price rigidities.

4 Conclusions

A microeconometric analysis of the commodity price pass-through to the consumer prices of nine selected products in the period from 1996 to 2009 shows that both the duration and extent of the pass-through vary rather widely by product. The long-term pass-through is strongest for eggs and firewood, followed by super gasoline and diesel fuel, whereas it is very low for bread rolls and beef steak. As expected, the effect is stronger for products whose consumer prices are largely determined by the associated commodity prices, and it tends to be weaker when cost-intensive processing steps are involved. The duration of the pass-through is shortest for fuel products (around two months) and longest for natural gas (whose price is still partly controlled by government in Austria). The results also show that the extent of price rigidities at the microlevel plays an important role in determining the duration of the pass-through.

The estimated extent of the pass-through also varies over time but, for most products, it has been significantly higher since the introduction of euro cash in Austria. However, without further analysis, it is impossible to conclude whether the rise in the pass-through over time has indeed been caused by the adoption of the euro or whether other factors might have contributed as well.

The estimation of the pass-through by the types of sales outlets gave mixed results. For meat products, the pass-through effect was significantly stron-

[7] *In an alternative estimation based on net prices, the long-term pass-through amounts to 0.62 for diesel fuel and 0.55 for super gasoline.*

ger in corner shops and markets than in supermarkets and discounters, which would support the disputed hypothesis that the pass-through is relatively stronger in a less competitive environment. The opposite is true for eggs, however, which would lend credence to the (likewise controversial) counter-hypothesis.

An analysis of the pass-through by geographical location revealed hardly any systematic differences between the 20 cities and towns under review. The only exception is natural gas, for which the pass-through is significantly higher in most cities other than Vienna. Maybe the breakdown by 20 different locations is too detailed to provide meaningful results, as the number of variables in the regression increases by 280. Limiting this breakdown to just a few regions or city size categories might yield more conclusive results in future analyses.

Regarding the symmetry of the commodity price pass-through, it turns out that companies are more inclined to pass on price hikes than price cuts in the case of super gasoline and diesel as well as beef steak, which confirms the results of earlier studies for fuels. Still, the long-term pass-through is far from complete for both gross and net fuel prices. Therefore, the slightly stronger pass-through of price hikes can also be attributable to factors other than fuel retailers' pricing policies.

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Annex

Table 1A

Mapping of CPI Products to Underlying Commodity Prices

Consumer product	Data available from	Associated commodity prices	Data available from	Data source
Lean pork cutlet	Jan. 1996 to Dec. 2009	Pork (grades S – P)	Jan. 1998 to Dec. 2010	Agricultural and forestry producer prices (Statistics Austria)
Beef top loin steak	Jan. 1996 to Dec. 2009	Beef: average of young bulls (grades E – P) and cows (grades E – P)	Jan. 1998 to Dec. 2010	
Eggs	Jan. 1996 to Dec. 2009	Eggs: average of free-range (large) and barn (medium) eggs	Jan. 1999 to Dec. 2010	
Whole milk	Jan. 1996 to Dec. 2009	Cow's milk (3.7% fat and 3.4% protein)	Jan. 1998 to Dec. 2010	
Bread rolls	Jan. 1996 to Dec. 2009	Soft milling wheat (12.5% minimum protein content)	Jan. 1998 to Dec. 2010	
Super-grade gasoline	Jan. 1996 to Dec. 2009	Crude oil (UK Brent)	Jan. 1996 to Dec. 2010	ECB Statistical Data Warehouse
Diesel	Jan. 1996 to Dec. 2009	Crude oil (UK Brent)		
Natural gas	Jan. 1996 to Dec. 2009	Import price index, subindex natural gas	Jan. 1999 to April 2009	Import price index (Statistics Austria)
Firewood	Jan. 1996 to Dec. 2009	Firewood (softwood)	Jan. 1998 to Dec. 2010	Agricultural and forestry producer prices (Statistics Austria)

Table 2A

Effect of the Euro Adoption on the Pass-Through (6 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
Euro Effect		+		+++		+++	+++		

Source: Author's calculations.

Note: +++, ++, + denote an increase in long-term pass-through after the changeover to the euro (at the 1%, 5% and 10% level of significance, respectively); –––, ––, – denote a decline in the long-term pass-through after the changeover to the euro (at the 1%, 5% and 10% level of significance, respectively).

Table 3A

Effect of the Euro Adoption on the Pass-Through (12 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
Euro Effect		+	+++			+++	+++		++

Source: Author's calculations.

Note: +++, ++, + denote an increase in long-term pass-through after the changeover to the euro (at the 1%, 5% and 10% level of significance, respectively); –––, ––, – denote a decline in the long-term pass-through after the changeover to the euro (at the 1%, 5% and 10% level of significance, respectively).

Table 4A

Effect of the Type of Sales Outlet on the Pass-Through (6 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls
Reference group: Supermarkets					
Retail warehouse			++		
Discounter	––		++		
Corner shop	+++	+++			n.a.
Specialist shop	–		–––		
Market					

Source: Author's calculations.

Note: +++, ++, + LTPT is stronger than in supermarkets (at the 1%, 5% and 10% level of significance, respectively); –––, ––, – LTPT is lower than in supermarkets (at the 1%, 5% and 10% level of significance, respectively). LTPT stands for long-term pass-through.

Table 5A

Effect of the Type of Sales Outlet on the Pass-Through (12 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls
Reference group: Supermarkets					
Retail warehouse			++	–––	–––
Discounter		–––			
Corner shop	+++	+++		+	n.a.
Specialist shop		–	–––	––	–––
Market					

Source: Author's calculations.

Note: +++, ++, + LTPT is stronger than in supermarkets (at the 1%, 5% and 10% level of significance, respectively); –––, ––, – LTPT is lower than in supermarkets (at the 1%, 5% and 10% level of significance, respectively). LTPT stands for long-term pass-through.

