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The OeNB's quarterly publication *Monetary Policy & the Economy* provides analyses of cyclical developments, macroeconomic forecasts, studies on central banking and economic policy topics as well as research findings from macroeconomic workshops and conferences organized by the OeNB.

Contents

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

ANALYSES

High Price Competitiveness of Austrian Exporters and Recovery of Private Consumption Support Economic Activity

Economic Outlook for Austria from 2005 to 2007 (December 2005)

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1 Summary

According to the December 2005 economic outlook of the Oesterreichische Nationalbank (OeNB), Austria's real gross domestic product (GDP) is projected to increase by 1.9% in 2005. Economic growth is then expected to accelerate to 2.3% in 2006 and in 2007. Inflation according to the Harmonised Index of Consumer Prices (HICP) will quicken temporarily to 2.2% in 2005 as a result of the rise in the price of oil and services and then moderate to 1.9% in 2006 and further to 1.7% in 2007. With labor supply on the rise, unemployment is predicted to rise by 0.4 percentage point to 5.2% in 2005 and to ease only slightly to 5.1% by 2007. The second stage of the tax reform and the three growth and employment packages will cause the budget deficit (Maastricht definition) to widen temporarily to 1.8% of GDP in 2005 and to 1.9% of GDP in 2006. In 2007, though, the budget deficit will shrink to 1.4% of GDP.

Chart 1

Real GDP Growth (seasonally adjusted)

Year-on-year change in % (annual figures) and quarter-on-quarter change (annualized, quarterly figures)

- Annual figures
- Quarterly figures

Source: Eurostat, OeNB.

Austria's economy posted a robust growth of 2.4% in 2004, underpinned by highly dynamic export growth, which, however, lost steam temporarily at the turn of the year 2004/2005. In the meantime, signs of a recovery in the euro area have intensified. The oil price hike has come to a standstill, and the fall in the external value of the euro in recent months buoys exports. Confidence, which had declined throughout the first half of 2005, has been picking up steadily. Against this background, Austrian exports have been regaining strength since the second quarter of 2005, sustained by ongoing improvements of the international unit labor cost position and the reinforcement of export relations with the dynamic markets of Central and Southeastern Europe. Hence, the OeNB expects exports to remain the chief support of economic activity.

Like in 2003, the development of households' real income in 2004 was characterized by surging property income coupled with a very weak rise in the real compensation of employees.

This income development and low consumer confidence in the face of high joblessness and more expensive energy prompted consumers to stash away most of their income gains. So far in 2005, real consumer spending growth has accelerated marginally. The tax relief measures implemented during the second stage of the tax reform now appear to be gradually strengthening consumer demand with a time lag. Private consumption is set to quicken further to roughly 2% in 2006 and in 2007.

Investment stagnated in the first half of 2005 due to the expiration of the investment growth subsidy. Although investment growth speeded up in the second half of 2005, gross fixed capital formation has been rising only slowly and is anticipated to go up by just 0.9% for 2005 as a whole. In fact, investment in plant and equipment is supposed to diminish by 1.7% in 2005. After that time, the positive development of corporate profits and still very favorable financing conditions should prop up investment. Exports and the growth and employment packages adopted in 2005 are expected to provide additional impulses. The OeNB sees gross fixed capital formation go up by 3.2% in 2006 and by 2.8% in 2007.

As a delayed reaction to the favorable economic developments in 2004, payroll employment will rise quite robustly by 1.1% in 2005. This trend is envisaged to continue throughout 2006 and 2007. The effects of the pension reforms, the influx of foreign labor and demographic effects in 2007 are expected to keep the unemployment rate at a high level over the entire forecast horizon.

Sharply mounting energy prices will raise inflation as measured by the HICP to 2.2% in 2005. For 2006 and 2007, inflation is forecast to decline to 1.9% and 1.7%, respectively, assuming that oil prices stay largely unchanged and that wages and prices are not raised significantly as a second-round effect of high oil prices.

Table 1

OeNB December 2005 Outlook for Austria – Key Results[1])

	2004	2005	2006	2007
	Annual change in % (real)			
Economic activity				
Gross domestic product	+2.4	+1.9	+2.3	+2.3
Private consumption	+0.9	+1.3	+1.9	+2.1
Government consumption	+1.0	+1.2	+1.2	+1.5
Gross fixed capital formation	+1.8	+0.9	+3.2	+2.8
Exports of goods and services	+8.4	+3.2	+6.5	+6.6
Imports of goods and services	+6.0	+1.9	+6.6	+6.7
	% of nominal GDP			
Current account balance	+0.2	+0.1	+0.4	+0.7
	Percentage points of GDP			
Contribution to real GDP growth				
Private consumption	+0.5	+0.7	+1.1	+1.1
Government consumption	+0.2	+0.2	+0.2	+0.3
Gross fixed capital formation	+0.4	+0.2	+0.7	+0.6
Domestic demand (excluding changes in inventories)	+1.1	+1.1	+1.9	+2.0
Net exports	+1.4	+0.7	+0.3	+0.3
Changes in inventories (including statistical discrepancy)	−0.1	+0.0	+0.1	+0.0
	Annual change in %			
Prices				
Harmonised Index of Consumer Prices (HICP)	+2.0	+2.2	+1.9	+1.7
Private consumption expenditure (PCE) deflator	+1.9	+2.0	+1.9	+1.8
GDP deflator	+2.0	+2.3	+1.6	+1.7
Unit labor costs in the total economy	−0.3	+0.8	+1.0	+0.9
Compensation per employee (at current prices)	+2.1	+2.3	+2.6	+2.5
Productivity (whole economy)	+2.4	+1.4	+1.6	+1.5
Compensation per employee (real)	+0.2	+0.3	+0.6	+0.7
Import prices	+0.6	+3.3	+2.0	+1.5
Export prices	−0.6	+1.8	+1.8	+1.7
Terms of trade	−1.2	−1.5	−0.2	+0.2
Income and savings				
Real disposable household income	+1.7	+2.7	+2.0	+1.8
	% of nominal disposable household income			
Saving ratio	9.0	10.2	10.4	10.3
	Annual change in %			
Labor market				
Payroll employment	+0.5	+1.1	+0.9	+1.1
	%			
Unemployment rate (Eurostat definition)	4.8	5.2	5.2	5.1
	% of nominal GDP			
Budget				
Budget balance (Maastricht definition)	−1.0	−1.8	−1.9	−1.4
Government debt	63.6	62.7	62.3	61.3

Source: 2004: Eurostat, Statistics Austria; 2005 to 2007: OeNB December 2005 outlook.

[1]) *The outlook was drawn up on the basis of seasonally adjusted and working-day adjusted national accounts data. Therefore, the historical values for 2004 may deviate slightly from the nonadjusted data released by Statistics Austria.*

2 Technical Assumptions

The OeNB contributed this forecast as its input for the Eurosystem's December 2005 staff economic projections for the euro area. The forecast horizon ranges from the fourth quarter of 2005 to the fourth quarter of 2007. November 15, 2005, was the cutoff date for the underlying assumptions on global economic trends and for the technical assumptions on interest rates, exchange rates and crude oil prices. The OeNB used its macroeconomic quarterly model to prepare the projections for Austria.

The seasonally and working-day adjusted national accounts data compiled by the Austrian Institute of Economic Research (WIFO), which are fully available up to the second quarter of 2005, represent the main data source. The historical values for 2004 may, however, deviate slightly from the nonadjusted annual data released by Statistics Austria. Data for the third quarter of 2005 are based on WIFO's flash estimate.

The OeNB's forecast starts from the assumption that the monetary policy framework will remain unchanged. It therefore presupposes constant levels of both short-term nominal interest rates and the nominal effective exchange rate of the euro over the entire forecast horizon. The underlying short-term interest rate (three-month EURIBOR) is based on the two-week average (2.28%) prior to November 10, 2005. Long-term interest rates, which are in tune with market expectations for ten-year government bonds, are forecast to come to 3.41% (2005), 3.59% (2006) and 3.69% (2007). A constant rate of USD/EUR 1.19 is assumed for future USD/EUR exchange rate trends. Oil prices are based on forward rates, which are expected to remain largely unchanged at about USD 60 per barrel (Brent) over the entire forecast horizon. The budget forecast includes only those measures which have been passed and suitably specified upon compilation of the OeNB outlook.

3 Euro Area Economy Strengthens on the Back of Robust Global Activity

3.1 Global Economic Growth Outside the Euro Area Remains Dynamic

After a record performance in 2004, the world economy has retained its robustness. Burgeoning oil prices have hardly affected the real economy and financial markets so far. This may have to do with the circumstance that the most recent price surge was to a goodly extent demand-induced and was thus not as abrupt as earlier oil price shocks. Although growth in the U.S.A. and in China will lose some momentum compared to the powerful rates recorded in 2004, both of these regions are still the most important engines of world economic growth.

Nearly all demand components in the *U.S.A.* are currently advancing at an animated pace. A very low saving ratio and rising real estate prices have kept consumer spending vigorous. Augmenting energy prices, high household debt, the gradual tightening of monetary policy and the end of the real estate price boom, however, pose a considerable risk to consumer spending in the U.S.A. Hence, private consumption is expected to lose strength. Investment activity is still flourishing at the moment, but signs of a cooling of the investment cycle are on the horizon. The output disruptions caused by the two tropical storms in the Gulf of Mexico are likely to be only temporary and in the medium term will probably be more than offset by the demand impulse triggered by the reconstruction

efforts. At least partly because of the hurricanes, the orientation of U.S. fiscal policy will remain expansive whereas a further moderate tightening of monetary policy appears to be in the cards. Consequently, business activity will gradually slow down. Macroeconomic imbalances (the budget and current account deficits) are not likely to be addressed in the near future. The danger of an abrupt depreciation of the U.S. dollar is currently assessed as being low, as central banks in Asia will continue to try to keep their currencies' exchange rate down against the U.S. dollar by purchasing U.S. currency.

In the first half of 2005, economic growth in *Japan* accelerated noticeably and stabilized at a somewhat lower level in the third quarter. Whereas the recovery was driven by exports and expansionary fiscal policy in the past, domestic demand has now become the mainspring of the expansion. With the labor market situation having improved, private consumption has gained speed. Investment activity in Japan is currently being supported by several factors, such as high profitability, restructured corporate balance sheets and favorable financing conditions. While consumer prices are still declining, producer prices have been on the rise in the wake of higher oil and commodity prices and rising wages, which signals the imminent end of deflation.

Growth in *Asia (excluding Japan)* remains extremely dynamic. There is no evidence that activity in the largest economy in the region, *China*, is cooling down. Measures designed to dampen investment did not result in a slowdown of growth. Excess capacity generated by animated investment activities in some sectors represents a serious risk. Private consumer demand is

increasingly gaining importance. Booming exports are entailing large export surpluses. The undervalued renminbi-yuan has appreciated only insignificantly since China abandoned its peg to the U.S. dollar in July 2005 and adopted at managed float currency regime. Therefore, China's external imbalances will hardly change in the short term. Growth in *India* is propelled by healthy domestic demand. A rapidly growing middle class is financing powerful consumer spending. In addition, investment activity, which is bolstered by public infrastructure spending, is powerful.

Growth in the *United Kingdom* will no longer be as strong in 2005 as in the preceding years. Up to now, consumption has benefited from the vibrant real estate market thanks to the flexible mortgage market. But flagging real estate price growth could dampen consumer spending, as could rising interest rates. Investment already lost momentum at the end of 2004. With public debt enlarging, expansionary fiscal policymaking is expected to come to an end. *Switzerland's* GDP contracted marginally at the end of 2004 and recovered a bit in the first half of 2005, fueled above all by booming industrial exports and investment. However, there are no signs of a positive trend reversal on the labor market. Though the economy is projected to firm further, growth will be perceptibly lower in 2005 than in 2004.

In the *new EU Member States,* whose economic situation is particularly important to Austria, stable growth is anticipated throughout the entire forecast horizon. The three largest countries – Poland, the Czech Republic and Hungary, are currently suffering from tepid domestic demand, which is also weakening import demand. Growth is thus based on net exports.

But from 2006, domestic demand is expected to become an important pillar of the economy again. Falling inflation rates and rising employment should support consumer spending growth. Rising investment will go hand in hand with a further increase in foreign demand and good profit developments.

3.2 Euro Area Recovery Gains Momentum

Economic activity in the euro area has improved discernibly so far in 2005. The third-quarter flash estimates which have been released so far confirm the strengthening of activity augured by the confidence indicators. Rising production expectations and improved order books hold out hope that the upward trend will continue over the next months. The depreciation of

the euro and the drop in oil prices since early September 2005 contributed importantly to this development. Euro area growth is projected to come to between 1.2% and 1.6% in 2005. Robust world economic growth and the euro depreciation in 2005 will sustain exports throughout the forecast horizon. In view of the positive development of profits and low financing costs, this external impulse should help reinforce investment. Recent survey results corroborate this expectation. The outlook for private consumption is set to remain subdued. With employment growth moderate and real incomes stagnating, purchasing power gains are likely to be weak. The Eurosystem projects euro area GDP growth to accelerate to between 1.4% and 2.4% in 2006 and 2007.

Table 2

Underlying Global Economic Conditions

	2004	2005	2006	2007
	Annual change in % (real)			
Gross domestic product				
World GDP growth outside the euro area	+5.6	+4.9	+4.8	+4.5
U.S.A.	+4.2	+3.6	+3.5	+3.0
Japan	+2.6	+2.4	+2.1	+2.0
Asia excluding Japan	+7.7	+7.0	+6.8	+6.8
Latin America	+4.7	+4.7	+4.2	+3.9
United Kingdom	+3.2	+1.8	+2.4	+2.6
New EU Member States	+4.6	+4.2	+4.4	+4.4
Switzerland	+2.1	+1.1	+1.7	+1.8
Euro area[1]	+2.1	1.2−1.6	1.4−2.4	1.4−2.4
World trade (imports of goods and services)				
World economy	+9.5	+6.4	+6.7	+6.6
Non-euro area countries	+11.0	+7.6	+7.0	+6.9
Real growth of euro area export markets	+10.3	+7.2	+7.1	+7.1
Real growth of Austrian export markets	+7.8	+6.1	+7.1	+6.6
Prices				
Oil price in USD/barrel (Brent)	38.3	55.0	60.0	59.5
Three-month interest rate in %	2.1	2.2	2.3	2.3
Long-term interest rate in %	4.1	3.4	3.6	3.7
USD/EUR exchange rate	1.24	1.25	1.19	1.19
Nominal effective exchange rate (euro area index)	104.18	103.96	102.09	102.09

Source: Eurosystem.

[1] Results of the Eurosystem's December 2005 projections. The ECB presents the result in ranges based upon average differences between actual outcomes and previous projections.

The recovery of economic activity in *Germany* is likely to be picking up somewhat at this juncture. After powerful first-quarter growth, German economic growth let up slightly in the second quarter of 2005, to accelerate again in the third quarter. The currently available economic indicators point to a favorable development in the fourth quarter of 2005 as well. However, growth remains fully dependent on export performance, which is a problem. While the price competitiveness of Germany's export industry has improved markedly in recent years, the growth impulses of exports have not been able to stimulate domestic demand so far. Diminishing real incomes act as a damper on consumer spending, which is forecast to remain very subdued in 2006. Construction investment is characterized by persistent negative growth; only investment in plant and equipment is now developing positively. With capacity utilization low in many sectors, however, the pace of investment is not expected to be very high. The dramatic budget situation is forcing the government to tighten fiscal policy. Most of the budget austerity measures announced in the new government's coalition agreement, such as the increase in value added taxes, will take effect in 2007 and will depress activity. The observed rise in employment figures reflects the impact of the fourth stage of labor market reform measures (Hartz IV). Unlike the "one-euro jobs" which have been created under the Hartz IV program, jobs subject to social security contributions are on the decline. Macroeconomic growth will stay subdued in Germany throughout the forecast horizon.

Among the euro area members, *France* is the country in which domestic demand is most stable. After growth had been rather weak in the first half of 2005, with consumer spending and investment on the decline, it returned to a robust level in the third quarter of 2005. Rising capacity utilization and mounting profit margins suggest that vigorous investment growth will last. Since 2003, France has been losing export market share, but the decline is expected to be only temporary.

Italy (along with Portugal) will probably post the lowest growth rate among European countries in 2005. Around the turn of the year 2004/2005, exports plummeted, triggering a recession. However, in the second and third quarters of 2005, with exports picking up and domestic demand strengthening, activity recovered again. Nevertheless, structural weakness and the unfavorable development of unit labor cost appear to presage a further loss of market share. Manufacturing and industrial and service sector confidence are sending out positive signals; they hold out hope that the positive development last observed will continue. Investment activity should accelerate perceptibly in 2006. Climbing real estate prices drive construction investment, whereas investment in plant and equipment is bolstered by improving profit margins. Conversely, consumer sentiment is gloomy, with no recovery of consumer spending in view.

4 Austrian Exports Benefit from Improved Unit Labor Cost Position

Real exports of goods and services abroad chalked up 8.4% growth in 2004, a rate that was well above the euro area average. There are several reasons for this favorable performance. First, Austrian exporters have succeeded in significantly improving their price competitiveness in recent years. Examining the cumulated rise in unit labor costs since 1999, Austria, at

+2.5%, posts the lowest increase in the euro area (average: +8.5%). In the comparable period, only Germany performed about as well in terms of unit labor costs (+2.6%).[1] This positive development was fueled by a more moderate wage policy than in other euro area countries and by above-average productivity growth.

Moreover, Austrian companies have scored successes in opening up new markets in Central and Southeastern Europe. These dynamic markets are attracting a widening share of Austria's goods and service exports abroad. Chart 2 clearly shows how the develop-

ment of exports to non-euro area countries offset the slump in exports to the euro area from 2001. Apart from exports to Central and Southeastern Europe, rising sales of goods and services to the U.S.A. play an important role. Throughout the forecast horizon, the growth of exports to markets outside the euro area will surpass that of exports to euro area markets. In 2004 export growth was clearly propelled by the animated development of global economic activity. This benefited Austria's export activity not just directly but also indirectly through exporters' close supply ties to Germany.

Chart 2

Growth of Austrian Euro Area and Non-Euro Area Export Markets

(Weighted import growth of trade partners in % year on year)

Euro area

Non-euro area

Source: Eurosystem.
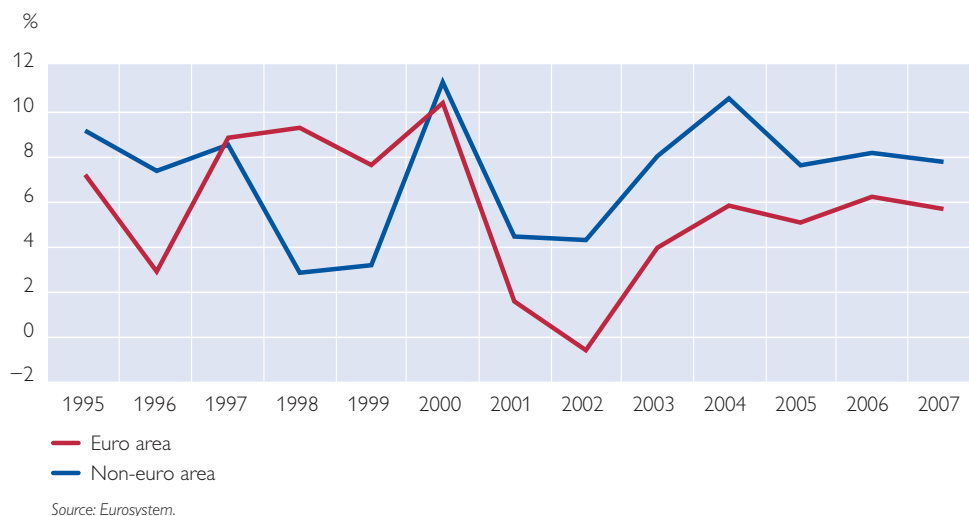
By contrast, the euro appreciation against the U.S. dollar from end-2000 dampened the price competitiveness of Austrian exports. In 2004 alone the

price competitiveness of Austria's export activity diminished by 5.4%.[2] Since the euro peaked at an exchange rate of USD 1.34 per euro in December 2004,

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[1] In fact, Austrian unit labor costs even fell by 2.8% from 1995 to 2004. Germany was the only other country to show sinking labor costs of −1.8% during the same period (Source: AMECO data base of the European Commission).

[2] Price competitiveness on the export side is expressed as the ratio of the prices of competitors on Austrian export markets to the prices of Austrian exports. A two-step weighting procedure is used to establish competitor prices. For each export market, the prices of other exports into the respective country are aggregated using their import shares as weights. In addition, the price of domestic production of the export market is considered. The competitor prices thus determined for each Austrian export market are then aggregated with the shares the respective market has in total Austrian exports.

the euro has lost considerable ground again, easing to USD 1.19 per euro.

However, with export market growth sluggish, Austrian exports sank in the fourth quarter of 2004 and the first quarter of 2005. In the second quarter of 2005, however, export growth picked up strongly and accelerated somewhat further in the third quarter. The full-year 2005 result of +3.2% export growth, though, will show a loss of market share as a consequence of the euro's strength. The more pronounced market expansion and improving price competitiveness should both help push export growth to 6.5% in 2006 and 6.6% in 2007.

Paralleling the development of exports, imports also receded marginally in the fourth quarter of 2004 and the first quarter of 2005. In the second half of 2005, the forecast revival of domestic demand and the firming of export activity are anticipated to boost imports. Import growth is scheduled to come to 1.9% for full-year 2005 before quickening to 6.6% in 2006 and 6.7% in 2007. In all three years, net exports will make a positive contribution to GDP growth. As exports in absolute terms are currently already some 10% higher than imports in absolute terms, net exports are envisaged to contribute positively to GDP growth even if imports and exports advance at the same rate, which they are expected to in 2006 and 2007.

Table 3

Growth and Price Developments in Austria's External Trade

	2003	2004	2005	2006	2007
	Annual change in %				
Exports					
Competitor prices in Austria's export markets	−5.6	−0.3	+3.5	+3.7	+1.5
Export deflator	+3.0	−0.6	+1.8	+1.8	+1.7
Changes in price competitiveness	−8.5	+0.3	+1.7	+1.9	−0.2
Import demand in Austria's export markets (real)	+5.6	+7.8	+6.1	+7.1	+6.6
Austrian exports of goods and services (real)	+2.7	+8.4	+3.2	+6.5	+6.6
Market share	−2.9	+0.6	−3.0	−0.5	+0.1
Imports					
International competitor prices in the Austrian market	−3.6	+0.2	+3.6	+3.2	+1.4
Import deflator	+0.3	+0.6	+3.3	+2.0	+1.5
Austrian imports of goods and services (real)	+4.5	+6.0	+1.9	+6.6	+6.7
Terms of trade	+2.7	−1.2	−1.5	−0.2	+0.2
	Percentage points of real GDP				
Contribution of net exports to GDP growth	−0.7	+1.4	+0.7	+0.3	+0.3

Source: 2003 and 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook, Eurosystem.

Surging oil prices in 2005 have caused the terms of trade to deteriorate massively, which acts as a damper on the nominal trade balance. The oil price shock becomes especially visible in the trade balance with countries outside the euro area, which worsened by 0.5 percentage point of GDP in 2005. Moderate import growth is anticipated to result in an improvement of the balance of trade with euro area countries, though. Overnight stays by visitors from abroad have been developing well in 2005 so far, despite the listless summer results in the wake of bad weather. The trend to higher-quality tourism has further lifted turnover. Balance of payments data show an 8%

decline in incoming tourism in the first half of 2005, which is thought to be attributable to data problems rather than reflecting actual developments. The trade surplus will contract from 2.0% of GDP in 2004 to 1.8% in 2005, but is expected to enlarge to 2.1% in 2006 and further to 2.2% in 2007.

Table 4

Austria's Current Account

	2003	2004	2005	2006	2007
	% of nominal GDP				
Balance of trade	1.2	2.0	1.8	2.1	2.2
Balance on goods	0.4	1.1	0.9	1.1	1.2
Balance on services	0.7	0.9	0.8	1.0	1.0
Euro area	−4.3	−5.1	−4.7	−4.7	−4.7
Non-euro area countries	5.5	7.0	6.5	6.8	6.9
Balance on income	−0.5	−0.8	−0.8	−0.7	−0.7
Balance on current transfers	−0.9	−0.9	−0.9	−0.9	−0.9
Current account	−0.2	0.2	0.1	0.4	0.7

Source: 2003 and 2004: OeNB; 2005 to 2007: OeNB December 2005 outlook.

The balance on income in the first half of 2005 was unchanged from the year-earlier result. No major change is expected to occur in the second half, either, so the outcome for 2005 as a whole is reckoned to be the same as in 2004, namely a deficit of 0.8% of GDP. With outward foreign direct investments maturing, the deficit on incomes is due to decrease somewhat in the next few years. The deficit on current transfers is likely to remain at 0.9% of GDP, the amount it has posted since 2002, through 2007. The current account balance will improve slightly over the forecast horizon and will close at 0.7% of GDP in 2007.

5 Oil Price Surge Still Not Expected to Have Major Second-Round Effects

Inflation as measured by the HICP declined successively from 2.4% in January 2005 to 2.0% in October. Inflation is projected to hover around or just above the 2% mark in the next few months. The rate of price increases is not expected to fall perceptibly below 2% until sometime during the course of the second half of 2006. This outlook is based on the assumption that the oil price rise will still not have any significant second-round effects on wages and prices.

The further course of inflation during the forecast horizon will fundamentally hinge on the developments of the subcomponents energy and services. The very flat course of the forward rates for oil demonstrate how strong the market's conviction has become that oil prices will remain high over the long term. Accordingly, the energy subcomponent of the HICP will still post inflation in the double digit range in the first half of 2006; only in 2007, will it cease to contribute significantly to overall inflation.

The easing of price pressure observed in the service sector since the beginning of 2005 is projected to last throughout the upcoming months. Inflation for housing rentals, which had still come to 10% in January 2005, plunged to 0.5% in October and should remain moderate in the next few months.

Intense competition among package holiday providers and in the telecommunications sector has resulted

Table 5

Price and Cost Indicators for Austria

	2004	2005	2006	2007
	Annual change in %			
Harmonised Index of Consumer Prices (HICP)	+2.0	+2.2	+1.9	+1.7
HICP energy	+6.9	+10.4	+6.5	−0.7
HICP excluding energy	+1.6	+1.5	+1.5	+1.9
Private consumption expenditure (PCE) deflator	+1.9	+2.0	+1.9	+1.8
Investment deflator	+0.1	+1.6	+1.5	+1.5
Import deflator	+0.6	+3.3	+2.0	+1.5
Export deflator	−0.6	+1.8	+1.8	+1.7
Terms of trade	−1.2	−1.5	−0.2	+0.2
GDP deflator	+2.0	+2.3	+1.6	+1.7
Unit labor costs	−0.3	+0.8	+1.0	+0.9
Compensation per employee	+2.1	+2.3	+2.6	+2.5
Labor productivity	+2.4	+1.4	+1.6	+1.5
Collectively agreed wage settlements	+2.1	+2.3	+2.8	+2.6
Profit margins[1]	+2.3	+1.4	+0.6	+0.8

Source: 2004: Eurostat, Statistics Austria; 2005 to 2007: OeNB December 2005 outlook.

[1] GDP deflator divided by unit labor costs.

in price cuts. By contrast, housing costs (operating and energy costs) are supposed to climb at an above-average rate in the near future. Prices in the subcategory industrial goods excluding energy have dropped in the course of 2005. With unit labor costs for industrial products developing favorably, prices for industrial goods are anticipated to stay moderate.

Overall, the OeNB expects that inflation as measured by the HICP will quicken to 2.2% in 2005 and will ease back to 1.9% in 2006 and will sink further to 1.7% in 2007. The fall wage negotiations have been concluded for very few sectors as yet. The settlements which have been concluded to date suggest that gains in the compensation of employees in 2006 will be a bit above the 2005 raises. The relatively high settlement for the metal industry (3.1% following 2.5% achieved in fall 2004) may be partly attributable to industry-specific factors, such as extraordinary profit developments and high productivity gains. In recent years, wage settlements for the retail trade

sector (+2.65% for 2006) have usually been below average. Hence, overall standard wages are expected to go up by 2.8% in 2006. This assumption represents an upward revision by +0.3 percentage point compared to the last OeNB outlook of June 2005. Standard wage increases are reckoned to slow to 2.6% in 2007 in tandem with the forecast decline in inflation.

Real compensation per employee, which advanced by just 0.2% in 2004, will nearly stagnate in 2005 as well (+0.3%) and is anticipated to accelerate slightly from 2006. With conditions on the labor market tight, wage growth will lag substantially behind productivity growth, however.

Higher oil prices will entail another pronounced deterioration of the terms of trade in 2005, but their negative impact is set to peter out in 2006. Unit labor costs diminished in 2004 and are calculated to augment by just under 1% a year from 2005 through 2007, with this rise attributable to lower productivity growth on account of the faster increase in employment. The ex-

pansion of corporate profit margins will let up somewhat over the forecast horizon but will remain positive. Profit margins had last declined perceptibly in 1993.

6 Domestic Demand Gradually Gains Strength in the Course of 2005

6.1 Quickening Pace of Consumer Spending Signals an End to the Rise of the Saving Ratio

Private consumption growth has persisted substantially below its long-term average since the economic downturn in 2001. Households increased their real spending by a mere 0.9% a year on average from 2001 to 2004, over 1.5 percentage points less than from 1997 to 2000. In the course of 2005, growth so far has accelerated step by step. Apparently, after a delay consumers are now beginning to spend income gains from the second stage of the tax reform. The dampening impulses emanating from the high energy prices and uncertainties (e.g. about jobs) are slowly receding. Cautious optimism characterizes the assessment of the future trend of consumer spending. In the upcoming quarters, private con-

sumption is projected to mount by around 0.5% a quarter. Despite the acceleration in the second half of 2005, consumption growth in 2005 as a whole will be only marginally higher than in 2004, coming to just +1.3% on account of the weak performance up to now.

Annual payroll employment growth over the entire forecast horizon is expected to remain stable at roughly 1%. This and the faster rise in wage settlements than expected in the June 2005 outlook will reinforce the compensation of employees in 2006 and 2007. The negative impact of higher inflation on households' real purchasing power will last into 2006. Not until the repercussions of the increase in oil prices on inflation cease will real wages begin to rise perceptibly again in the course of 2006. The further outlook for consumer spending in the period covered by this forecast will be determined by two other factors as well – the rise in mixed income of the self-employed and property income, and the development of consumer confidence. The income of the self-employed is anticipated to parallel the stable course of operating surpluses

Table 6

Determinants of Nominal Household Income in Austria

	2004	2005	2006	2007
	Annual change in %			
Compensation of employees	+2.6	+3.3	+3.5	+3.5
Employees	+0.5	+1.1	+0.9	+1.1
Wages per employee	+2.1	+2.3	+2.6	+2.5
Mixed income (net) of the self-employed and property income	+7.5	+5.5	+5.0	+4.5
Net transfers minus direct taxes[1]	−6.2	+1.9	−3.8	−5.7
	Contribution to disposable household income in percentage points			
Compensation of employees	+2.1	+2.7	+2.8	+2.8
Mixed income (net) of the self-employed and property income	+2.3	+1.8	+1.6	+1.5
Net transfers minus direct taxes[1]	−0.8	+0.2	−0.5	−0.7
Disposable household income (nominal)	+3.7	+4.7	+3.9	+3.6

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.
[1] Negative values indicate an increase in (negative) net transfers minus direct taxes, positive values indicate a decrease.

throughout the forecast period. Property incomes are calculated to climb fairly strongly once again in 2005 in view of bullish domestic and international financial markets and then to subside to average growth rates in 2006 and 2007. Overall, the contributions of mixed income to household disposable income will decline marginally but still remain quite strong (see box "Sharp Rise in Property Income in 2003 and 2004").

Sharp Rise in Property Income in 2003 and 2004

In 2003 and 2004 the saving ratio enlarged by a total of 1.3 percentage points. An important reason for this rise must be seen in the composition of household income. Whereas net property income – which accrues mainly to the population groups with a high propensity to save – accounted for less than 14% of household disposable income in 2003 and 2004, it contributed to more than two-thirds of the growth of household disposable income in this period (see chart in this box). Conversely, the increase in real compensation of employees remained disappointing because real wage growth and employment growth were weak.

Property income breaks down into interest payments (share in total property income in 2004: 16%), distributed income of corporations (70%) and property income attributed to insurance policyholders (14%). The surge in distributed income of corporations as well as property income attributed to insurance policyholders is responsible for the rise in property income in 2003 and 2004. The favorable development of corporate profits and the recovery in the Austrian and international financial markets are likely to have played a crucial role in this result. By contrast, interest payments diminished, as interest rates were low.

Several factors in addition to the composition of household income appear to have been instrumental in pushing up the saving ratio. For example, the distribution of labor income has become more unequal over the past few years (Guger and Marterbauer, 2005). As the marginal propensity to consume falls with declining incomes, this labor income development has a negative impact on consumer spending growth. But high unemployment and the greater fear of job losses in the wake of growing globalization also seem to have lifted consumers' saving ratio. Finally, the necessary structural reforms which were implemented recently and depressed consumer confidence also put a damper on consumer spending (Janger et al., 2005).