Table 6A

Effect of the City on the Pass-Through (6 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
Reference city: Vienna									
Eisenstadt	– –							+++	
Linz						– – –		+++	
Salzburg						– –	– – –		– –
Graz									– –
Klagenfurt			– –			– – –	– – –		–
Innsbruck	– – –		–	+		++		+++	
Bregenz						– –	– – –	+++	
St. Pölten		++						+++	
Steyr								+++	
Kapfenberg						+++		+++	
Villach						+++	+++	++	
Dornbirn	– –						– – –	+++	– – –
Wr. Neustadt				+++		+++	++	n.a.	
Wels			+++					+++	
Wolfsberg			– –					+	
Feldkirch	– –		– –			– – –	– – –	n.a.	
Krems	– – –		– – –					n.a.	
Amstetten	–					– –		n.a.	– –
Baden	– – –					+++	++	n.a.	– –

Source: Author's calculations.

Note: +++, ++, + LTPT is stronger than in Vienna (at the 1%, 5% and 10% significance level, respectively); – – –, – –, – LTPT is lower than in Vienna (at the 1%, 5% and 10% significance level, respectively). LTPT stands for long-term pass-through.

Table 7A

Effect of the City on the Pass-Through (12 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
Reference city: Vienna									
Eisenstadt						+++		+	
Linz							+++	+++	
Salzburg									
Graz						+++	++		
Klagenfurt			– –						
Innsbruck			– –			+++		+++	+++
Bregenz						– –	– – –	+++	+
St. Pölten		++	– –			+		++	
Steyr						+	+++	++	+++
Kapfenberg						+++	– – –	+	
Villach									
Dornbirn						– –	– – –	+++	
Wr. Neustadt								n.a.	– – –
Wels						+++	+++	++	++
Wolfsberg			– – –			+	+		
Feldkirch	–		– –				– –	n.a.	+++
Krems	– –		– –			++		n.a.	
Amstetten				–				n.a.	– –
Baden	–							n.a.	++

Source: Author's calculations.

Note: +++, ++, + LTPT is stronger than in Vienna (at the 1%, 5% and 10% significance level, respectively); – – –, – –, – LTPT is lower than in Vienna (at the 1%, 5% and 10% significance level, respectively). LTPT stands for long-term pass-through.

Table 8A

Asymmetric Pass-Through (6 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
Stronger pass-through		+++			– –	+++	+++		

Source: Author's calculations.

Note: +++, ++, + LTPT is stronger for cost increases (at the 1%, 5% and 10% significance level, respectively); – – –, – –, – LTPT is stronger for cost cuts (at the 1%, 5% and 10% significance level, respectively). LTPT stands for long-term pass-through.

Table 9A

Asymmetric Pass-Through (12 Months)

Product	Pork cutlet	Beef steak	Eggs	Whole milk	Bread rolls	Super gasoline	Diesel	Natural gas	Firewood
Stronger pass-through	– – –	++				+++	+++		

Source: Author's calculations.

Note: +++, ++, + LTPT is stronger for cost increases (at the 1%, 5% and 10% significance level, respectively); – – –, – –, – LTPT is stronger for cost cuts (at the 1%, 5% and 10% significance level, respectively). LTPT stands for long-term pass-through.

Price Level Convergence Before and After the Advent of EMU

Friedrich Fritzer[1]

This article explores the convergence in consumer prices for groups of countries within the European Economic and Monetary Union (EMU) and for selected non-EU countries, using detailed product-level data for 35 goods and services. It also analyzes the price gap between Austria and its major trading partners Germany and Italy.

Within the euro area (the 11 founder members), price level convergence has been found to have occurred primarily in the run-up to the launch of euro banknotes and coins. Only in the case of consumer goods, such as personal transport equipment, clothing and footwear, and audio-visual, photographic and information processing equipment, did price levels continue to converge across the euro area countries also after the cash changeover. Compared with the other groups of countries reviewed here, food and services price levels converged to a much lesser extent or not at all in the euro area. However, during the whole period considered the variation in consumer prices was lowest in the euro area.

Price level comparisons carried out between Austria and Germany/Italy revealed convergence in the case of both consumer goods and services, except for food prices. The latter is likely to have been due primarily to structural changes in retail trade: while in many sectors the trend decline in labor costs and profit margins and moderate deregulation may have contributed to price convergence between Austria and its trading partners, the Austrian food sector has displayed a trend toward rising labor costs. Another driver of food price differences is the VAT applied to food products, which is higher in Austria than in Germany or Italy.

JEL classification: E31, F15
Keywords: economic integration, prices, euro

The European Single Market was designed to promote four fundamental freedoms: free movement of goods, free movement of persons, freedom to provide services and free movement of capital and payments. The resulting integration of the participating national markets and the implementation of a monetary union have allowed goods and factor prices to become efficient drivers of economic decision-making. One intended outcome of the "European integration project" was trend convergence of prices for identical or similar products even when traded on geographically separate markets. Otherwise, price differences in tradable goods could be used to realize profits (price arbitrage). However, the Balassa-Samuelson effect indirectly brings about a convergence in price levels also for nontradable goods. The crucial driver here is labor mobility between the tradable and nontradable goods sectors (e.g. Rogers, 2001). Nevertheless, exploiting price differences in identical goods has cost implications (e.g. transportation costs, fees, taxes, "nontariff trade barriers" such as a lack of price transparency) which can restrict or even eliminate price arbitrage. But for the most part price differences for the same or similar products are indicators of market frictions, which ultimately result in deadweight loss.

Against this backdrop, this article investigates whether the advent of EMU gave rise to increased price convergence in the euro area and/or EU countries. Price level differences are not only indicators of untapped growth potential (due to the above-mentioned market frictions), but can also make the conduct of monetary policy within the

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Fabio Rumler,
OeNB

common currency area more difficult inasmuch as varying price levels give rise to inflation differentials. In that case, the Eurosystem's common monetary policy can be too restrictive for some countries, and too accommodating for others.