Contribution to Real Disposable Household Income
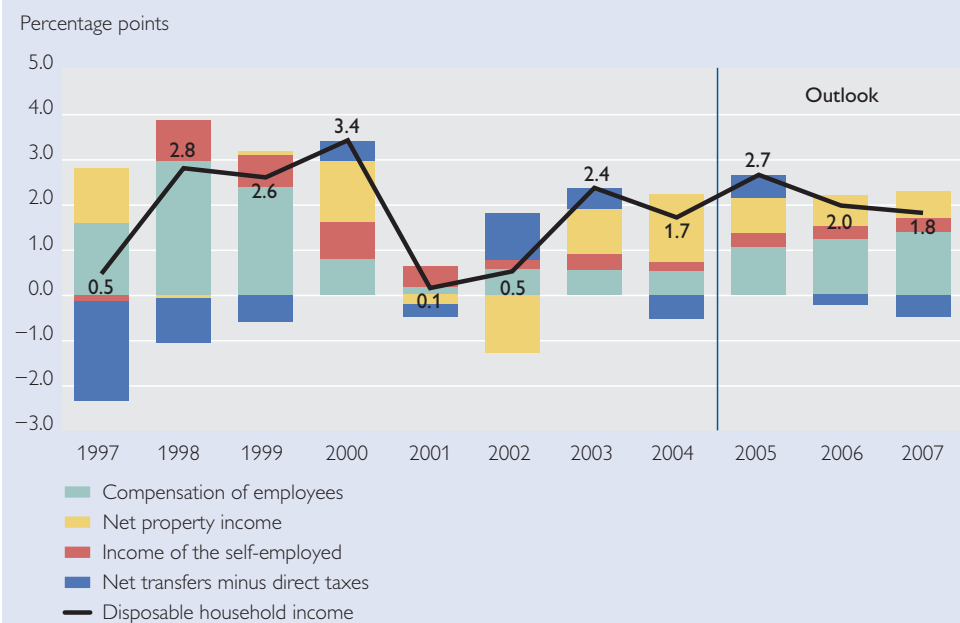
Percentage points

Source: Statistics Austria; 2005 to 2007: OeNB December 2005 outlook.

Net transfers minus direct taxes will contribute a total of 0.2 percentage point to households' real disposable income growth in 2005, reflecting the impact of the second stage of tax reform. However, in 2006 and 2007, this component will dampen income growth again, as it usually does. Consumer confidence, which is still in the doldrums, should pick up gradually when the economic framework improves. Consumer spending is projected to climb to 1.9% in 2006 and to 2.1% in 2007.

Table 7

Private Consumption in Austria

	2004	2005	2006	2007
	Annual change in %			
Disposable household income (nominal)	+3.7	+4.7	+3.9	+3.6
Private consumption expenditure (PCE) deflator	+1.9	+2.0	+1.9	+1.8
Disposable household income (real)	+1.7	+2.7	+2.0	+1.8
Private consumption (real)	+0.9	+1.3	+1.9	+2.1
	% of nominal disposable household income			
Saving ratio	9.0	10.2	10.4	10.3

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.

With household incomes making headway and consumer growth still hesitant, the saving ratio probably rose noticeably again in the first half of 2005. Although no official data on the saving ratio have become available yet, the results of the financial accounts on households' net financial investment support this assumption.[3] Seeing that households' disposable incomes will rise by 2.7% in real terms in full-year 2005, the saving ratio is expected to go up by 1.2 percentage points to 10.2% and to hover at about that level in 2006 and 2007.

6.2 Temporary Dip in Investment Growth in the First Half of 2005

The financial accounts data are revised frequently and sometimes substantially when new data become available. Demand-side GDP components, above all investment, have been subject to es-pecially pronounced revision in the recent past. According to the latest financial accounts data, gross fixed capital formation growth amounted to 1.8% in real terms in 2004, 3.0 percentage points below the figure officially given when the OeNB outlook was compiled in June 2005. The tepid growth of gross fixed capital formation in 2004 comes as a surprise, as companies had been expected to invest heavily in 2004 to take advantage of the temporary investment subsidy before it expired at the end of 2004. However, the specific features of the investment growth subsidy appear to have prompted many business startups that the statistics could not appropriately register. The surge in machinery and transport equipment imports, above all in the second half of 2004 (+19% year on year), corroborates suspected underrepresentation of investment in 2004 in the statistics.

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[3] According to the financial accounts, households' net financial investment came to EUR 7.6 billion in the first six months of 2005 as compared to an average of EUR 4.6 billion in the comparable periods of the years 2001 through 2004.

Table 8

Investment Activity in Austria

	2004	2005	2006	2007
	Annual change in %			
Total gross fixed capital formation (real)	+1.8	+0.9	+3.2	+2.8
of which: Investment in plant and equipment (real)	+1.4	−1.7	+4.4	+3.9
Residential construction investment (real)	−0.3	+0.2	+1.4	+1.5
Nonresidential construction investment and other investment	+1.1	+1.5	+3.1	+2.3
Government investment (real)	−8.8	+9.3	+3.4	−1.8
Private investment (real)	+2.4	+0.5	+3.2	+3.1
	Contribution to total gross fixed capital formation growth in percentage points			
Investment in plant and equipment (real)	+0.6	−0.7	+1.8	+1.6
Residential construction investment (real)	−0.1	+0.0	+0.3	+0.3
Nonresidential construction investment and other investment	+0.4	+0.6	+1.2	+0.9
Government investment (real)	−0.5	+0.5	+0.2	−0.1
Private investment (real)	+2.3	+0.5	+3.0	+2.9
	Contribution to real GDP growth in percentage points			
Inventory changes (real)	−0.2	+0.0	+0.1	+0.0

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.

In the first half of 2005, investment growth weakened in the wake of the expiration of the investment subsidy at the end of 2004, but not as much as originally expected. Both the decline in imports of machinery and transport equipment in the first half of 2005 (−5% year on year) and the lackluster expansion of corporate loans along with unusually low corporate borrowing requirements according to financial accounts data confirm the reduced rate of corporate investment in this period.

The outlook for investment is based on the assumption that the temporary dampening caused by the expiration of the investment subsidy is limited to the first three quarters of 2005 and that investment will recover noticeably thereafter. The slight revival of machinery and transport equipment imports from mid-2005 and the steady improvement in business confidence are first evidence that this assumption holds. Even though investment growth is scheduled to accelerate in the fourth quarter, it should amount to only 0.9% for 2005 as a whole as a result of the weak performance of gross fixed capital formation up to now.

In 2006 and 2007, good corporate profit developments will have a positive impact on investment activity. The enlargement of companies' profit margins measured as the difference between unit labor cost growth rates and the GDP deflator has steadily gained ground since 1994. Assuming that wage increases will remain moderate, this trend should continue throughout the forecast horizon. Additionally, the exceptionally good financing conditions compared to the past and the lively export activity should bolster investment. Moreover, the government's economic stimulus packages ("Reform dialogue for growth and employment," May 2005; "Regional employment and growth campaign 2005–2006," August 2005 and "Qualification campaign and introduction of a combination wage," September 2005) are expected to provide an important demand impetus.

Capacity utilization, by contrast, is likely to dampen companies' investment enthusiasm; it was assessed more and more pessimistically in the course of 2005 and currently stands just below the long-term average. Consequently, the OeNB is counting on a recovery of investment activity in 2006 and 2007, but the investment cycle is not expected to be very pronounced. Investment growth is set to quicken to 3.2% in 2006 and 2.8% in 2007. The investment ratio will drop to 21.2% in 2005, the lowest value since 1984, and will revive only marginally in 2006 and 2007.

Investment in plant and equipment, the investment category which is most sensitive to cyclical changes, is especially hard hit by the termination of the investment subsidy and will contract by 1.7% in 2005; it will expand faster than the other categories in 2006 and 2007, though. The outlook for residential construction investment remains cautiously optimistic. After decreasing for eight consecutive years, they should post slightly positive growth again in 2005. Civil engineering construction investment is to benefit from more animated public sector demand over the entire forecast horizon.

6.3 Labor Market Ambivalence Continues: Unemployment Remains Persistently High despite Record Employment

The fairly powerful revival of economic activity in 2004 had repercussions on the labor market, albeit with a certain time lag. The growth of seasonally and working-day adjusted payroll employment is likely to speed up from 0.5% in 2004 according to national accounts data to 1.1% in 2005. However, the number of hours worked is anticipated to grow more slowly than employment, because part-time jobs and flexible working arrangements are on the rise. The disproportionately strong increase in female employment and service-sector employment confirms that the different growth rates can be traced to the rise in part-time and flexible jobs. The ongoing increase in the number of reported vacancies – a good leading indicator of labor market trends – signals that upcoming employment developments will be stable. Payroll employment growth will hover at roughly 1% in 2006 and 2007. Public sector employment is envisaged to sink a bit in 2005 and 2006 and to edge up in 2007. Self-employment according to national accounts data will fall further

Table 9

Labor Market Developments in Austria

	2004	2005	2006	2007
Annual change in %				
Total employment	+0.0	+0.4	+0.7	+0.8
of which:				
Payroll employment	+0.5	+1.1	+0.9	+1.1
Self-employment	−1.8	−2.1	−0.2	−0.4
Public sector employment	−0.4	−0.3	−0.1	+0.1
Registered unemployment	+1.9	+1.0	+0.7	−1.3
Labor supply	+0.1	+0.5	+0.7	+0.7
%				
Unemployment rate (Eurostat definition)	4.8	5.2	5.2	5.1

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.

as a result of the decline in agricultural self-employment.

Conditions on the labor market are not expected to ease during the period covered by the outlook, even though new jobs will be created. The jobless rate will climb to 5.2% in 2005 as a consequence of the higher-than-average rise in labor supply, will stay at this level in 2006 and will fall back to 5.1% in 2007. Three factors will determine the development of labor supply in the future: First, demographic changes will cause an additional rise in labor supply in particular in 2007. Second, the influx of labor from abroad is supposed to remain marked throughout the forecast horizon. Third, a continuously growing number of older persons will remain part of the labor force as a result of the pension reforms implemented in 2000 and 2003. Considering that the jobless rate is persevering at a high level, a cyclical increase in labor supply will not play a role, however.

7 Cyclical Risks Are Largely Balanced

The further development of oil prices, which will remain highly volatile and will attract a considerable risk premium, still represents the main risk to economic activity. Low spare production capacities and refineries' high capacity utilization make it likely for prices to be hiked additionally if new shocks hit the market (supply shortfalls or a sharp surge in demand).

Apart from the future course of oil prices, an abrupt correction of the high U.S. current account deficit represents a forecast risk. Such a correction would be linked to a corresponding de-cline in the U.S. dollar's exchange rate, which would be a severe blow to the competitiveness of European exports. The probability of such a scenario occurring, however, is currently assessed as being low, considering that Asian central banks continue to support the U.S. dollar by purchases. While the euro area's economic activity has firmed somewhat, the further development of domestic demand remains a downside risk. In view of the upcoming consolidation phase in Germany, further developments there are also subject to considerable risk. The comprehensive consolidation package will sap the German economy's strength, above all in 2007. The increase in value added tax and in pension insurance contributions (net of the reduction in unemployment insurance contributions) in 2007 will dampen German consumer spending by roughly 1% in the same year. By contrast, the frontloading of purchases is expected to trigger a marginal pickup in economic activity in the second half of 2006. German cyclical developments will add +0.02 percentage point to Austrian GDP growth in 2006 and reduce it by –0.1 percentage point in 2007, an effect which could not be taken into consideration and which thus represents a risk to the outlook.

Upward risks marginally predominate for the domestic demand components. Within the baseline scenario, the OeNB assumes that the wage moderation approach followed in the past will be maintained throughout the forecast horizon. However, considering that the wage ratio has steadily declined since 1994,[4] wage settlements may be higher in the future than cur-

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[4] The wage ratio (compensation of employees and employers' contributions in percent of GDP) contracted from 54.2% in 1993 to 49.2% in 2004, a decline by over 4 percentage points.

rently assumed and may therefore trigger short-term Keynesian demand impulses. If the reduction of corporate taxes, the introduction of group taxation and the government's economic stimulus packages cause investment to revive more strongly than assumed in the forecast, this also represents a slight upward risk for GDP growth. The consumption forecast is surrounded by a particularly high degree of uncertainty. On the one hand, the burgeoning of the saving ratio observed in the past few years provides scope for a more robust recovery of consumer spending, on the other hand precautionary savings related to consumers' concerns about economic prospects may rise.

Overall, the risks to the forecast appear to be slightly on the downside in the short run and largely balanced in the medium term.

8 Growth Prospects Virtually Unchanged from June 2005 Outlook

Oil prices represent the only substantial change in external conditions by comparison to the June 2005 outlook. The assumptions of oil prices per barrel of Brent for the outlook for 2005 through 2007 are USD 4.4, USD 9.3 and USD 10.5 higher. The higher oil prices are reflected in the greater cost of goods of competitors on Austria's export and import markets. As expected, demand on Austrian export markets cooled off only temporarily at the beginning of 2005 and will remain animated throughout the entire forecast horizon. The forecast assumptions about economic growth outside the euro area are unchanged from June 2005, and the exchange rate declined marginally. Financing costs as measured by long-term interest rates decreased by 16 basis points to 37 basis points compared to the June 2005 outlook.

Table 10

Change in the Underlying Global Environment since the June 2005 Outlook

	December 2005			June 2005			Difference		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
Annual change in %									
Growth of Austria's export markets	+6.1	+7.1	+6.6	+5.7	+6.9	+6.8	+0.4	+0.2	−0.2
Competitor prices in Austria's export markets	+3.5	+3.7	+1.5	+1.5	+2.0	+1.5	+2.0	+1.7	+0.0
Competitor prices in Austria's import markets	+3.6	+3.2	+1.4	+1.9	+1.8	+1.5	+1.7	+1.4	−0.0
USD									
Oil price per barrel (Brent)	55.0	60.0	59.5	50.6	50.7	49.0	+4.4	+9.3	+10.5
Annual change in %									
Nominal effective exchange rate (exports)	−0.0	+0.6	+0.0	−0.5	+0.2	+0.0	+0.5	+0.4	+0.0
Nominal effective exchange rate (imports)	−0.1	+0.2	+0.0	−0.3	+0.1	+0.0	+0.2	+0.2	+0.0
%									
Three-month interest rate	2.2	2.3	2.3	2.1	2.1	2.1	+0.0	+0.2	+0.2
Long-term interest rate	3.4	3.6	3.7	3.6	3.8	4.1	−0.2	−0.2	−0.4
Annual change in %									
U.S. GDP (real)	+3.6	+3.5	+3.0	+3.4	+3.2	+3.1	+0.2	+0.3	−0.1
USD/EUR									
USD/EUR exchange rate	1.25	1.19	1.19	1.29	1.29	1.29	−0.05	−0.09	−0.09

Source: Eurosystem.

Table 11 lists the reasons for the revisions of the outlook for Austria in detail. Apart from the impact of changed external assumptions, the impact of new data and a residual explain the revisions. The effect of new data covers the impact of revisions of historical data which had already been released for the last forecast and the forecasting error of the last forecast for the newly released quarterly data. The effects of the new external assumptions were simulated using the OeNB's macroeconomic model. The simulation showed that the stronger growth of world trade, lower long-term interest rates and the depreciation of the euro more than offset the dampening effect of higher oil prices. All in all, changes in external conditions result in a GDP rise of about 0.1% a year; the remainder of the change is due to a shift in experts' assessments about the development of domestic factors, such as government consumption or wage settlements.

Table 11

Breakdown of Forecast Revisions

	GDP			HICP		
	2005	2006	2007	2005	2006	2007
	Annual change in %					
December 2005 outlook	+1.9	+2.3	+2.3	+2.2	+1.9	+1.7
June 2005 outlook	+2.0	+2.2	+2.2	+2.3	+1.7	+1.6
Difference	−0.1	+0.1	+0.1	−0.1	+0.2	+0.1
Due to:						
New data[1]	−0.1	+0.0	+0.0	−0.1	+0.0	+0.0
Revision of historical data	+0.1	−0.0	−0.0	+0.0	+0.0	+0.0
Projection errors	−0.2	+0.0	+0.0	−0.1	+0.0	−0.0
External assumptions	+0.1	+0.1	+0.1	+0.1	+0.2	+0.2
Other[2]	−0.1	+0.0	−0.0	−0.1	−0.0	−0.0

Source: OeNB June and December 2005 outlooks.
[1] Effect of revised historical data and new data (forecasting error).
[2] Different assumptions about trends in domestic variables such as wages, government consumption, effects of tax measures, other rating changes and model changes.

The deterioration of growth prospects for Austria in 2005 (−0.1 percentage point) is attributable mainly to the unexpectedly languid growth in the first quarter of 2005. By contrast, growth in the second and third quarters was in line with the June 2005 outlook values; moreover, the further course of economic growth was revised only minimally. In both 2006 and 2007, growth is expected to be 0.1 percentage point higher than envisaged in the June outlook. The composition of growth, though, has changed more strongly compared to the June outlook. Now, forecasters expect net exports to make a somewhat stronger contribution. Also, the development of government consumption and from 2006 investment activity is assessed more optimistically. The estimate of the growth of household consumption, though, is somewhat more cautious than given in the last OeNB outlook. With consumer spending remaining subdued at the beginning of 2005 and consumer confidence persistently low, consumer spending is now seen to recover at a slower pace than was anticipated in the June outlook. Prompted by the rise in energy prices, the forecasters revised upward inflation expectations for 2006 by 0.2 percentage point.

8.1 Comparison with Other Forecasts

The available forecasts of Austria's economic development until 2007 do not differ markedly from the OeNB outlook. At 2.3%, the OeNB figure for economic growth in 2006 is at the upper limit among forecasts. Along with economic indicators showing the improvement of cyclical developments, the outlook relied on the flash estimates for the third quarter of 2005, which were available in time for the completion of the outlook on November 21, 2005.

Table 12

Comparison of Current Economic Forecasts for Austria

Indicator	OeNB			WIFO		IHS		OECD			IMF		European Commission		
	Dec. 2005			Sep. 2005		Sep. 2005		Nov. 2005			Sep. 2005		Nov. 2005		
	2005	2006	2007	2005	2006	2005	2006	2005	2006	2007	2005	2006	2005	2006	2007
	Annual change in %														
Key results															
GDP (real)	+1.9	+2.3	+2.3	+1.7	+1.8	+1.8	+2.1	+1.8	+2.1	+2.3	+1.9	+2.2	+1.7	+1.9	+2.2
Private consumption (real)	+1.3	+1.9	+2.1	+1.4	+1.7	+1.7	+1.9	+1.2	+1.7	+1.9	×	×	+1.2	+1.6	+2.0
Government consumption (real)	+1.2	+1.2	+1.5	+0.6	+0.0	+0.8	+0.8	+1.1	+1.2	+1.3	×	×	+1.0	+1.0	+0.9
Gross fixed capital formation (real)[1]	+0.9	+3.2	+2.8	+0.4	+2.4	+2.1	+3.2	+0.9	+2.8	+3.8	×	×	+0.5	+2.5	+2.9
Exports (real)	+3.2	+6.5	+6.6	+3.4	+4.3	+4.7	+5.7	+2.5	+6.3	+7.8	×	×	+3.9	+5.2	+5.0
Imports (real)	+1.9	+6.6	+6.7	+1.8	+3.9	+4.4	+5.6	+1.8	+6.0	+7.8	×	×	+2.0	+5.2	+5.0
GDP per employee	+1.4	+1.6	+1.5	+1.2	+1.1	+0.8	+1.2	×	×	×	×	×	+1.3	+1.3	+1.6
GDP deflator	+2.3	+1.6	+1.7	+1.8	+1.8	+1.8	+1.7	+2.2	+1.5	+1.4	+1.8	+1.8	+1.6	+1.4	+1.3
CPI	×	×	×	+2.4	+2.1	+2.4	+1.9	×	×	×	+2.0	+1.8	×	×	×
HICP	+2.2	+1.9	+1.7	+2.3	+2.0	×	×	+2.2	+1.8	+1.4	×	×	+2.2	+2.1	+1.7
Unit labor costs	+0.8	+1.0	+0.9	+1.1	+1.6	×	×	×	×	×	×	×	+0.9	+1.4	+0.7
Payroll employment	+0.4	+0.7	+0.8	+0.9	+0.9	+1.0	+0.9	×	×	×	×	×	+0.4	+0.6	+0.6
	%														
Unemployment rate[2]	5.2	5.2	5.1	5.1	5.1	5.1	5.1	5.8	5.8	5.7	5.0	4.7	5.0	5.0	5.1
	% of nominal GDP														
Current account	0.1	0.4	0.7	0.5	0.4	0.1	−0.4	−0.4	−0.1	0.3	0.0	−0.3	0.8	0.6	0.6
Government surplus/deficit	−1.8	−1.9	−1.4	−1.9	−2.0	−1.9	−1.8	−2.0	−2.0	−1.5	−2.0	−1.8	−1.9	−1.8	−1.4
External assumptions															
Oil price in USD/barrel (Brent)	55.0	60.0	59.5	58.0	62.0	56.0	62.0	58.0	54.5	51.0	54.2	61.8	55.0	61.4	60.3
Short-term interest rate in %	2.2	2.3	2.3	2.1	1.8	2.1	2.3	2.2	2.2	2.9	2.1	2.4	×	×	×
USD/EUR exchange rate	1.25	1.19	1.19	1.25	1.21	1.25	1.23	1.19	1.19	1.19	1.25	1.21	1.25	1.21	1.22
	Annual change in %														
Euro area GDP (real)	1.2−1.6	1.4−2.4	1.4−2.4	−1.3	−1.4	−1.3	−1.8	+1.4	+2.1	+2.2	−1.2	−1.8	−1.3	−1.9	−2.1
U.S. GDP (real)	+3.6	+3.5	+3.0	+3.3	+3.3	+3.3	+3.0	+3.6	+3.5	+3.3	+3.5	+3.3	+3.5	+3.2	+2.7
World GDP (real)	+4.4	+4.3	+4.1	×	×	×	×	×	×	×	+4.3	+4.3	+4.3	+4.3	+4.2
World trade	+6.4	+6.7	+6.6	+6.7	+7.0	+10.0	+6.0	+7.3	+9.1	+9.2	+7.0	+7.4	+6.9	+7.4	+7.3

Source: OeNB, WIFO, IHS, OECD, IMF, European Commission.
[1] For IHS: Gross investment.
[2] Eurostat definition; for OECD: OECD definition.

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Annex
Detailed Result Tables

Table 13

Demand Components (Real Prices)

Chained volume data (reference year = 2000)

	2004	2005	2006	2007	2004	2005	2006	2007
	EUR million				Annual change in %			
Private consumption	124,119	125,713	128,099	130,750	+0.9	+1.3	+1.9	+2.1
Government consumption	39,700	40,175	40,657	41,267	+1.0	+1.2	+1.2	+1.5
Gross fixed capital formation	47,614	48,058	49,599	50,991	+1.8	+0.9	+3.2	+2.8
of which: Investment in plant and equipment	19,868	19,523	20,378	21,174	+1.4	−1.7	+4.4	+3.9
Residential construction investment	9,498	9,514	9,648	9,791	−0.3	+0.2	+1.4	+1.5
Investment in other construction	18,688	18,969	19,552	20,004	+1.1	+1.5	+3.1	+2.3
Changes in inventories (including statistical discrepancy)	1,887	1,886	2,036	2,033	×	×	×	×
Domestic demand	213,320	215,833	220,391	225,041	+1.0	+1.2	+2.1	+2.1
Exports of goods and services	118,065	121,795	129,766	138,363	+8.4	+3.2	+6.5	+6.6
Imports of goods and services	108,801	110,921	118,281	126,204	+6.0	+1.9	+6.6	+6.7
Net exports	9,264	10,874	11,484	12,159	×	×	×	×
Gross domestic product	222,583	226,707	231,876	237,200	+2.4	+1.9	+2.3	+2.3

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.

Table 14

Demand Components (Current Prices)

	2004	2005	2006	2007	2004	2005	2006	2007
	EUR million				Annual change in %			
Private consumption	132,088	136,467	141,747	147,216	+2.9	+3.3	+3.9	+3.9
Government consumption	42,315	43,533	44,885	46,394	+3.0	+2.9	+3.1	+3.4
Gross fixed capital formation	49,516	50,764	53,177	55,490	+1.9	+2.5	+4.8	+4.3
Changes in inventories (including statistical discrepancy)	159	2,874	2,667	2,324	×	×	×	×
Domestic demand	224,078	233,639	242,476	251,424	+3.8	+4.3	+3.8	+3.7
Exports of goods and services	121,467	127,532	138,382	150,078	+7.7	+5.0	+8.5	+8.5
Imports of goods and services	108,602	114,383	124,398	134,708	+6.6	+5.3	+8.8	+8.3
Net exports	12,865	13,149	13,984	15,370	×	×	×	×
Gross domestic product	236,942	246,788	256,460	266,794	+4.5	+4.2	+3.9	+4.0

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.

Table 15

Deflators of Demand Components

	2004	2005	2006	2007	2004	2005	2006	2007
	2000 = 100				Annual change in %			
Private consumption	106.4	108.6	110.7	112.6	+1.9	+2.0	+1.9	+1.8
Government consumption	106.6	108.4	110.4	112.4	+2.0	+1.7	+1.9	+1.8
Gross fixed capital formation	104.0	105.6	107.2	108.8	+0.1	+1.6	+1.5	+1.5
Domestic demand (excluding changes in inventories)	105.9	107.9	109.8	111.7	+1.5	+1.8	+1.8	+1.7
Exports of goods and services	102.9	104.7	106.6	108.5	−0.6	+1.8	+1.8	+1.7
Imports of goods and services	99.8	103.1	105.2	106.7	+0.6	+3.3	+2.0	+1.5
Terms of trade	103.1	101.6	101.4	101.6	−1.2	−1.5	−0.2	+0.2
Gross domestic product	106.4	108.9	110.6	112.5	+2.0	+2.3	+1.6	+1.7

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.

Table 16

Labor Market

	2004	2005	2006	2007	2004	2005	2006	2007
	1,000				Annual change in %			
Total employment	4,145.3	4,162.7	4,192.4	4,224.8	+0.0	+0.4	+0.7	+0.8
of which: Private sector employment	*3,670.2*	*3,689.4*	*3,719.5*	*3,751.2*	*+0.1*	*+0.5*	*+0.8*	*+0.9*
Payroll employment (national accounts definition)	3,317.5	3,352.7	3,383.7	3,419.4	+0.5	+1.1	+0.9	+1.1
	%							
Unemployment rate (Eurostat definition)	4.8	5.2	5.2	5.1	×	×	×	×
	% of real GDP							
Unit labor costs (whole economy)[1]	65.5	66.0	66.7	67.3	−0.3	+0.8	+1.0	+0.9
	EUR 1,000 per employee							
Labor productivity (whole economy)[2]	53.7	54.5	55.3	56.1	+2.4	+1.4	+1.6	+1.5
	EUR 1,000							
Real compensation per employee[3]	33.0	33.1	33.3	33.6	+0.2	+0.2	+0.6	+0.7
	At current prices, EUR 1,000							
Gross compensation per employee	35.2	36.0	36.9	37.8	+2.1	+2.3	+2.6	+2.5
	At current prices, EUR million							
Total gross compensation of employees	116,679	120,583	124,820	129,239	+2.6	+3.3	+3.5	+3.5

Source: 2004: Eurostat; 2005 to 2007: OeNB December 2005 outlook.
[1] Gross wages divided by real GDP.
[2] Real GDP divided by total employment.
[3] Gross wages per employee divided by the private consumption expenditure (PCE) deflator.

Table 17

Current Account

	2004	2005	2006	2007	2004	2005	2006	2007
	EUR million				% of nominal GDP			
Balance of trade	4,631.0	4,435.8	5,344.1	5,966.1	2.0	1.8	2.1	2.2
Balance on goods	2,498.4	2,343.5	2,821.0	3,314.7	1.1	0.9	1.1	1.2
Balance on services	2,132.6	2,092.3	2,523.1	2,651.4	0.9	0.8	1.0	1.0
Euro area	−11,980.6	−11,569.1	−12,090.6	−12,533.1	−5.1	−4.7	−4.7	−4.7
Non-euro area countries	16,611.6	16,004.9	17,434.8	18,499.1	7.0	6.5	6.8	6.9
Balance on income	−1,813.8	−1,998.5	−1,922.0	−1,816.0	−0.8	−0.8	−0.7	−0.7
Balance on transfers	−2,244.1	−2,115.8	−2,282.1	−2,360.1	−0.9	−0.9	−0.9	−0.9
Current account	573.1	321.5	1,140.0	1,790.0	0.2	0.1	0.4	0.7

Source: 2004: OeNB; 2005 to 2007: OeNB December 2005 outlook.

Table 18

Quarterly Outlook Results

	2005	2006	2007	2005				2006				2007			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Prices, wages and costs	Annual change in %														
HICP	+2.2	+1.9	+1.7	+2.4	+2.1	+2.2	+2.0	+2.0	+2.1	+1.9	+1.6	+1.6	+1.7	+1.7	+1.6
HICP (excluding energy)	+1.5	+1.5	+1.9	+1.9	+1.5	+1.3	+1.2	+1.1	+1.5	+1.7	+1.6	+1.8	+1.9	+1.9	+1.9
Private consumption expenditure (PCE) deflator	+2.0	+1.9	+1.8	+2.4	+2.1	+1.7	+1.8	+1.8	+1.9	+2.1	+1.9	+1.8	+1.7	+1.7	+1.8
Gross fixed capital formation deflator	+1.6	+1.5	+1.5	+1.7	+1.5	+1.6	+1.5	+1.4	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.6
GDP deflator	+2.3	+1.6	+1.7	+3.0	+2.5	+2.3	+1.3	+1.4	+1.5	+1.4	+2.1	+1.7	+1.7	+1.7	+1.7
Unit labor costs	+0.8	+1.0	+0.9	+0.1	+0.8	+1.2	+1.2	+0.9	+1.0	+1.0	+1.1	+1.0	+1.0	+0.9	+0.9
Nominal wages per employee	+2.3	+2.6	+2.5	+2.3	+2.4	+2.4	+2.0	+2.4	+2.4	+2.5	+3.0	+2.6	+2.5	+2.4	+2.4
Productivity	+1.4	+1.6	+1.5	+2.1	+1.6	+1.2	+0.8	+1.4	+1.4	+1.4	+1.9	+1.6	+1.5	+1.5	+1.5
Real wages per employee	+0.2	+0.6	+0.7	−0.1	+0.3	+0.7	+0.1	+0.5	+0.5	+0.4	+1.1	+0.8	+0.7	+0.7	+0.6
Import deflator	+3.3	+1.7	+1.5	+3.1	+3.6	+3.6	+2.9	+2.3	+2.1	+1.9	+1.7	+1.6	+1.5	+1.5	+1.4
Export deflator	+1.8	+1.8	+1.7	+1.6	+2.7	+3.6	−0.7	+1.2	+1.2	+0.8	+4.2	+1.7	+1.6	+1.7	+1.8
Terms of trade	−1.5	−0.2	+0.2	−1.5	−0.9	+0.0	−3.4	−1.1	−0.9	−1.1	+2.5	+0.2	+0.1	+0.2	+0.3
Economic activity	Annual and/or quarterly changes in % (real)														
GDP	+1.9	+2.3	+2.3	+0.1	+0.5	+0.6	+0.5	+0.6	+0.6	+0.6	+0.5	+0.6	+0.6	+0.6	+0.6
Private consumption	+1.3	+1.9	+2.1	+0.3	+0.4	+0.5	+0.4	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5
Government consumption	+1.2	+1.2	+1.5	+0.3	+0.3	+0.3	+0.2	+0.3	+0.3	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4
Gross fixed capital formation	+0.9	+3.2	+2.8	−0.2	+0.2	+0.3	+0.8	+1.1	+1.0	+0.8	+0.6	+0.7	+0.7	+0.7	+0.7
of which: Investment in plant and equipment	*−1.7*	*+4.4*	*+3.9*	*−1.1*	*+0.1*	*+0.2*	*+1.3*	*+1.4*	*+1.4*	*+1.2*	*+0.9*	*+0.9*	*+0.9*	*+0.9*	*+0.9*
Residential construction investment[1]	*+0.2*	*+1.4*	*+1.5*	*−0.6*	*+0.5*	*+0.6*	*+6.4*	*−4.4*	*+0.6*	*+0.6*	*+0.5*	*+0.3*	*+0.2*	*+0.3*	*+0.4*
Exports	+3.2	+6.5	+6.6	−0.4	+0.7	+1.0	+6.1	−1.0	+1.5	+1.5	+1.6	+1.6	+1.6	+1.7	+1.7
Imports	+1.9	+6.6	+6.7	−0.3	+0.5	+0.8	+2.4	+1.8	+1.5	+1.6	+1.6	+1.6	+1.7	+1.7	+1.7
	Contribution to real GDP growth in percentage points														
Domestic demand	+1.1	+1.9	+2.0	+0.2	+0.3	+0.4	+0.4	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5
Net exports	+0.7	+0.3	+0.3	−0.1	+0.2	+0.1	+2.1	−1.5	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1
Changes in inventories	+0.0	+0.1	+0.0	+0.1	+0.0	+0.0	−2.0	+1.6	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
Labor market	%														
Unemployment rate (Eurostat definition)	5.2	5.2	5.1	5.0	5.1	5.2	5.3	5.3	5.3	5.2	5.2	5.1	5.1	5.1	5.1
	Annual and/or quarterly changes in %														
Total employment	+0.4	+0.7	+0.8	+0.1	+0.1	+0.1	+0.7	−0.1	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2	+0.2
of which: Private sector employment	*+0.5*	*+0.8*	*+0.9*	*+0.1*	*+0.1*	*+0.1*	*+0.8*	*−0.1*	*+0.2*	*+0.2*	*+0.2*	*+0.2*	*+0.2*	*+0.2*	*+0.2*
Payroll employment	+1.1	+0.9	+1.1	+0.3	+0.3	+0.3	+0.7	−0.2	+0.2	+0.2	+0.2	+0.3	+0.3	+0.3	+0.3
Additional variables	Annual and/or quarterly changes in % (real)														
Disposable household income	+2.7	+2.0	+1.8	+1.3	+0.6	+0.7	+0.3	+0.4	+0.6	+0.6	+0.5	+0.4	+0.4	+0.4	+0.3
	% of real disposable household income (saving ratio) and % of real GDP (output gap)														
Household saving ratio	10.2	10.4	10.3	10.0	10.2	10.1	10.4	10.3	10.4	10.4	10.4	10.4	10.4	10.3	10.3
Output gap	−0.9	−0.5	−0.2	−1.0	−0.9	−0.7	−1.2	−0.8	−0.6	−0.4	−0.3	−0.3	−0.2	−0.2	−0.2

Source: OeNB December 2005 outlook. Quarterly values are seasonally adjusted.
[1] Excluding other investment in construction and other investment.