Previous studies (e.g. Crespo Cuaresma et al., 2007; Sturm et al., 2009; ECB, 2011) indicate that increased price convergence was observed in the euro area in the run-up to the establishment of the monetary union, but that progress on this front stalled thereafter. In section 1, we examine this issue with reference to 35 goods and services aggregates for the euro area and groups of EU countries as well as for selected non-EU countries. This detailed analysis leads to slightly more optimistic conclusions than those of previous studies. Section 2 considers price differences between Austria and its major trading partners Italy and Germany, and works through some potential causes for these differences. This is a direction which has not previously been pursued in the literature. Section 3 sums up the content of the article and draws a few conclusions.

1 Price Level Convergence in the Euro Area and Other Groups of Countries

The underlying data for the price level convergence analysis are drawn from the comparative price level indices developed jointly by Eurostat and the OECD together with national central statistical offices within the context of the European Comparison Programme. These indices are based on purchasing power parities (PPPs) converted into a currency.[2] Price level convergence is measured using the standard deviation and variation coefficient[3] calculated for all groups of countries. The EU Member States are grouped into three clusters for this purpose:

1. The euro area in a "fixed composition": Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.
2. EU1 countries – EU countries outside the "fixed composition" euro area which have a current rating of at least "investment grade"[4]: the Czech Republic, Denmark, Estonia, Malta, Poland, Slovakia, Slovenia and the United Kingdom.
3. EU2 countries – all other EU countries not covered by either of the above: Bulgaria, Cyprus, Greece, Hungary, Latvia, Lithuania, Romania and Sweden.

On top of this, the convergence indicators are also calculated for the euro area in a "flexible composition"[5] and for the following selection of non-EU countries, which have been incorporated into the comparison as a benchmark:

[2] *The PPPs are calculated using only products and services which can be compared across countries. For this reason, the consumption basket used for the PPP/comparative price level calculation differs from the HICP basket.*

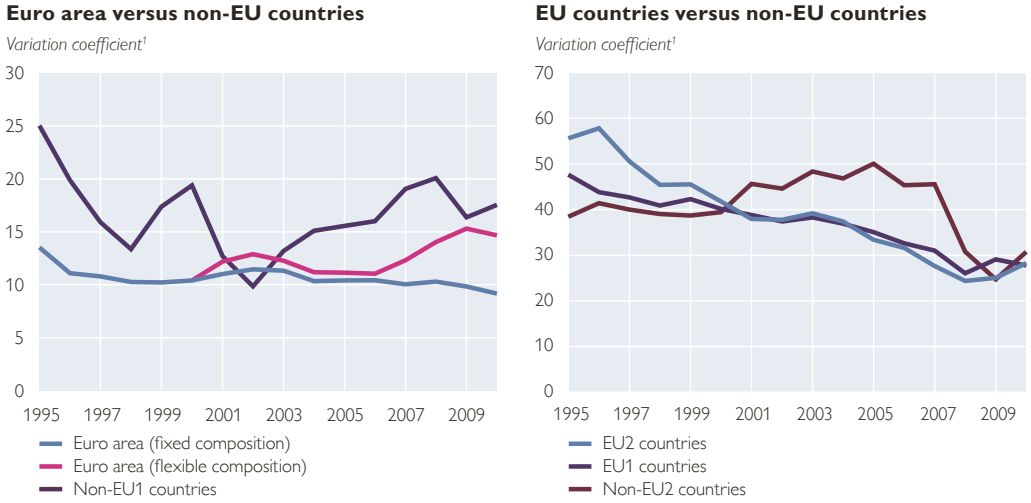
[3] *For the variation coefficient, the standard deviation is divided by the mean of the variable, thus calculating the standard deviation in prices across the countries within a group. The countries are not weighted, as price convergence questions require the measurement of actual price differences, and not differences distorted by weightings.*

[4] *"Investment grade" is judged to be less risky than "speculative grade" by market participants. Standard & Poor's defines BBB– as the lowest "investment grade" rating, and BB+ as the highest "speculative grade" rating. Countries are grouped on the basis of their Standard & Poor's rating as at September 2011.*

[5] *Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain (from 1995), Greece (from 2001), Slovenia (from 2007), Cyprus and Malta (from 2008) and Slovakia (from 2009). The analysis covers the period from 1995 to 2010. Estonia joined the euro area in 2011 and is therefore included in the "EU1 countries" group.*

Chart 1

General Consumer Price Level: Change in Variation Coefficient



Source: Eurostat (price level indices from the European Comparison Programme), author's calculations.

[1] Standard deviation as a percentage of the mean. When the variation coefficient of the price level falls (rises), the national price levels are converging (diverging).

Note: Euro area (fixed composition): founding members of monetary union; euro area (flexible composition): all euro area members as of date of accession; EU1 countries (EU2 countries): EU countries with an "investment grade" ("speculative grade") rating; non-EU1 countries (non-EU2 countries): selected non-EU countries with an "investment grade" ("speculative grade") rating.

4. NEU1 countries – non-EU countries with a current rating of at least "investment grade": Japan, Norway, Switzerland and the U.S.A.
5. NEU2 countries – non-EU countries with a lower rating than those in the NEU1 group: Albania, Bosnia and Herzegovina, Croatia, Iceland, Macedonia, Montenegro, Serbia and Turkey.

The countries were clustered based on their "sovereign credit ratings," which have the benefit of reflecting, among other things, key determinants of developments in the price level: for example, structural factors such as labor market flexibility and the competitive environment in the corporate sector, or growth prospects, which ultimately also play a key role in determining the price level in an economy (on this point, see also the discussion on price level determinants at the end of this section). Of course, there are other classification criteria such as geographical distance or differences in income levels that might have been used to define country clusters, yet they have the drawback of taking account only of some of the factors relevant to price trends. The findings of this study are, incidentally, the same when the EU1 and EU2 countries form a single cluster.

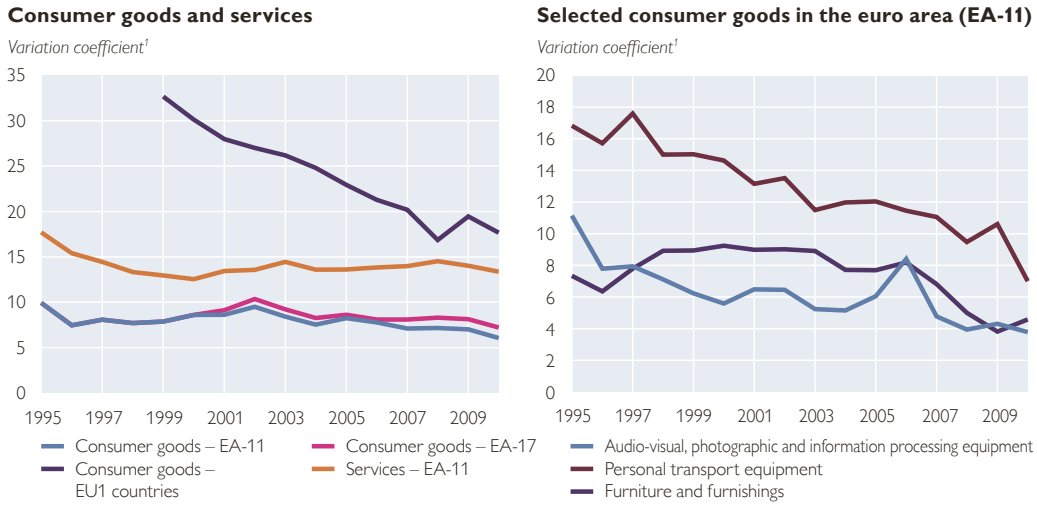
Chart 1 provides an overview of the changes in the variation coefficient for the aggregate consumer price level (household consumption expenditure) over time.

The variation coefficient[6] data in chart 1 show that price variation has been considerably lower in the euro area countries since 1995 than in the

[6] *The qualitative conclusions remain unchanged when the standard deviation is used as the measure of convergence. In assessing the level of price convergence, this article therefore refers only to the variation coefficient.*

Chart 2

Consumer Goods and Services: Change in Variation Coefficient



Source: Eurostat (price level indices from the European Comparison Programme), author's calculations.

[1] Standard deviation as a percentage of the mean. When the variation coefficient of the price level falls (rises), the national price levels are converging (diverging).

Note: Euro area (fixed composition) – EA-11: founding members of monetary union; euro area (flexible composition) – EA-17: all euro area members as of date of accession; EU1 countries: EU countries with an "investment grade" rating.

two clusters of non-euro area EU countries.[7] In 2010, price level variation in the "fixed composition" euro area group, i.e. in the 11 founding members of the euro area, stood at slightly less than 10% of the mean price level, while in the other groups of countries it reached up to three times the "fixed composition" euro area level. In addition, we find a moderate improvement in price level convergence for the "fixed composition" euro area from 2002 onward as opposed to a significant deterioration in price level convergence within the "flexible composition" euro area. This can be attributed to the accession of a number of countries with a relatively low price level during this period – Greece (2001), Slovenia (2007), Cyprus and Malta (2008) and Slovakia (2009).

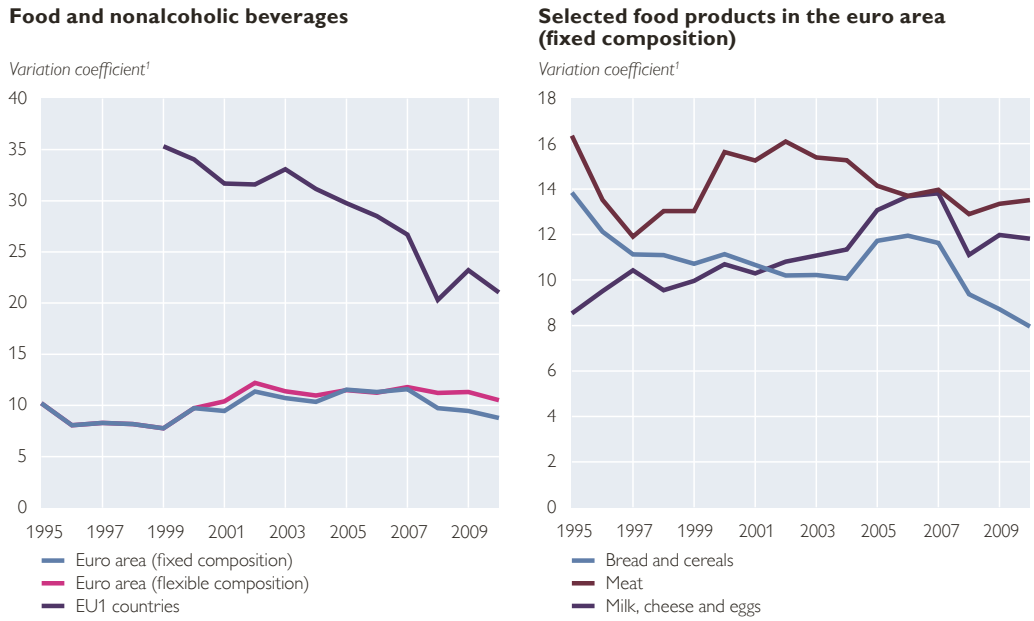
In the groups of countries which belong to the EU but not the euro area (EU1 and EU2), while a trend improvement in price convergence can be detected over the period from 1995 to the present as a whole, the variation coefficient for the EU countries in 2010 (around 28%) is significantly higher than that of the "fixed composition" euro area cluster (around 9%) and the "flexible composition" cluster (around 15%). The non-EU countries also recorded far higher variations in the price level than the euro area countries over the period as a whole, whereby the variation within the group of higher-rated non-EU countries[8] (NEU1: Japan, Norway, Switzerland and the U.S.A.) was considerably lower than that in the NEU2 group (Albania, Bosnia and Herzegovina, Croatia, Iceland, Macedonia, Montenegro, Serbia and Turkey).