The Natural Rate of Interest – Concepts and Appraisal for the Euro Area

Real interest rates in the euro area fluctuated sharply between −4.2% and +7.7% over the past half century. A key question for monetary policy makers and economic agents is: What is the "neutral," "equilibrium" or "natural" real interest rate to which current rates might eventually move back? In the long run, the natural rate of interest is influenced by productivity developments, population growth and the time preference for consumption over saving. In the medium run, the natural rate may also be influenced by fiscal policy, the structure of financial markets, and inflation risk premiums. Globalization should over time contribute to an international convergence of natural rates. Empirical estimates of the natural rate differ considerably and are associated with large error margins; estimates in "real time" suffer from additional uncertainty. Monetary policy rules based on the natural rate (e.g. Taylor rules, real interest rate gap) should thus be treated with great caution. Monetary policy might use the natural rate to consider appropriate responses to technological and demographic shocks. The majority of recent estimates for the euro area points to a fall in the natural rate to a level as low as 1.5%. This may reflect a more credible monetary policy and deep euro area financial markets, but also slowing productivity growth and a decline in the working-age population. In the future, the growing need for private savings for retirement might lower the natural rate, whereas "fiscal consolidation fatigue" might raise the natural rate.

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1 Introduction: Revived Attention on the Natural Rate of Interest (NRI)

A key question for monetary policy-makers and any economic agent making long-term investment decisions is: Where are interest rates heading to? Are they going to remain at the current level, fall or rise in the future? Underlying this question is another one: Is the current level of real interest rates similar to, lower or higher compared to some average or "neutral" value? And what is this neutral value of interest rates toward which current rates are believed to be moving back sooner or later?

Over the past few years, interest in the theoretical notion of a "neutral" or "natural" rate of interest has been revived. Two developments contributed to this phenomenon: First, central banks nowadays use the level of the (nominal) short-term interest rate as their primary policy instrument; given that prices react sluggishly to changes in the policy rate, in practice the central bank also steers the short-term real interest rate. Second, monetary policy rules based on steering the interest rate around its neutral level have become very popular over the past decade. Inflation targeting rules steer the real rate around its neutral rate depending on whether the inflation rate is forecast to be at, below or above its target level. Taylor rules in addition take into account whether output is, or is forecast to be, at, below or above the economy's potential. The difference between the actual and the neutral rate (the "real interest rate gap") should, according to these rules, have predictive power for future inflation. The usefulness of all these rules crucially depends, among other things, on knowledge about the "natural rate."

This paper first provides definitions of, and draws distinctions between, concepts of the NRI for various time horizons. Starting from a historical overview of real interest rates in the euro area, it proceeds to analyze the effects of structural changes and shocks, including globalization, on the euro area NRI. Various empirical estimates proposed in the economic literature are supplemented with some estimates by the authors for the most recent past. The paper concludes on a cautious note on the use of the NRI and derived monetary policy rules or indicators for actual monetary policy and discusses possible influences on the further evolution of the euro area NRI.

2 The Natural Rate of Interest: Definitions and Time Horizons

A major contribution to the definition of the NRI and its application to monetary policy goes back to the Swedish economist Knut Wicksell,[4] who stated:

"There is a certain rate of interest on loans which is neutral in respect to commodity prices, and tends neither to raise nor to lower them" (Wicksell, 1898, p. 102).

"So long as prices remain unaltered, the [central] bank's rate of interest is to remain unaltered. If prices rise, the rate of interest is to be raised; and if prices fall, the rate of interest is to be lowered; and the rate of interest is henceforth to be maintained at its new level until a further movement of prices calls for a change in one direction or the other." (Wicksell, 1898, p. 189)

"It is not a high or low rate of interest in the absolute sense which must be regarded as influencing the demand for raw materials, labor, and land or other productive resources, and so indirectly determining the movement of prices. The causative factor is the current rate of interest on loans as compared with what I shall be calling the natural rate of interest on capital. This natural rate is roughly the same thing as the real interest of actual business." (Wicksell, 1898, p. xxv.)

Since Wicksell, various definitions of the NRI have been proposed. Before describing them, let us point out that from a theoretical viewpoint the distinction between the actual real interest rate and some natural real interest rate is only relevant in an economy with rigid prices or expectations based on incomplete or incorrectly processed information, such that prices are not fully aligned with real economic circumstances. By contrast, in a – hypothetical – world of fully flexible prices and rational expectations, the actual and natural interest rates coincide (see Deutsche Bundesbank, 2001, p. 37).

The economic literature is quite ambiguous when it comes to definitions on the natural interest rate. For the purpose of this survey, we distinguish between a long-run and a medium-run definition of the NRI.[5] The former views the concept from the

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[4] Other economic thinkers who contributed to developing the concept of the "natural rate of interest" – not necessarily with the same meaning attached to the term, though – include Thornton, 1802, Meade, 1933, Keynes, 1936, as well as members of the Austrian school of economics.

[5] We do not include the very short-term concept proposed by Archibald and Hunter (2001), which extends to the time that it takes for changes in interest rates to affect inflation. A short-term natural rate thus defined would be comparable in terms of time horizon with the policy rate derived from monetary policy rules such as the Taylor rule or inflation targeting rules.

perspective of growth theory, the latter from a business cycle and monetary policy point of view.

The "*long-run NRI*" is commonly defined as the real interest rate where "all markets are in equilibrium and there is therefore no pressure for any resources to be redistributed or growth rates for any variables to change" (Archibald and Hunter, 2001). In this – hypothetical – steady state, the long-run NRI depends on the structural features that influence an economy's long-term growth potential, which in turn depends on the rate of *technical progress, population growth* and households' *time preference of consumption today over saving for tomorrow.*[6]

Using this definition of the NRI, the dependence of this concept on the three above-mentioned components can be easily demonstrated graphically. Following Archibald and Hunter

(2001, pp. 21f.), chart 1 panel A illustrates in a highly stylized and simplified way how the long-run NRI can be thought of being determined by the intersection of "investment" and "saving" schedules.

– The downward-sloping investment schedule shows that the demand for loanable funds falls as the cost of borrowing increases, since fewer investment projects yield enough return to cover financing costs. The upward-sloping savings schedule illustrates that the supply of loanable funds increases with the real interest rate, as people save more, the higher the (expected) return on their savings. Equilibrium is reached where the supply of and demand for loanable funds match, i.e. at the intersection of the savings and investment schedules, at the level of r_1.

Chart 1

Stylized View of Savings, Investment and the Natural Rate of Interest (NRI)
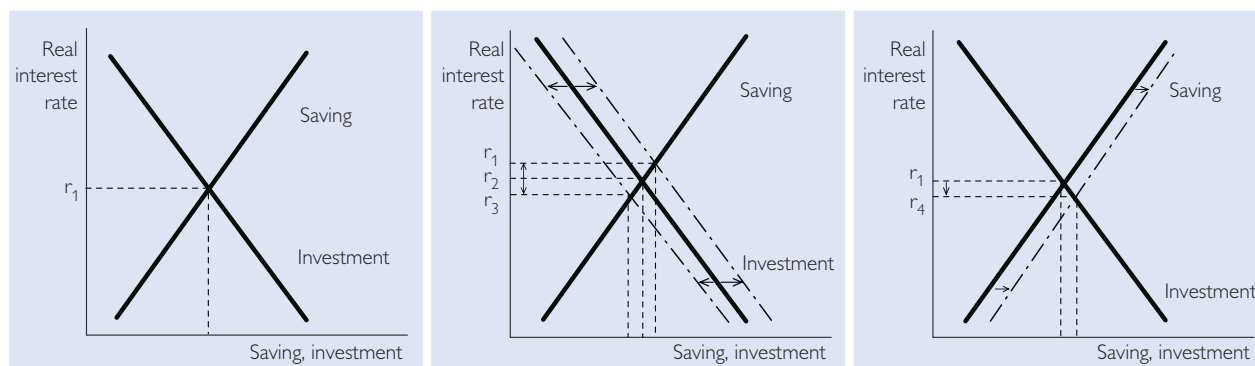
Panel A: The NRI is determined by matching saving and investment.

Panel B: A decrease (increase) in the return on capital shifts the investment schedule to the left (right), reducing (increasing) the NRI.

Panel C: An increased preference for saving shifts the saving schedule to the right, reducing the NRI.

Source: Archibald and Hunter (2001, pp. 21f.), adapted.

– The position of the *investment schedule* depends on how profitable investment is, in other words: on the productivity of capital, which is influenced by how efficiently and in what combination with

other production factors capital is used. For example, technical progress raises total factor productivity and makes the existing stock of capital more profitable, shifting the investment schedule to the right

[6] *This relationship is also referred to as the "modified golden rule" in growth theory.*

and raising the equilibrium real interest rate to r_2 in chart 1 panel B. Conversely, if, for example due to lower birth rates or ageing, less labor is available for a given level of the capital stock, less output can be produced with that capital. The investment schedule would then shift to the left, and the long-run equilibrium real rate of interest will fall to r_3 in chart 1 panel B.

— The position of the *savings schedule* depends, other things being equal, on consumers' willingness to delay consumption at any given real interest rate. A general shift in time preference between consuming today and saving for the future shifts the savings schedule. For example, if people feel that public pensions might be reduced or that they will spend more years in retirement due to higher life expectancy, they might react by saving more, irrespectively of the prevailing level of the real interest rate. The savings schedule would then permanently move to the right, and the long-run equilibrium real interest would fall to r_4 in chart 1 panel C.[7]

The "*medium-run NRI*" can be defined as the real short-term interest rate consistent with real GDP at its potential level, in the absence of transitory shocks to demand. Potential GDP, in turn, is defined as the level of output with stable inflation, in the absence transitory shocks to supply. Therefore, the natural rate of interest is the level of real interest rates that is consistent with stable inflation in the absence of temporary shocks to demand and sup-

ply (see Williams, 2003, p. 1). This medium-run definition does not require all economic variables to be at their long-run, steady state levels. For example, public debt, the current account or the level of the real exchange rate could be in a state which is not sustainable in the long run.

The medium-run NRI broadly corresponds to business cycle frequencies. Thus, it is also comparable in terms of time horizon to the equilibrium real interest rates in Taylor monetary policy rules, around which the policy rate fluctuates depending on the deviation of inflation and output from their target and potential.

In the economic literature, a number of further factors which might influence the evolution of the NRI in addition to the basic determinants associated with the long-run growth model described above have been proposed (see e.g. ECB, 2004, and Björksten and Karagedikli, 2003):

— Structural shifts in *fiscal policy* can affect the NRI. Governments are very large borrowers or lenders (depending on whether the budget is in deficit or in surplus). Their action might thus affect the aggregate savings of the economy as a whole. If private agents do not fully adjust their private savings to counter any change in public savings,[8] an increase in the budget deficit, for example, would require a rise in the natural rate of interest. Empirical studies confirm a positive relationship between the level of long-term real interest rates and public debt or deficit levels.

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[7] *A change in time preference could also alter the slope of the savings schedule — a movement that would also affect the NRI.*

[8] *Ricardian equivalence would predict that in response to an increase in public debt, private agents would increase private savings one for one to provide for anticipated future tax increases. However, the empirical evidence on the relevance of the Ricardian equivalence proposition is mixed in its results for both developed and developing countries (see for example Evans, 1993, Khalid, 1996, and Crespo Cuaresma and Reitschuler, 2004).*

— The *structure of financial markets* can influence the NRI in various ways. Efficient financial markets facilitate the optimal allocation of savings across investment projects and over time. A broader range of savings products, which better suits savers' needs and preferences in terms of return, risk and liquidity and achieves more efficient combinations of these features, may encourage households to save more, thereby lowering the equilibrium real interest rate. By contrast, financial liberalization also implies easier access to credit for households and businesses, thereby increasing the demand for loanable funds, which would raise the natural rate of interest.

— *Finally, risk considerations* may affect the noninflationary level of the real interest rate. In particular,
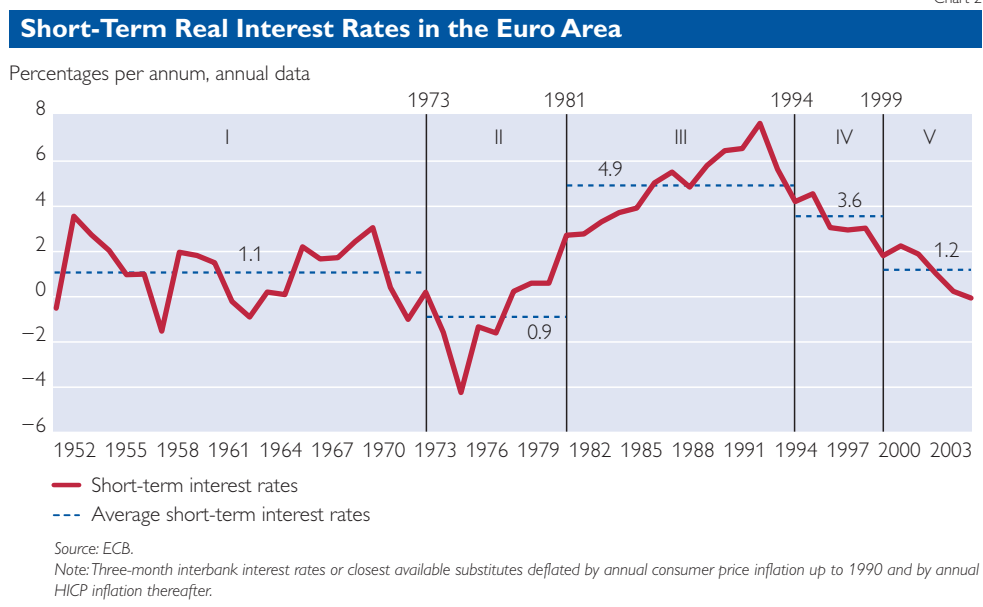
lack of a credible commitment to price stability may put upward pressure on inflation expectations, thus requiring the central bank to keep real interest rates higher to maintain price stability.

Combining the various definitions of the NRI over different time horizons depicts an NRI that fluctuates in response to permanent shocks but converges toward a steady-state value in the (shock-free) long run.

3 A Brief History of the Short-Term Real Interest Rate in the Euro Area

Often, as a starting point for analyzing the NRI, authors look at the historical evolution of the real interest rate. The rationale is that the real rate is assumed to have fluctuated around its natural level.

Chart 2

Short-Term Real Interest Rates in the Euro Area

Percentages per annum, annual data

Short-term interest rates
Average short-term interest rates

Source: ECB.
Note: Three-month interbank interest rates or closest available substitutes deflated by annual consumer price inflation up to 1990 and by annual HICP inflation thereafter.

Following ECB (2004) and Deutsche Bundesbank (2001), we can distinguish *five phases* in the evolution of short-term real interest rates in

the euro area since the 1950s. During the *first phase* up to 1973, real interest rates fluctuated between –1.5% and +3.6%,[9] with an average of 1.1%.

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[9] *All figures in this section refer to annual averages.*

The rather moderate average real interest rate – with episodes of even negative rates – at a time of high real growth was attributable to restrictions on the international mobility of capital and volatile inflation rates in some euro area countries.

The *second* phase was *initiated* by the breakdown of the Bretton Woods System of fixed exchange rates, coupled with the oil price shock *in 1973*. In an already overheated economy, at a time of falling potential growth, monetary and fiscal policies used the new freedom generated by flexible exchange rates and responded through expansionary demand policies. The resulting substantial rise in worldwide inflation rates entered economic history books as the "Great Inflation." With nominal interest rates lagging behind the surge in inflation, real interest rates dropped dramatically to –4.2% in 1975 and recorded a negative average during the period from 1973 to 1980 of –0.9%.

During the *third* phase, *between 1981 and 1993*, euro area real interest rates surged to historical highs, reaching close to 7.7% in 1992 and an average of 4.9% over that period. The reasons for this development ranged from increased inflation premiums and monetary authorities' disinflation policies in response to the Great Inflation to soaring public deficits in many Western industrialized countries. In addition, the ERM exchange rate tensions in the first half of the 1990s entailed considerable exchange rate risk premiums.

The *fourth* phase, *starting in 1994,* was marked by a sharp decline in real interest rates. Around this time, many national central banks were granted a high degree of independence as required by the Maastricht Treaty ("legal Maastricht convergence criterion"),

which made these central banks' commitment to the primary goal of price stability increasingly credible. In parallel, the future euro area countries underwent decisive fiscal consolidation programs to meet the Maastricht fiscal convergence criteria. The widening of ERM exchange rate bands as from August 2, 1993, in combination with increasing expectations of future EMU participation ("convergence plays") contributed to discouraging speculative attacks and diminishing exchange rate risk premiums.

The *fifth and hitherto last phase* started with *Stage Three of EMU in 1999* and was marked by a further decline in real interest rates to 0%, with the period average so far coming to 1.2%. The firm anchoring of inflation expectations below 2% reflected the rapid public recognition of the Eurosystem's credible commitment to price stability. Moreover, modest or weak GDP growth and inflation rates prompted low official interest rates. The adoption of the euro contributed crucially to the development of a large and deep, more competitive euro financial market. More recently, rising private savings and hesitant private investment contributed to further reducing market real interest rates.