[7] *For price convergence calculations covering the period 1995–98, the euro area is defined as the 11 founder member countries.*

[8] *The surge in price variability in the NEU1 group between 1998 and 2001 is ascribable first and foremost to price rises in Japan and the U.S.A. during this period.*

Chart 3

Price Level Convergence for Food Products in Different Country Groups



Source: Eurostat (price level indices from the European Comparison Programme), author's calculations.

[1] Standard deviation as a percentage of the mean. When the variation coefficient of the price level falls (rises), the national price levels are converging (diverging).

Note: Euro area (fixed composition): founding members of monetary union; euro area (flexible composition): all euro area members as of date of accession; EU1 countries: EU countries with an "investment grade" rating.

A closer look at the consumer price level reveals that, from 2002 onward, price levels among euro area countries have converged for consumer goods in particular, but not for consumer services (chart 2). Consumer service prices diverged even markedly in the "flexible composition" euro area cluster in 2001 and 2007–09 (when Greece, Slovenia, Malta, Cyprus and Slovakia joined the euro area), a pattern that has started to reverse somewhat only recently (not shown in chart 2).

Within the consumer goods sector, price convergence in the euro area countries increased in particular in the case of durable goods such as audio-visual equipment, computers, cars and furniture, while for nondurable goods (e.g. food products) it was conspicuously weaker, or even stagnant (chart 3).

In contrast to durable consumer goods, there was some divergence in food prices across the euro area countries – especially during the commodity price shock of 2007 and 2008[9] (bread and cereals, dairy products, oils and fats), and after the first BSE cases came to light in Europe in the fall of 2000 (meat products). These instances of price level divergence can thus be partly attributed to external influences. Despite the decline in price convergence, the food price gap is also smaller in the euro area countries than in the other country groups studied.

Price convergence has also been observed, in particular, in sectors that have been deregulated, for example

[9] *In late 2010 and 2011, commodity price growth once again started to accelerate strongly. The latest published price level data are for 2010, and thus cover only the initial period of the latest commodity price shock.*

Table 1

Variation Coefficients for Consumer Prices in Selected Country Groups

		Euro area 11		Euro area 17		EU1 countries	
		1995 to 2001	2002 to 2010	1995 to 2001	2002 to 2010	1995/99 to 2001[1]	2002 to 2010
1	Household final consumption expenditure	0.11	0.10	0.11	0.13	0.40	0.33
2	Consumer goods	0.08	0.08	0.08	0.08	0.30	0.22
3	Nondurable goods	0.10	0.10	0.11	0.11	0.36	0.26
4	Semidurable goods	0.08	0.06	0.08	0.06	0.19	0.11
5	Durable goods	0.08	0.06	0.08	0.07	0.20	0.18
6	Food and nonalcoholic beverages	0.09	0.11	0.09	0.11	0.34	0.27
7	Food	0.09	0.10	0.09	0.11	0.34	0.27
8	Bread and cereals	0.12	0.10	0.12	0.12	0.42	0.34
9	Meat	0.14	0.14	0.14	0.17	0.40	0.36
10	Fish	0.13	0.13	0.13	0.13	0.24	0.22
11	Milk, cheese and eggs	0.10	0.12	0.10	0.13	0.29	0.19
12	Oils and fats	0.10	0.12	0.10	0.12	0.22	0.16
13	Other food	0.11	0.10	0.11	0.10	0.31	0.26
14	Nonalcoholic beverages	0.13	0.16	0.13	0.15	0.30	0.30
15	Alcoholic beverages, tobacco and narcotics	0.29	0.27	0.29	0.26	0.50	0.38
16	Alcoholic beverages	0.35	0.30	0.35	0.28	0.36	0.22
17	Tobacco	0.26	0.30	0.26	0.31	0.70	0.58
18	Clothing and footwear	0.10	0.08	0.10	0.08	0.18	0.10
19	Clothing	0.10	0.08	0.10	0.08	0.18	0.10
20	Footwear	0.14	0.09	0.14	0.09	0.18	0.11
21	Housing, water, electricity, gas	0.18	0.18	0.18	0.22	0.60	0.52
22	Electricity, gas and other fuels	0.11	0.11	0.11	0.15	0.55	0.37
23	Household furnishings, equipment	0.08	0.07	0.08	0.07	0.29	0.20
24	Furniture and furnishings, carpets	0.08	0.07	0.08	0.08	0.29	0.21
25	Household appliances	0.08	0.07	0.08	0.08	0.07	0.13
26	Health	0.15	0.14	0.16	0.18	0.65	0.52
27	Transport	0.10	0.09	0.11	0.11	0.36	0.28
28	Personal transport equipment	0.15	0.11	0.15	0.11	0.28	0.27
29	Transport services	0.18	0.16	0.19	0.20	0.56	0.41
30	Communication	0.24	0.11	0.24	0.13	0.30	0.13
31	Recreation and culture	0.10	0.08	0.10	0.10	0.37	0.32
32	Audio-visual, photographic and information processing equipment	0.07	0.05	0.07	0.06	0.10	0.10
33	Education	0.26	0.29	0.26	0.31	0.74	0.67
34	Restaurants and hotels	0.15	0.14	0.15	0.15	0.40	0.38
35	Miscellaneous goods and services	0.13	0.12	0.13	0.14	0.49	0.41
	Test statistic	1.49		0.17		5.74	
	(Null hypothesis: mean of the variation coefficients from 1995 to 2001 is identical to that from 2002 to 2010).	Not significantly different		Not significantly different		Significantly different	

Source: Author's calculations.

[1] *For the EU1 countries, the 1995–2001 average was calculated only for the aggregate consumer price level (household final consumption expenditure). For all other goods and services, for the period preceding the changeover to euro banknotes and coins only the average for 1999–2001 could be calculated due to a lack of data.*

Note: EU1 countries: EU countries with an „investment grade" rating.

communication. In this sector, too, price convergence is further advanced in the euro area than in most of the other country groups.

By contrast, in the case of nontradable goods – and in particular services such as education – higher levels of price variability emerged in the euro area after 2001, a trend which has only started to reverse slightly in the last few years (see also table 1). Evidence on whether the introduction of the euro played a role here is as yet inconclusive. Table 1 shows the mean variation coefficients for all 35 goods and services aggregates for both the euro area and

the EU1 countries, before and after the changeover to euro banknotes and coins.

The quantitative value of the mean variation coefficient for the euro area (as constituted by the 11 founding members) shows that, for the aggregate consumer price level (household final consumption expenditure), this value was only marginally lower in the years after 2001 than it was before 2001 (0.10 versus 0.11). A clear-cut decrease in the variation coefficients for the "fixed composition" euro area group – in particular in the case of clothing, footwear, personal transport equipment, audio-visual, photographic and information processing equipment and alcoholic beverages – was offset by a rise in other categories, most notably in the case of nonalcoholic beverages and tobacco. A test of the equality of the mean variation coefficients across all goods and services aggregates before and after 2001 reveals that these do not differ significantly in the case of the "fixed" and "flexible" composition euro area clusters, but that they do in the case of the EU1 countries. However, it must be emphasized that the tests are based on a relatively small number of samples (23 product groups) and that the underlying normal distribution assumption is thus subject to a degree of uncertainty.[10] Overall, the statistical tests do not offer any conclusive evidence that the pace of price convergence changed in the euro area after 2001.

Even though – as described above – price convergence in the euro area countries is at a more advanced stage than in other country groups, the question remains why convergence is not complete or why the prices of some product groups continue to diverge. A series of studies (ECB, 2011; Andersson et al., 2009; Rogers, 2007; Sturm et al., 2009) cite the following determinants for price gaps between countries.

Economies with a relatively high level of prosperity (as measured by real per capita GDP) and taxation have been empirically found to also have higher price levels. While the effect of taxation on the price level is evident, the positive correlation between real GDP and the price level operates through both demand (e.g. higher consumer demand) and supply factors (higher productivity and thus higher wages). In the studies mentioned above, reference is also made to the fact that geographical distance between economies has a substantial influence on price level differences. The greater the geographical distance, the larger the price differences are. Alongside these macroeconomic conditions, several structural factors have also been proved to have a causal effect on existing price differences: both retail profit margins and barriers to market entry for newly established firms show a positive correlation with the price level; that is to say, the higher the profit margins and/or entry barriers, the higher the price level. In the case of trade concentration measures, different results were generated depending on the indicator used: while the Herfindahl-Hirschman Index (HHI) is negatively correlated with the price level gap between countries, the concentration ratio (Ck) for the k largest trading companies shows a positive

[10] *A two-sample test was conducted for the difference in arithmetic means for paired samples (Bleymüller et al., 2008). Higher-level aggregates, such as nondurable goods (which are mainly composed of food products), were not included. Thus, of the 35 aggregates listed in table 1, only 23 products and services can be used for the calculation of the test statistics.*

correlation with this price gap. In the HHI's case this means that, with a rising degree of concentration, the price level differences between countries diminish, while in the case of the concentration ratio (Ck) the opposite holds true (price gaps between countries widen as the degree of concentration rises). This seemingly contradictory result is interpreted below.

Companies operate in both the end-user market (vis-à-vis consumers) and the procurement market (vis-à-vis product manufacturers), acting as suppliers in the former and consumers in the latter. On the one hand, a concentrated market structure among retail firms can make for better purchasing conditions in the procurement markets, while on the other firms' dominant position in the end-user market can be exploited to set excessively high prices. Against the backdrop of the (seemingly) contradictory correlations between the concentration ratios and the price level gap cited above we can conjecture that, from an empirical perspective, the HHI is clearly a better indicator for the buying power of companies in the procurement markets for obtaining more favorable purchase terms. By contrast, the concentration ratio (Ck) apparently provides a better empirical measure of the potential for firms to set excessively high prices in the end-user markets due to dominant market position (ECB, 2011).

2 Price Level Developments in Austria versus Germany, Italy and the Euro Area

Based on the relative price level indices,[11] marked convergence in the general consumer price level can be seen between Austria and its main trading partners Italy and Germany since 1995 (chart 4, left-hand panel). At the beginning of this period, the price level in Austria was considerably above Italy's, and marginally below Germany's. Between 1995 and 1999, factors contributing to consumer price convergence between Austria and Italy included exchange rate effects (appreciation of the Italian lira). However, in the last few years the difference in consumer price levels between Austria and its main trading partners has begun to increase slightly again.