This historical account shows that the level of the short-term real interest rate has varied sharply over time, also reflecting structural changes in underlying forces. Apart from its obvious analytical limitations, such a backward-looking, descriptive historical approach may be particularly misleading with respect to current and future levels of the NRI, given that forces driving past real interest rate levels may no longer be relevant and new shocks may have occurred. Thus, the following section investigates more sophisticated methods to estimate the NRI.

4 Estimates of the Natural Rate of Interest in the Euro Area

Since the NRI is a theoretical concept and is not directly observable, it needs to be estimated. Various estimation methods have been employed, which can be summarized under three categories (see Bomfim, 2001).

a) *Structural economic models* can be used to estimate measures of the NRI. For the euro area, Smets and Wouters (2003) and Giammarioli and Valla (2003) have provided estimates of NRIs using dynamic stochastic general equilibrium (DSGE) models. An advantage of this approach is that the estimates thus derived can be given an economic interpretation regarding the sources of changes in real interest rates. Moreover, since they seek to capture the underlying dynamic decision-making behavior of consumers and firms, these estimates are often claimed to be less subject to the Lucas critique.[10] Model-based approaches have the disadvantage that the estimates crucially hinge on the assumptions made by the model builder. Substantial progress has been made over past years in DSGE modeling; still, the models currently used are continuously being developed further. Therefore, "intermediate" approaches of a combination of small models with some structure with statistical filtering techniques have been proposed e.g. by Laubach and Williams (2003), whose method was applied to the euro area by Mésonnier and Renne (2004).

Browne and Everett (2004, 2005) propose to use the rate implied by the consumption-based capital asset-pricing model (CCAPM) as the natural rate. Using a CCAPM augmented with liquidity constraints, the observed intertemporal consumption behavior of agents is used to obtain an estimate of the rate prevailing in the absence of nominal frictions and informational asymmetries.

The point estimates of the NRI according to Giammarioli and Valla (2003) corresponding to the EMU sample (up to end-2002) are presented in panel A of chart 3, the estimates corresponding to the work of Mésonnier and Renne (2004) are presented in panel B and those by Browne and Everett (2005) are plotted in panel C. While the NRI estimates by Giammarioli and Valla (2003) fluctuate slightly around 3%, the NRI obtained by Mésonnier and Renne (2004) presents a sharp decline from a level of approximately 4% to 1% in the period from 1999 to 2001. The same type of dynamics is observed for the estimates in Browne and Everett (2005), with the point estimates of the NRI remaining between 1% and 2% since end-2001.

b) A second strain of the literature employs *pure statistical econometric methods*. Basically, these methods attempt to derive estimates of the equilibrium real rate from past developments of the real interest rate itself ("univariate filtering") or from the joint behavior of the real interest rate, output and inflation rates. The advantage of such approaches lies in "letting the data speak for themselves," without interference through possibly wrong theoretical assumptions, and in their simplicity and ease of frequent updates. An obvious disadvantage is that esti-

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[10] Lucas (1976) pointed out that when predicting the effects of major policy changes, relations estimated from past data may be very misleading. Models derived from "deep" economic relationships are therefore widely held to be less subject to the Lucas critique than purely empirical relationships. However, Estrella and Fuhrer (2003) provide evidence that partly contradicts this view by showing that forward-looking, optimizing models may be less stable in the face of monetary regime changes than their backward-looking counterparts.

mates so derived cannot strictly be interpreted in economic terms.

Crespo Cuaresma et al. (2004a) provide an example of this type of research. Panel D in chart 3 presents the estimates of the NRI obtained using a multivariate structural time series model[11] for the real interest rate, inflation and industrial production using risk premium-adjusted interest rate data[12] in the period from January 1991 to April 2005. The NRI estimated this way declined slowly over time in the first part of the EMU period, reaching a level of approximately 1% by 2002 and maintaining that level thereafter.

c) A third group of methods seeks to extract *financial market views* on the NRI from financial market indicators. On the one hand, these methods widely use the yield curve as an indicator of the monetary policy stance. This approach is based on the notion that longer-term interest rates reflect market forecasts of the future path of short-term interest rates; assuming that, on average, policy rates fluctuate around an "equilibrium level," the long end of the yield curve can be seen as a proxy of the (market expectation of the future) NRI. A steeper yield curve thus signals a currently loose monetary policy stance and vice versa. A shortcoming of this approach is that the yield curve may also be influenced by changing inflation expectations. This issue is addressed by extracting expectations on future real interest rates from inflation-indexed bonds, as in ECB (2004) for the euro area.

A method for obtaining NRI estimates (see Basdevant et al., 2004) is based on the rational expectation hypothesis, according to which the yield

to maturity of a bond can be decomposed into expected one-period yields and a risk premium. As a consequence, the difference between the nominal long-term interest rate and the sum of expected inflation and the average yield spread for a given period can be thought of as an indicator of the neutral rate of interest. Panel E in chart 3 presents the result of estimating this version of the NRI. The ten-year and three-month interest rates were used as the long-term and short-term interest rates, respectively; inflation expectations were assumed to be formed as if the agents believed that inflation followed a random walk, and the average yield spread was computed on the basis of data covering the period from 1991 to 2005. For the second half of the EMU sample, the NRI estimate obtained using the term-spread approach leads to a similar qualitative assessment of the monetary policy stance in the euro area as the risk-adjusted estimates presented above, and since 2002 the estimate tends to fluctuate around a value of 1.5%.

Bomfim (2001) and Christensen (2002) present a related method to extract the NRI based on inflation-indexed bonds, and the resulting NRI from the application of this method to euro area data is presented in panel F of chart 3. The estimate fell continuously from approximately 3.5% in 1999 to about 3% by the end of the sample.

Apart from the clear differences across point estimates from different methodologies (as shown in chart 3), a great amount of uncertainty about the NRI is present also for each individual method. Mésonnier and Renne (2004), for instance, present a 90% confidence interval around the NRI

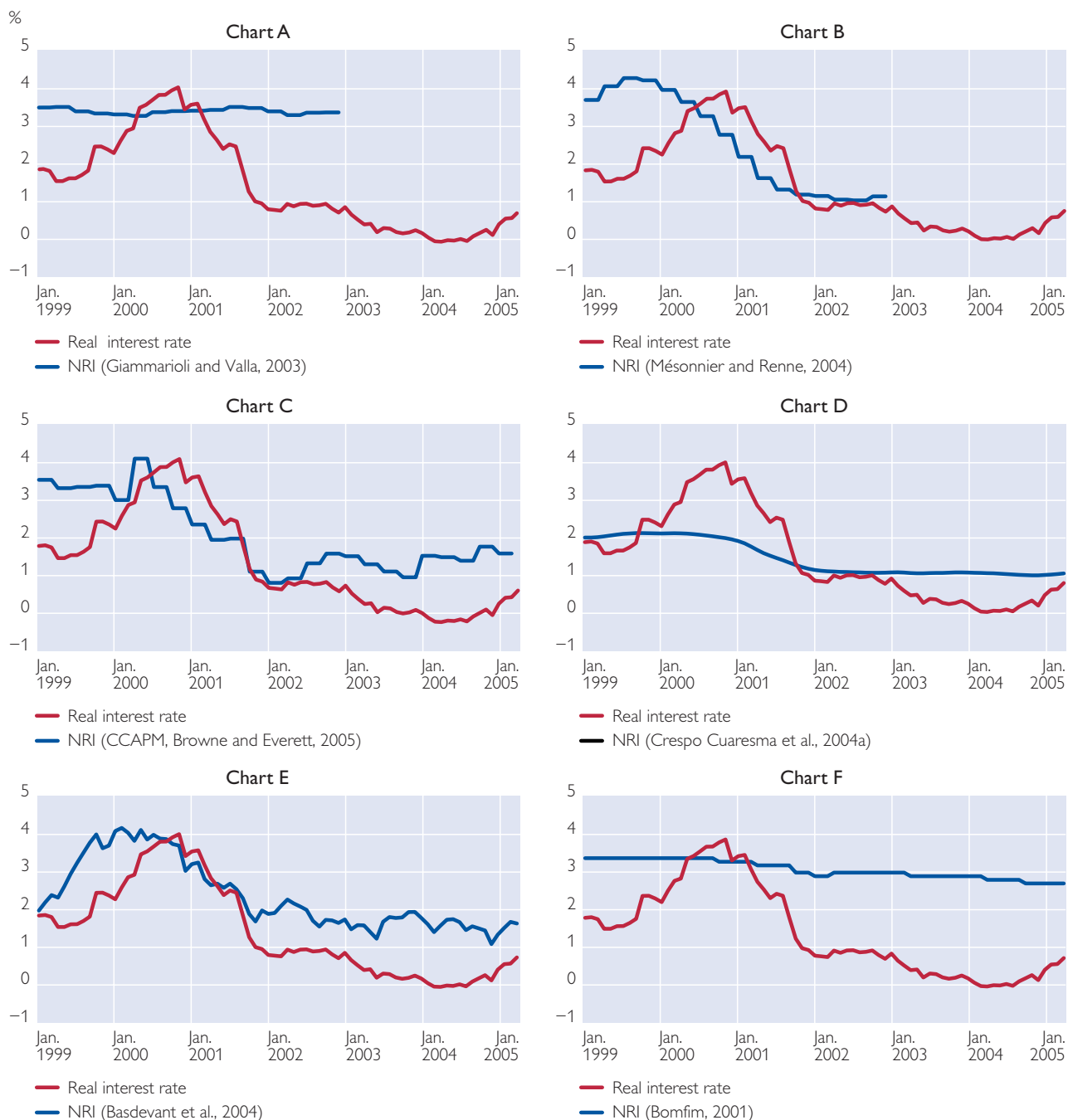[11] *For details of the method used see Crespo Cuaresma et al. (2004a).*
[12] *For the method of risk adjustment see Crespo Cuaresma et al. (2004b).*

estimate, which is roughly 4 percentage points wide at the end of the sample. Comparably large confidence intervals are also reported in Crespo Cuaresma et al. (2004a). Obviously, the practical usefulness of the NRI is limited by the uncertainty surrounding the point estimates.

Chart 3

NRI Estimates for the Euro Area

%

Chart A

Real interest rate
NRI (Giammarioli and Valla, 2003)

Chart B

Real interest rate
NRI (Mésonnier and Renne, 2004)

Chart C

Real interest rate
NRI (CCAPM, Browne and Everett, 2005)

Chart D

Real interest rate
NRI (Crespo Cuaresma et al., 2004a)

Chart E

Real interest rate
NRI (Basdevant et al., 2004)

Chart F

Real interest rate
NRI (Bomfim, 2001)

Source: Data for panels A to C were provided by the authors of the papers quoted in each panel; panels D to F: authors' own calculations.

Box 1: Globalization and the Natural Rate of Interest –

A Survey of International NRI Estimates

In a world without risk and other frictions, matching worldwide savings and worldwide investment as described in chart 1 would result in a world long-run NRI. In reality, however, various frictions hamper cross-national savings and investment. Even in the absence of official capital controls (including discriminatory tax regulations and regulatory provisions favoring domestic investment), savers may exhibit a "home bias" as a result of information disadvantages (including the risk associated with an investment, the foreign legal framework and jurisdiction) or higher transactions costs when lending out their funds to far-away borrowers. As a result, the NRI may differ between countries or monetary areas.

The far-reaching liberalization of capital movements, which encompasses the major economic areas, and the increasing information transparency on international investment should have contributed to reducing the segmentation between national financial markets. Thus, it is plausible to assume that national NRIs are increasingly influenced by developments in the world at large and should gradually converge to a "world NRI".[1] While this assumption may be valid for all countries and monetary areas, smaller countries are more likely to be subject to external influences than larger monetary areas such as the U.S.A. or the euro area.

A survey of the international literature on NRI estimates (table 1) reveals the following broad global patterns of recent NRI developments.

- *First, the NRI has declined over the years. This result seems to be a general one. Underlying reasons might be liberalized and therefore more competitive and efficient capital markets. In addition, central banks worldwide have been granted greater independence and have been increasingly successful in achieving and maintaining low and stable inflation, providing for a substantial fall in inflation risk premiums.*

- *Second, several studies indicate that from the beginning of the 1990s, the pattern of the NRI in the U.S.A. differs from that in the euro area. While the euro area NRI has gradually declined since the mid-1990s, it was already extraordinarily low for the U.S.A., but then rose in the period from the mid-1990s up to 2000. This development may reflect, inter alia, the higher U.S. productivity growth, the very low U.S. private savings ratio and the sharp surge in the U.S. government deficit and debt ratio.*

- *Third, some authors detect a tendency that NRI estimates for smaller economies are larger than those for the big countries. For New Zealand, for instance, the OECD notes that the NRI seems to be higher than in larger OECD economies; this may reflect greater GDP and exchange rate volatility, lower liquidity of the debt denominated in New Zealand dollars or a high net foreign debt ratio (OECD, 2004). Other reasons include exchange risk premiums or a perception among international investors that financial markets in New Zealand are relatively small and peripheral.*

In the future, the NRI may be influenced by a complex set of interacting developments. For instance, technological progress and global population growth might put upward pressure on the global NRI. Global savings may be influenced, for instance, by international current account imbalances and by how these will be unwound. Global risk premiums, in turn, will be subject to e.g. political developments, global inflation and exchange rate developments and by the smooth functioning of global financial markets.

[1] *The same reasoning applies even more strongly to convergence among national NRIs within the euro area. Given the high degree of market integration due to the single market and the euro, differences among national NRIs should to a large extent be leveled out through arbitrage within the euro area. Thus, it seems fair to use the approximation of a "euro area NRI" throughout this paper.*

Survey of International NRI Estimates

Author	Country	Type of method used	Time horizon	Range of NRI	NRI at end of sample
Bomfim (2001)	U.S.A.	Treasury inflation-indexed securities –implied equilibrium real rate series	1998–2001	Relatively stable, ranging from 3.6% in early 1998 to around 4% in the second half of 1999	3.7% in Q2/01
Brzoza-Brzezina (2004a)	U.S.A.	Structural VAR model; Laubach and Williams (2003)	1960–2002; 1980–2002	−5% to +8%, but very volatile; −5% to +8% and less volatile.	1% in mid-2002; 2% in mid-2002
Laubach and Williams (2003)	U.S.A.	Small macromodel estimated using Kalman filter	1960s–2002	2%–5%	Around 3% in mid-2002
OECD (2004)	U.S.A.	Laubach and Williams (2003)	Update Laubach et al. (2003) up to Q3/04	Further decline	2.1% in Q3/04
Manrique and Marques (2004)	U.S.A.	Laubach and Williams (2003)	mid-1960s– end-2001	1.5%–5%	In late 2001 the estimate was around 2.5%
Clark and Kozicki (2004)	U.S.A.	Laubach and Williams (2003)	1962–2003	0%–5%	Just above 2% for 2001–2003
Amato (2004)	U.S.A.	Latent variable model	1965–2001	2.5%–4%	2001: around 3%
Djoudad et al. (2004)	Canada	Kalman filter – Laubach and Williams (2003)	1985–2003	1.3%–1.6% (one-sided)	1.5% in 2003
Djoudad et al. (2004)	Canada	DSGE – Neiss and Nelson (2003)	Q2/85–Q2/04	0.0%–6.0% with considerable variability	1% in Q2/04
Lam and Tkacz (2004)	Canada	DSGE – Neiss and Nelson (2003)	Q1/84–Q1/02	4 different types of models; NRIs: lowest 0.7%, highest 7.6%	1.25%–2% in 2002
Björksten and Karagedikli (2003)	New Zealand	Yield curve approach plus Kalman filter	1992–2002	3.8%–5.8%	3.8% in 2002
Basdevant et al. (2004)	New Zealand	Several models	1992–2002	Similar downward trend in the 1990s, starting from the range of 5.2%–6.7%	End points in early 2003 lie in the range of 3.25%–4.25%
Smets and Wouters (2003)	Euro area	DSGE	1970–2000	−10% to +10%	Around −2% in 2000
Gerdesmeier and Roffia (2003)	Euro area	Different Taylor-type specifications	1985–2002	recursive estimates: 3%–7%; time-varying estimate: 1%–9%	Steep decline since 1996; 3% or 1% at end of sample
Giammarioli and Valla (2003)	Euro area	DSGE – Neiss and Nelson (2003)	1973–2000	1973–2000 up to 6%; 1994–2000 around 3.0%–3.7%	2.75% in 2000
Crespo Cuaresma et al. (2004)	Euro area	Multivariate structural time series model	1991–2002	8%–2%	1,5% – 2% in spring 2002
Mésonnier and Renne (2004)	Euro area	Kalman filter – Laubach and Williams (2003)	Q1/79–Q4/02	NRI lies between 1% and a 7% peak in 1989	Around 1% in Q4/02
Browne and Everett (2005)	Euro area	CCAPM model estimates	Q1/81–Q1/05	0,5%–4,5%	Around 1.5% in Q1/05
Amato (2005)	Germany	Latent variable model	1965–2001	2%–3%	Around 2.75% in 2001
Amato (2005)	U.K.	Latent variable model	1965–2001	−2% to +4%	Around 3.5% in 2001
Larsen and McKeown (2004)	U.K.	Kalman filtering techniques used in a small semistructural model	Q3/66–Q3/02	−6% to +8%; over the inflation-targeting period (Q4/92–Q3/00) 3.7% on average	Around 3% in 2002
Manrique and Marques (2004)	Germany	Laubach and Williams (2003)	mid-1960s– end-2001	1,5%–4%	Around 1.5% in 2002

Survey of International NRI Estimates					
Author	Country	Type of method used	Time horizon	Range of NRI	NRI at end of sample
Bernhardsen (2005); Norges Bank (2004)	Norway	Not given	1995 to late 2004	3%–4%	Bernhardsen (2005): 2.5%– 3.5%; Norges Bank (2004): 3%
Brzoza-Brzezina (2004b)	Poland	Kalman filter and structu- ral vector autoregression model	1998–2003	1%–11%	Around 4% in 2003

5 Caution When Using the NRI and Derived Indicators for Monetary Policy

Chart 3 clearly illustrates the problems associated with the model-dependent nature of NRI point estimates. The estimates plotted in chart 3 present strong differences in both the level of the natural rate and in the dynamics of the NRI for the period from 1999 to 2005. While all estimates tend to present a downward sloping trend, the starting level in 1999 and the value of the NRI at the end of the sample used for the estimation differ across models. Obviously, such differences in NRI estimates can strongly affect monetary policy conclusions.[13] On the one hand, the method in Giammarioli and Valla (2003) and Bomfim (2001) yield NRI estimates that fluctuate only slightly around a value of approximately 3.5%, with a slight decreasing trend that is more visible in the case of estimates using inflation-indexed bonds. On the other hand, the estimates based on Mésonnier and Renne (2004) and Basdevant et al. (2004) present more volatile short-term dynamics, with the point estimates of the NRI falling from more than 4% to around 1% (in the case of Mésonnier

and Renne, 2004) or 2% (for the estimates based on Basdevant et al., 2004) in 2000 and 2001. The methods based on the statistical features of the data present an intermediate case, with very stable short-run dynamics and a decreasing NRI from approximately 2% in 1999 to around 1% in 2005.

The results presented in chart 3, furthermore, correspond to NRI estimates obtained *a posteriori*, i.e. using the information available up to the end of the sample employed. At any given point in time, however, the information the monetary authority has at its disposal on the variables that may affect the NRI only covers the time period up to that particular moment. This fact adds yet another dimension of uncertainty to NRI estimation – a dimension that may distort the evaluation of monetary policy decisions. To illustrate the effect of this second source of uncertainty, chart 4 shows the real-time estimates and the full-sample estimates for the method used in Crespo Cuaresma (2004a), together with confidence intervals corresponding to twice the standard error of each estimate. In some cases the real-time and full-sample point estimates of the NRI even lead to opposite qualitative assessments of the monetary policy

[13] It should be noticed that differences occur not only across methods, but also depending on whether risk premium corrections are carried out prior to EMU entry or not. Crespo Cuaresma et al. (2004a, 2004b) present evidence on this issue.
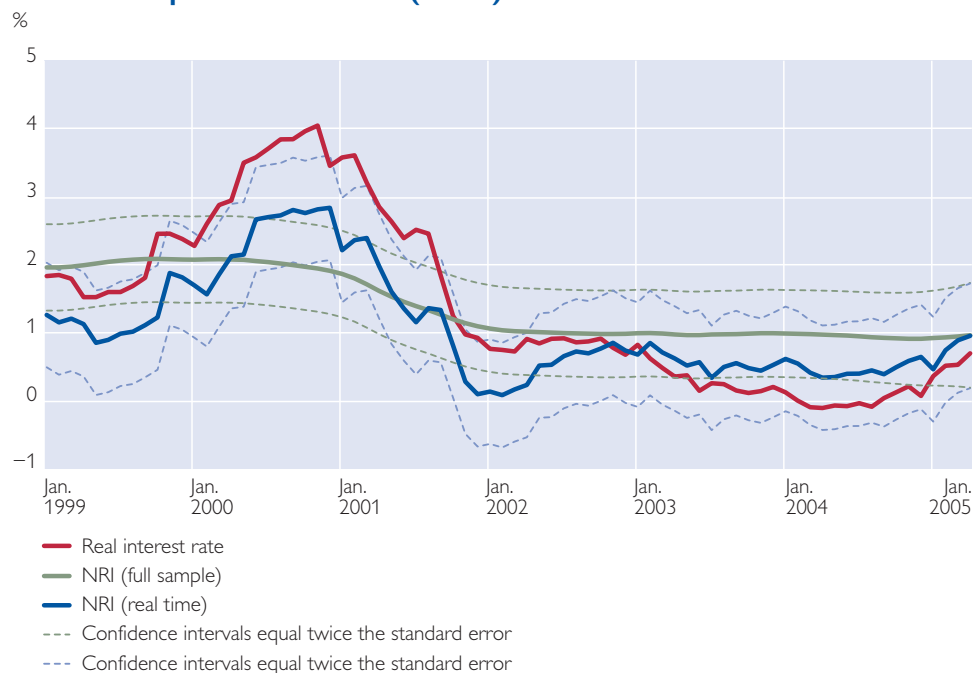
stance in the euro area. Clear examples are the results for 1999 and for the period from end-2001 up to early 2003: while the real-time point estimates of the NRI imply a positive and relatively sizeable real interest rate gap, the full-sample results indicate a contractionary monetary policy stance for the same periods.

The confidence intervals plotted in chart 4 also illustrate the high degree of uncertainty surrounding NRI estimates: for the case of the real-time estimate, for example, the real interest rate falls within the confidence interval in the period from end-2001 until the end of the available sample (April 2005).

Chart 4

Full Sample versus Real-Time NRI Estimates, Based on the Method
Used in Crespo Cuaresma et al. (2004a)

Real interest rate
NRI (full sample)
NRI (real time)
- - - Confidence intervals equal twice the standard error
- - - Confidence intervals equal twice the standard error

Source: OeNB.

The divergence between real-time and full-sample estimates can lead to significant costs for monetary policy. Using a small macroeconomic model of the U.S. economy, Orphanides and Williams (2002)[14] show that underestimating the uncertainty surrounding natural interest rate estimates can lead to sizeable costs when using Taylor-type monetary rules.[15]

In order to illustrate the difficulties involved in extracting monetary policy advice from NRI point estimates, we perform a simple exercise by computing the implied policy rates from a stylized euro area Taylor rule using different real-time estimates of the neutral rate. We will concentrate on three methods, corresponding to each of the broad methodologies described

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[14] See also Orphanides (2001, 2003).

[15] As an alternative, Orphanides and Williams (2002) propose the use of difference rules for monetary policy, which do not rely on estimates of the neutral rate.
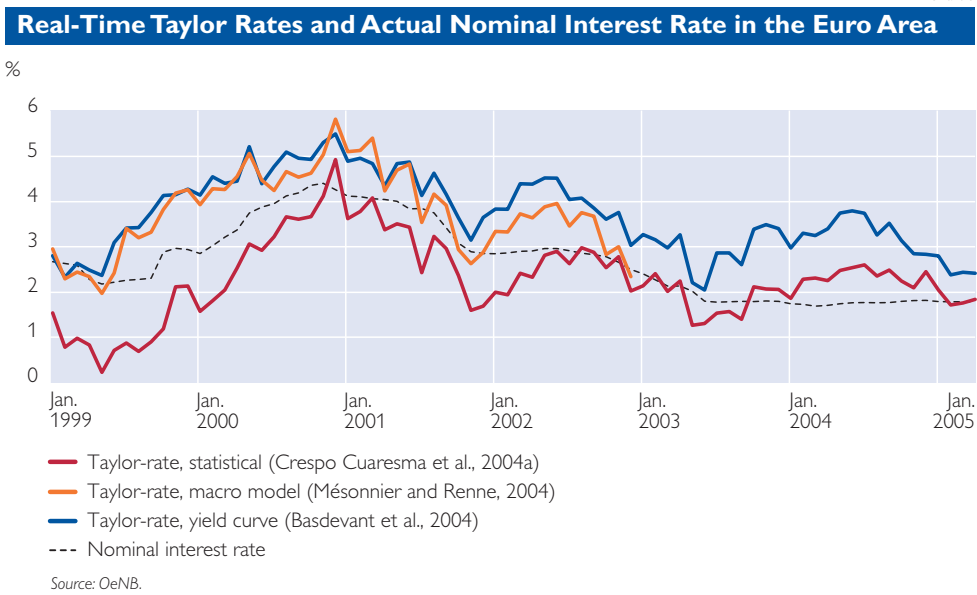
above: the model-based estimates by Mésonnier and Renne (2004), the NRI estimates based on the statistical model put forward in Crespo Cuaresma et al. (2004a) and those based on the yield-curve as in Basdevant et al. (2004). Chart 4 presents the policy rate implied by the Taylor rule given by

$$i_t^p = r_t^* + \pi^* + 1.5(\pi_t - \pi^*) + 0.5g_t,$$

where r_t^* refers to the (real-time) neutral rate of interest, π^* is the inflation objective, assumed to be equal to 2% for this exercise, and g_t is the output gap, proxied by Hodrick-Prescott filtered (logged) industrial production. We will abstract from issues of interest rate smoothing and uncertainty surrounding the output gap estimate (which is computed using the full-sample information) so as to focus on the differences driven by the real-time point estimates of the NRI.

Chart 5

Real-Time Taylor Rates and Actual Nominal Interest Rate in the Euro Area

Taylor-rate, statistical (Crespo Cuaresma et al., 2004a)
Taylor-rate, macro model (Mésonnier and Renne, 2004)
Taylor-rate, yield curve (Basdevant et al., 2004)
Nominal interest rate

Source: OeNB.

The implied policy rates shown in chart 5 present more evidence on the difficulties involved when using estimated NRIs in real time for monetary policy advice. During most of the sample, the monetary policy assessment based on the gap between the Taylor rate and the actual nominal interest rate does not produce the same results for the three methods. While the overall *dynamics* of the Taylor rate broadly coincide across methods, the *level* of the Taylor rate derived from the purely statistical estimate of the NRI differs from the other two estimates by more than 150 basis points on average.

The use of different NRI estimates also heavily influences the elasticities of empirically estimated Taylor rules with respect to the output gap and inflation expectations. Crespo Cuaresma et al. (2004a, 2004b) show that the parameter estimates of NRI-based Taylor rules for the euro area depend strongly on whether pre-EMU risk premiums are adjusted for or not. Specifically, the use of raw interest rate data for estimating the NRI leads to an overestimation of the monetary policy response to the output gap and also distorts the estimates of the policy rate's response to deviations from the inflation target.

The real interest rate gap, defined as the difference between the actual real interest rate and the NRI, is also a widely used measure of the monetary

policy stance, which should – in theory – possess leading indicator properties for inflation. Given the substantial difference in NRI estimates documented above, the different real interest rate gaps associated with the different NRI estimates are bound to have different correlation structures with future in-

flation rates. Chart 6 shows the correlation between the real interest rate gap resulting from the three methods compared above and future year-on-year core inflation (leading by one to twelve months) in the euro area for the period since the introduction of EMU.

Correlation between Different Real Interest Rate Gap Estimates and Future Inflation
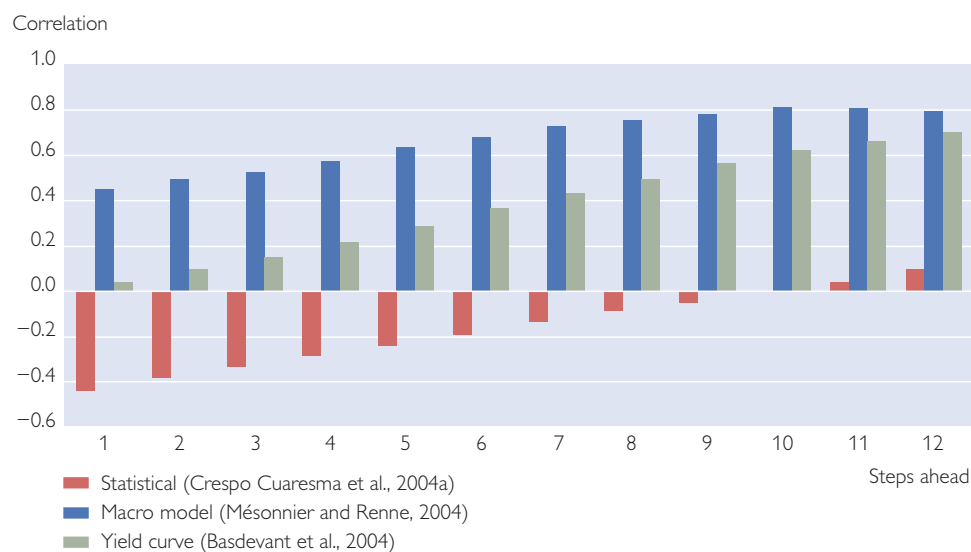
Source: OeNB.

The negative correlation between the real interest rate gap and inflation, which is supported by economic theory (see e.g. Neiss and Nelson, 2003), only appears in the estimates by Crespo Cuaresma et al. (2004a), which shows the highest (negative) correlation for one-month-ahead inflation, with declining negative correlation for inflation up to nine months ahead. The other two methods lead to a *positive* correlation that reaches a peak of approximately 0.8 for ten-months-ahead inflation rates if the NRI is estimated

according to Mésonnier and Renne (2004) and 0.7 for twelve-months-ahead rates according to the method used in Basdevant et al. (2004).[16]

6 Conclusions

When deciding on interest rates, most monetary policymakers implicitly take a position on at least the order of magnitude of the NRI to gauge whether and to what extent their monetary policy is neutral, restrictive or expansionary and to determine the direction and extent of interest rate changes. Thus,

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[16] Mixed results for the leading indicator property of the real interest rate gap with respect to inflation are also found for different time periods in the United Kingdom by Larsen and McKeown (2004). They argue that the vanishing leading indicator property is the result of monetary policy being geared toward keeping expected inflation constant and actual inflation close to a target. In this case, the deviation between actual and target inflation rates comes close to "white noise", with no correlation between the real interest rate gap and the inflation rate.

the concept of the NRI is *in principle useful for monetary policy.*

However, from a practical point of view, the use of the NRI for monetary policymaking meets with several *major obstacles.* As shown above, the literature puts forward various definitions of the NRI, potentially attached to different time horizons. Linked to this fact there is a wide variety of model specifications and empirical estimation methods that may yield rather diverse results, while real-time estimates have even wider error margins. For the euro area, the additional question arises of how to address, in empirical estimation, the large-scale and time-varying risk premiums that prevailed prior to 1999. Finally, to what extent should the natural interest rate be treated as a national/regional versus a global concept? Thus, Blinder's (1998, p. 33) view that "the neutral real rate of interest is difficult to estimate and impossible to know with precision. It is therefore most usefully thought of as a concept rather than as a number, as a way of thinking about monetary policy rather than as the basis for a mechanical rule" continues to be valid. A *pragmatic approach* thus seeks to identify broad orders of magnitude for the level, and changes in the level, of the NRI in response to structural changes and (potentially permanent) shocks in the economy. More in particular, the NRI is a useful framework for thinking about appropriate monetary policy responses to productivity shocks- and their sequencing over time.[17] In this sense, the NRI and derived indicators such as the real interest rate gap can be *some among many tools* a central bank uses.

As regards *estimates of the NRI*, judging from statistical econometric and financial market data-based estimation methods, the euro area NRI has been on a downtrend since the start of EMU, reaching around 1% to 1.5% recently. By contrast, the DSGE-based estimate quoted here does not detect any noticeable downward trend, yielding a recent NRI estimate of around 3% to 3.5%. The falling trend of productivity growth since the early, and more markedly so since the mid-1990s, a downtrend in population growth, the recent rise in private savings in several euro area countries – if it were to reflect a structural change in savings over consumption preferences – as well as lower inflation risk premiums and deeper and more efficient financial markets due to the creation of the euro would all fit with the notion of a falling NRI.

A high or low level of the NRI as such is neither an advantage nor a drawback for an economy. However, the *underlying causes may be considered welcome or undesirable.* On the one hand, a falling NRI in the euro area may reflect falling inflation risk premiums that are attributable to a credible monetary policy and a larger, deeper and more efficient single euro area financial market. On the other hand, a downtrend in the NRI can also reflect a falling trend in the working age population or weak productivity growth.

Three final considerations follow from the above observations.

The first consideration relates to *monetary policy.* The establishment of EMU and of the independent Eurosystem has reduced inflation risk premi-

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[17] *A typical example is the monetary policy response to a positive productivity shock. In the short term, the higher productivity increases potential output and thus reduces inflationary pressure, thus allowing a softer monetary policy stance. However, in the longer term, the higher demand for capital will raise the NRI, requiring monetary policy to hike interest rates in order to keep the monetary stance neutral.*

ums and eliminated former ERM exchange rate risk premiums and has thus lowered the real interest rate level. If the NRI had indeed declined, the current low level of real short-term interest rates in the euro area may be less exceptional than when judging from simple historical averages. That long-term real interest rates have fallen by far less than short-term rates recalls, however, that in the longer run, real interest rates are determined by the markets. Over the longer run, central bank actions are reflected in economic agents' expectations and will thus primarily change the price level and nominal interest rates. In the long run, the central bank can thus influence the real capital market rate only indirectly via inflation risk premiums that are included in the long-term real interest rate. By eliminating inflation uncertainties to the greatest extent possible, the central bank allows long-term real interest rates to approach as far as possible the risk-free equilibrium level.