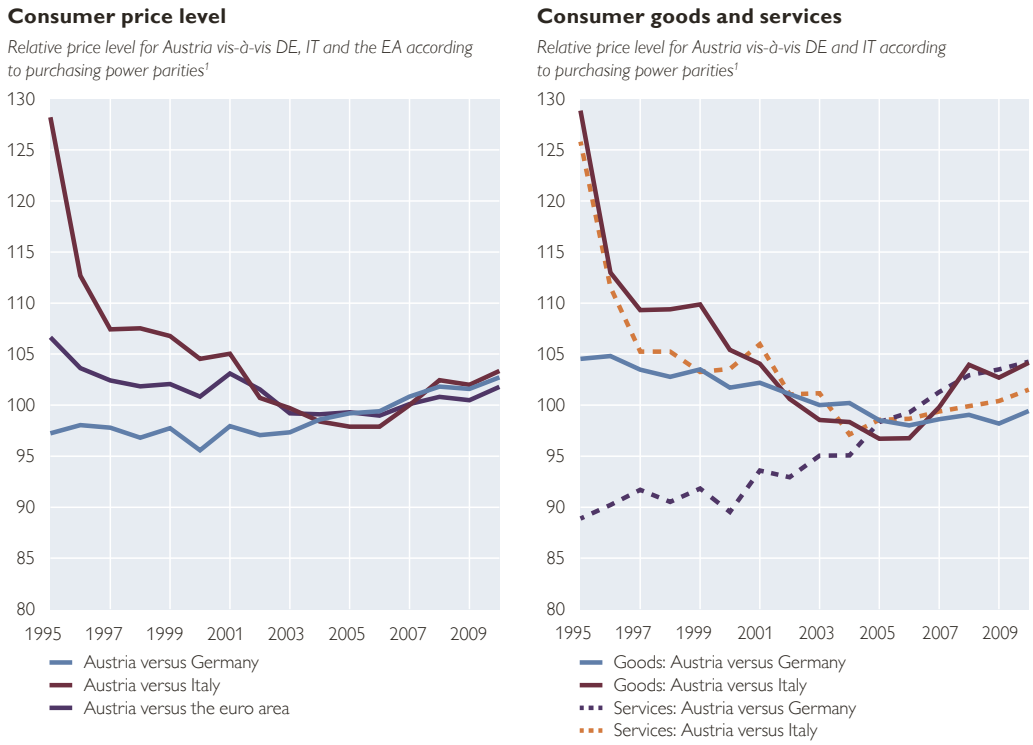
One striking aspect here is the diverging patterns of price level convergence for services and consumer goods: in the services sector, Austria's position relative to Germany changed from a considerably lower to a slightly higher price level between 1995 and 2010, while its distinctly higher price level of the 1990s compared to Italy's subsequently showed marked convergence. At the same time, price convergence in consumer goods significantly trailed price convergence in services. Moreover, Austria's goods price level was above that of both neighboring countries from 1995 to 2002. In other words, the price level developments between Austria and its main trading partners did not mirror the convergence process that prevailed at the euro area level where the convergence of services prices trailed the convergence of consumer goods prices.

As discussed in section 1, determinants of price levels include standard of living, taxation arrangements, and structural variables in the retail trade

[11] *The price level indices compiled under the Eurostat/OECD Purchasing Power Parities Programme are normalized to the EU average (EU-15 = 100 or EU-27 = 100). In order to compare Austrian price levels directly with those in Germany (Italy and the euro area), the price level indices for Austria (normalized here to EU-15 = 100) are divided by those of the other country or region and then multiplied by 100. If the resulting relation is over (under) 100, Austria's price level is above (below) that of the other country or region.*

Chart 4

Differences in Price Levels: Austria versus Germany, Italy and the Euro Area



Source: Eurostat (price level indices from the European Comparison Programme), author's calculations.

[1] Austria versus Germany (Italy/the euro area) is defined as the price level index for Austria divided by that for Germany (Italy/the euro area) and multiplied by 100. The Eurostat price level indices used are normalized to EU-15 = 100. Euro area (fixed composition): founding members of monetary union.

sector (such as market regulation, labor costs, profit margins, and company concentration). The following paragraphs highlight some striking developments in these variables in the context of the development in the price gap between Austria, Germany, and Italy.

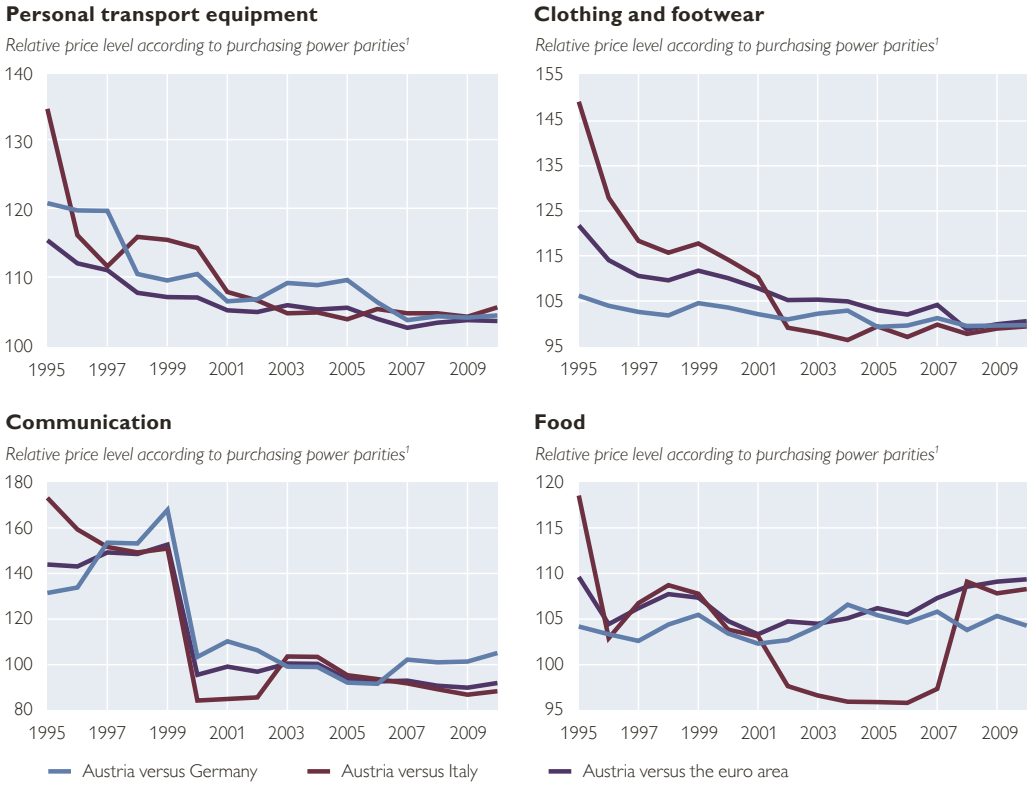
One salient factor here is the *harmonization in the degree of regulation* among the countries studied, which may have contributed to price level convergence. The influence of regulation on price level differences was demonstrated in ECB (2011). According to OECD indicators, the degree of regulation in both Austria and Italy decreased substantially in the period from 1998 to 2008[12] while remaining consistently low in Germany over the same period.[13] OECD indicators also show that regulations on store opening hours, restrictions on commercial undertakings with a large amount of trading space as well as barriers to market entry and operational restrictions for firms are particularly strict in Austria compared to other countries.

[12] *The latest available indicators on retail industry regulation are for 2008. All indicators can be provided on request.*

[13] *Some non-EU countries, such as Switzerland, are even less regulated than Germany, Italy or Austria.*

Chart 5

Differences in Price Levels: Austria versus Germany and Italy



Source: Eurostat (price level indices from the European Comparison Programme), author's calculations.

[1] *Austria versus Germany (Italy/the euro area) is defined as the price level index for Austria divided by that for Germany (Italy/the euro area) and multiplied by 100. The Eurostat price level indices used are normalized to EU-15 = 100. Euro area (fixed composition): founding members of monetary union.*

The noticeable convergence in the general price level for consumer goods between Austria and its main trading partners Germany and Italy is particularly clear for the *clothing and footwear* and *personal transport equipment* product groups (chart 5). In the services area, communication has been one of the sectors which has contributed to price convergence between Austria and its neighbors. The decisive factor here was the EU-wide liberalization of these markets, which began in the late 1990s. In contrast, in the *food sector* there was no trend toward converging price levels among the three countries studied, with the price level in Austria lying slightly above that of its neighbor countries almost constantly since 1995.

Several structural indicators for the food retail market have contributed to the stagnating, or even, more recently, slightly deteriorating level of price convergence in the food sector. Compared with the other countries studied, Austria's food trade has relatively high labor costs, which have followed a modest upward trend since 2002. Faber and Stokman (2009) provide empirical evidence that variations in labor costs across the euro area countries ("non-traded input costs") constitute a significant determinant of price level differences. In addition, profit margins in Austria are higher than Italy's. The link between profit margins and price gaps was investigated in ECB (2011). Parallel to Austria's relatively high profit mar-

gins compared to Italy, the (national) concentration in the food retail industry in Austria (and also in Germany) is greater than in Italy. The concentration process, which has been generally advancing over time, may also have worked against price convergence within the food retail industry (in Germany, this process has been particularly robust since 2004).[14] However, alongside these structural factors, lower taxes on food products in Germany and Italy are also playing a role in price level differences. While VAT on food in Germany has been at 7% since 1995, and Italy charges 4%, in Austria VAT on food is charged at 10%.[15]

Equally, the higher price levels in the *clothing and footwear* and *personal transport equipment* sectors in Austria compared to its neighbor countries and the increasing price convergence seen since 1995 can be at least partly explained by structural factors: in all three countries in the comparison, we can observe an ongoing reduction and convergence in labor costs in the retail industry for these sectors, a development which has been especially conspicuous in the automobile trade.

3 Summary and Conclusions

In general, consumer price levels converged strongly in the 11 founding member countries especially during the preparations for European monetary union. After 1999, price convergence in the "fixed composition" euro area country group improved only moderately, while in the "flexible composition" country group it deteriorated markedly, especially after 2006. This latter development can be attributed to the accession of countries with a comparatively low price level (Greece, Slovenia, Malta, Cyprus, and, above all, Slovakia) in 2001 and 2007–09. At a less aggregate level, however, significant progress in convergence can be observed in the monetary union countries after the launch of the single currency. Specifically, price level convergence occurred mainly in the area of durable consumer goods and, to a lesser extent, services.

Price level differences within the non-euro area EU countries (EU1 and EU2) are considerably greater than those found in the euro area, although price gaps in the EU1 and EU2 countries have narrowed substantially since 1995. Larger price gaps than those found within the euro area can also be observed outside the EU, and some of these have not lessened since the end of the 1990s (e.g. within the NEU1 countries).

Relatively large differences in the levels of service and food prices were observed in the euro area in the course of the changeover to euro banknotes and coins. Evidence on whether there is a causal relationship between the increase in price level differences observed during the euro changeover period and the changeover is as yet inconclusive. Particularly in the case of food products, it is likely that external factors (BSE crisis) played a more significant role. The accession to the euro area of a number of low-price countries entailed not only higher price level differences, but also larger inflation differentials within the monetary union, thus making it more difficult to conduct monetary policy. This is probably a passing phase, however, as the robust productivity and economic

[14] *The data on developments in labor costs, profit margins and concentration indicators in the food sector are available on request.*

[15] *European Commission (2011).*

growth to be expected in the low-price countries over the medium to long term should also result in an ongoing alignment in prices toward the "core" euro area level. At all events, the standard deviation of the HICP inflation rates in the countries which joined the euro area in 2001 or later (Greece, Estonia, Malta, Slovakia, Slovenia and Cyprus), which averaged 2.7% in 1997–2001, has since fallen to 1.4% (average for the years 2002–11), meaning that it is now only marginally higher than the comparable value for the 11 euro area founder members.

Austria's price gap vis-à-vis its main trading partners has narrowed sharply for both goods and services in the years since 1995. In some sectors, such as clothing and footwear and personal transport equipment, this price convergence has been especially noticeable, whereas in the case of food products (where Austria's price level lies slightly above that of Germany and Italy) there has been no perceptible narrowing of price differentials. Also striking was that the EU-level process of deregulation in the communication services sector, which began in the late 1990s, brought with it an abrupt drop in price levels in Austria.

The ongoing deregulation of retail trade and the proportional decline in labor costs and profit margins (as well as the convergence in these items between Austria and its main trading partners) may have contributed to the price level convergence seen in many sectors of the Austrian, German and Italian economies. In the case of food products, however, the trend toward moderately rising labor costs in Austria and the higher level of VAT imposed on food products could be partly responsible for the stable price gap in this area.

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