The second consideration concerns *aggregate savings*. Many European countries have experienced falling private saving rates over the past two decades. More recently, the notion has been raised that consumers might – permanently – step up their savings in response to uncertainties about the future of public pension schemes or to the expectation a longer life span in retirement. Saarenheimo (2005) predicts a substantial decline in real interest rates to the order of 70 basis points or more as a result of ageing-related developments. This could substantially and for an extended period of time depress the NRI. Public savings have been moving in the opposite direction from private savings. In the run-up to EMU, European governments reduced their negative public savings rates. More recently, however, they have – partly in response to weak cyclical demand conditions, partly as a result of "consolidation fatigue" – again widened their budget deficits. The effects from recent changes in the Stability and Growth Pact remain be seen, but the odds point more in the direction of higher, rather than lower, fiscal deficits. The uncertainty is further enhanced by prevailing substantial external imbalances in major world economies. The unwinding of these external imbalances, the timing and extent of which are unknown, might substantially affect future global saving and natural rates of interest.

The third consideration states that a falling and low NRI may, other things being equal, also reflect a low *return on capital* and thus low real growth and wealth accumulation. Policies aiming at increasing the return on capital (such as investment in R&D and in education) and encouraging labor market participation would support potential growth, which would eventually exert an upward pressure on the NRI.

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Price Setting in Austria – Results from the Eurosystem Inflation Persistence Network

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This study examines price setting in Austria using micro observations of Consumer Price Index (CPI) data on the one hand and a one-time survey on firms' price-setting practices on the other hand. The analysis of the micro CPI data shows that consumer prices are adjusted roughly once a year averaged over all items in the CPI. However, there are enormous differences across sectors: The prices of energy products and unprocessed food are adjusted most often whereas the prices of nonenergy industrial goods and of services are changed less frequently. Austria ranks roughly in the middle range among euro area countries in terms of the frequency of price changes; it does not stand out for either especially rigid or especially flexible prices. Judging from the data set analyzed, the euro cash changeover did not bring about a significant inflationary effect. The supplementary company survey revealed that (producer) prices are reviewed four times as often as they are actually adjusted – about once a year. Price rigidity evidently tends to arise more at the second level of price formation, namely at the actual price-setting level. Firms state implicit (long-term customer relationships) and explicit contracts as causes for delaying price adjustments.

1 Introduction

Price setting is an important topic for monetary policymaking. The empirical evidence indicates that prices in an economy react to a monetary policy impulse with a certain time lag, which is one reason why monetary policy has a short-term real effect. In this respect it is crucial for monetary policymakers to know about the cause and extent of price rigidities. The appropriate reaction to shocks, for example, depends among other things on the degree of price stickiness in an economy. Moreover, price rigidity partly determines how long inflation and real economic variables take to return to their initial levels after a shock.

This study attempts to answer two questions relevant to monetary policymaking: How often are prices changed at the consumer and at the producer level in Austria, and which empirical regularities can be observed in the process? Which theories of price rigidity are relevant in practice and should therefore be incorporated in econometric models? To answer this question, it is indispensable to conduct a disaggregated analysis of price setting in Austria. For one thing, representative statements about price setting can be made only on the basis of a broad data set, and for another, a meaningful analysis of important features of pricing – such as sectoral, or idiosyncratic, differences in price-setting behavior – is possible only with a disaggregated approach. Hence, this study presents the main stylized facts about pricing in Austria on the basis of such a disaggregated approach to determine the extent and characteristics of existing price rigidities at the Austrian consumer and producer price level.

For lack of data, price setting at the micro level in Austria had not been analyzed up to now. This article is a summary of two more extensive studies conducted by the OeNB[1] within the framework of the Eurosystem Inflation Persistence Network, a joint research initiative of the euro area's national central banks (NCBs) and the European Central Bank (ECB) to examine inflation persistence.[2] These two studies

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[1] *Baumgartner et al. (2005) and Kwapil et al. (2005).*

[2] *Rigid, or sticky, prices refer to prices that adjust sluggishly at the micro level to a change in economic conditions. By contrast, inflation persistence denotes the time it takes inflation at the macro level to return to its initial level after a disturbance. In this study the terms „rigid prices" ("sticky prices") and "flexible prices" are used as opposites and are thus value-free, as we have no information about price-determining factors, so that no judgment can be made about whether a price adjustment would be required or not (except in the case of the results presented in section 5).*

are based on the analysis of two data sets that were made available especially for this research initiative. The analysis of consumer prices was performed using micro observations of data underlying the Austrian Consumer Price Index (CPI). To analyze producer prices and above all to shed light on the motives for price adjustments or nonadjustments, a survey of 800 Austrian companies was conducted and evaluated.

In the analysis of companies' price-setting behavior, we assumed that price-setting is the result of optimizing by companies. Optimizing refers not just to the decision whether a company should change prices or not, it covers the entire decision-making process behind price formation ranging from the collection of data on which to base the decision to the processing of these data to pricing itself. The use of micro CPI data serves to analyze the result of this decision-making process. However, it takes a different strategy to shed light on the underlying reasons and motivations, which is why we also opted for a direct survey of firms. This survey was targeted at establishing how companies arrive at their pricing decisions.

This study is structured as follows: Section 2 describes the extent and features of price rigidities on the basis of micro observations of data underlying the Austrian CPI for the average of the years 1996 to 2003. Section 3 presents price rigidities over time during this period, in particular during the euro cash changeover. The analysis of Austrian firms' price setting using survey data is discussed in section 4, and section 5 examines the applicability of various theories of price stickiness to companies' price-setting behavior.

Section 6 concludes with a summary of the main findings and draws conclusions for economic policymaking.

2 How Often Are Prices Adjusted? Evidence from Micro CPI Data

2.1 Analysis of 3.6 Million Individual Price Observations

Retail price dynamics in Austria are reviewed in this section: How flexible or how sticky are prices at the micro level in Austria? Are price changes more frequent in one sector than in another?

The analysis is based on monthly price quotes of all goods and services in the basket used to compute the Austrian CPI.[3] Statistics Austria provided the resulting data set to the Oesterreichische Nationalbank (OeNB) exclusively for this research project; it contains a total of 3.6 million price quotes of over 700 products for a 96-month period (January 1996 to December 2003). The monthly price quotes come with information about the store offering the product and the product characteristics as well as the unit (number or weight of items) to which the price relates. With the help of these data, the development of a product, e.g. a specific rand of banana in a particular store (anonymous), can be tracked over time and the frequency and extent of price adjustments of this product in this particular store can be determined.

2.2 On Average, 15% of All Prices Are Adjusted on a Monthly Basis

This study uses the average frequency of price changes (here, the average frequency of all price changes of a product in the period from 1996 to 2003) to determine the degree of price rigidity.

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[3] For confidentiality reasons, Statistics Austria excluded some products – such as cigarettes, cars and daily papers – from the data set it provided. Consequently, the data set used represented 90% coverage of the total basket of goods and services.

This measure is calculated on the basis of micro price observations, i.e. all observed price adjustments of a given product are divided by all valid price observations of this product. The frequency of price changes for a given product can then be summarized at the COICOP group[4] level or by product type[5] at the CPI level and at the aggregate CPI level to gain an insight into price stickiness in various sectors of the Austrian economy.

Table 1 provides an overview of Austrian consumer price changes broken down by the 12 COICOP groups and 5 CPI product types in comparison with changes in headline CPI. From the last line in table 1, we can conclude that on the average over all products, 15% of all prices are changed every month; this implies that Austrian consumer prices are adjusted every 14 months on the average.

Table 1

Frequency of Price Changes

Sample period January 1996 to December 2003	Frequency of price changes	Average duration of price spells	Frequency of price increases	Frequency of price decreases	Average price increase	Average price decrease
	per month in %	months	per month in %	per month in %	%	%
By COICOP group						
COICOP 01: Food and nonalcoholic beverages	17.3	7.9	9.1	7.9	16.9	18.7
COICOP 02: Alcoholic beverages and tobacco	14.6	6.5	7.4	7.0	14.6	14.9
COICOP 03: Clothing and footwear	12.0	9.4	6.4	5.0	23.1	33.7
COICOP 04: Housing, water, gas and electricity	11.2	14.7	6.9	4.0	6.6	8.7
COICOP 05: Furnishings, household equipment and routine household maintenance	6.9	17.8	4.1	2.5	9.3	13.6
COICOP 06: Health care expenses	5.6	18.8	4.4	1.1	4.0	6.7
COICOP 07: Transport	36.5	11.2	18.8	17.7	8.3	8.8
COICOP 08: Communications	8.9	16.0	1.8	6.9	15.5	26.0
COICOP 09: Leisure and culture	24.2	15.8	12.3	11.2	11.1	12.3
COICOP 10: Education	4.5	23.2	4.1	0.4	4.9	0.5
COICOP 11: Hotels, cafés and restaurants	8.3	19.3	5.4	2.6	7.3	8.4
COICOP 12: Miscellaneous goods and services	7.1	18.7	4.9	2.0	7.6	11.4
By product type						
Unprocessed food	24.0	6.5	12.6	11.1	19.6	22.0
Processed food	12.8	8.5	6.8	5.8	14.8	16.1
Energy	40.1	8.3	20.7	19.3	5.1	4.4
Nonenergy industrial goods	10.2	13.7	5.4	4.3	13.2	18.6
Services	12.6	19.4	7.4	5.0	8.1	10.9
Total	**15.1**	**14.1**	**8.2**	**6.6**	**11.4**	**14.7**

Source: OeNB, Statistics Austria.

2.3 Price Stickiness Differs Strongly Among Sectors

Table 1 also shows that prices of unprocessed food (24%) and energy (40%) are changed more frequently than those of other products. The strong influence of supply-side factors, such as the seasonal price fluctuations of fresh goods or the dependence of energy prices from the volatile price developments in the international oil market, on the prices of these goods explains this greater frequency. By contrast, the prices of industrial goods (10%)

[4] Classification Of Individual COnsumption by Purpose (COICOP).

[5] Unprocessed food, processed food, nonenergy industrial goods, energy, services.

and services (12%) are adjusted relatively more rarely. Above all administered prices, such as the charges and fees of central, state and local governments, which are also covered by the basket of goods and services, contribute to this low frequency of price changes. This order of the relative degree of price rigidity in the various sectors, with energy exhibiting the most flexible prices followed by unprocessed food and services showing the stickiest prices, is the same in all euro area countries with the exception of Portugal and in the U.S.A. (table 2).

2.4 45% of All Price Changes Are Reductions

The examination of price changes by increases and decreases shows that prices were raised somewhat more often on average than they were cut. A separate review of price increases and decreases is important also to demonstrate that a high frequency of price adjustments does not automatically result in a higher rate of inflation, as price increases and reductions may offset each other and only a lasting change in the frequency of price adjustments should have an impact on the rate of inflation. Table 1 reveals that the average frequency of 8.2% of price increases for headline CPI contrasts with an average frequency of 6.6% of price decreases. Consequently, 45% of all price changes are price reductions, which contradicts the popular misconception of downward price rigidity. Services are an exception to this rule, above all public services as well as restaurants and ho-

tels, as the frequency of price increases of 7.4% substantially outweighs the frequency of price reductions of 5.0%. Conversely, the COICOP group communications exhibits a much higher frequency of price cuts than of price increases, most likely because the prices of consumer electronics products are frequently lowered.

The last two columns of table 1 indicate that the extent of observed price changes can deviate considerably from the inflation rate and that price reductions are somewhat larger than price increases: Average price increases over all categories came to 11.4%, average price reductions came to 14.7%. This asymmetry may be explained for the most part by sale markdowns and promotion discounts, which are larger than regular price hikes and cuts. Given rampant discounting in the COICOP category clothing and footwear, price changes are comparatively large and the asymmetry is especially pronounced in this group.

2.5 The Frequency of Price Changes in Austria Corresponds to the Euro Area Average

Table 2 provides an international comparison of the frequency of price changes on the basis of a 50-item basket of goods.[6] The result indicates that the frequency of price changes in Austria is in the middle range – corresponding exactly to the average – of the euro area countries,[7] with Luxembourg topping the list at 23% and Italy exhibiting the lowest frequency of price changes at 10%.

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[6] The restriction to 50 products is also the reason the frequency of price changes in table 2 deviates marginally from that in table 1. However, the marginal deviation also confirms that the choice of this sample is representative of the entire basket of goods.

[7] Studies like the above-mentioned study which analyzed price rigidities using micro data were conducted within the framework of the Inflation Persistence Network for the other euro area countries except Greece and Ireland. The results of these country studies were summarized by Dhyne et al. (2005) in a cross-country analysis for the euro area.

Table 2

International Comparison: Frequency of Price Changes by Product Type						
in %						
Frequency of price changes	Unprocessed food	Processed food	Energy (oil products)	Nonenergy industrial goods	Services	Total country weights
Austria	37.5	15.5	72.3	8.4	7.1	15.4
Belgium	31.5	19.1	81.6	5.9	3.0	17.6
Germany	25.2	8.9	91.4	5.4	4.3	13.5
Spain	50.9	17.7	×	6.1	4.6	13.3
Finland	52.7	12.8	89.3	18.1	11.6	20.3
France	24.7	20.3	76.9	18.0	7.4	20.9
Italy	19.3	9.4	61.6	5.8	4.6	10.0
Luxembourg	54.6	10.5	73.9	14.5	4.8	23.0
Netherlands	30.8	17.3	72.6	14.2	7.9	16.2
Portugal	55.3	24.5	15.9	14.3	13.6	21.1
Euro area	**28.3**	**13.7**	**78.0**	**9.2**	**5.6**	**15.1**
U.S.A.	47.7	27.1	74.1	22.4	15.0	24.8

Source: Dhyne et al. (2005).

Moreover, the last line in table 2 shows that at almost 25%, the frequency of total consumer price changes in the U.S.A. is higher than that of the euro area. Apart from the different structure of the CPI basket of goods in the U.S.A. and the lack of harmonization in the calculation of the measures,[8] differing competitive retail structures and different idiosyncratic or macroeconomic shocks may serve to explain these discrepancies.

3 The Frequency and Extent of Price Changes over Time

3.1 Pronounced Seasonal Peaks in January

Chart 1 shows the frequency of price changes, which were calculated for every month, from the beginning of 1996 to end-2003. A distinct seasonal pattern with annual peaks in January is observable, which reflects the common business practice of adjusting prices around the turn of the year. Moreover, the chart illustrates that

price changes became more frequent in 2000 and thereafter and that this trend – at least in the chart – coincided with the rise in the aggregate inflation rate in 2000. This could point to a positive relationship between the frequency of price changes and the aggregate inflation rate, as suggested in other studies on this topic.[9] In addition, the two lower lines in chart 1 attest to the absence of distinctive differing seasonal patterns and trend developments between the frequency of price increases and price reductions.

Just like the frequency of price changes, which is shown in chart 1, the average rise of all price changes over time for the entire basket of goods can be presented in a chart. Chart 2 compares absolute price changes with the rise of price increases and reductions from January 1996 through December 2003. This chart reveals that the rise of price changes also exhibits seasonal fluctuations, with peaks generally occurring in July (sometimes in August). As is evident from the break-
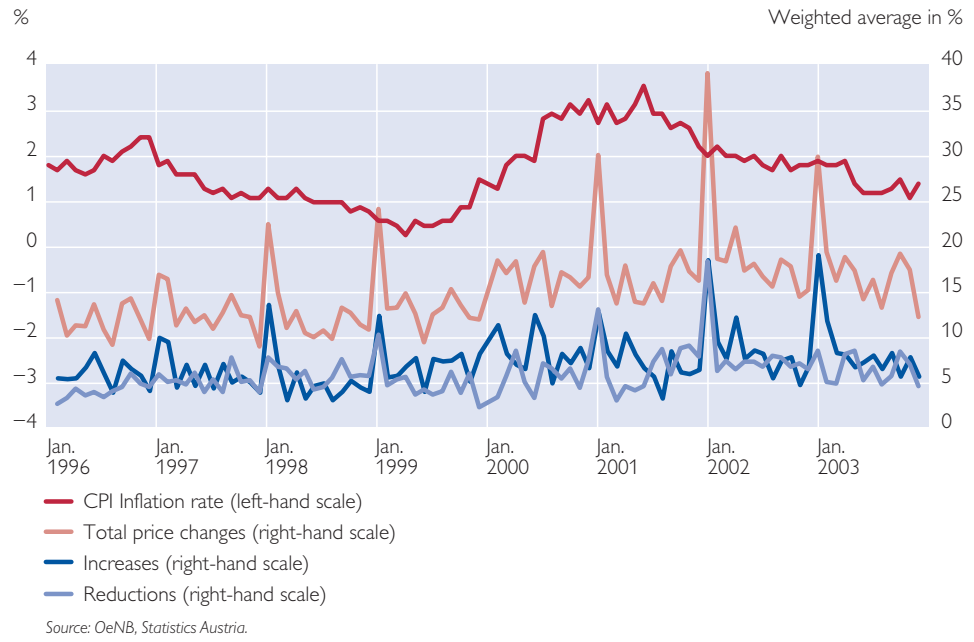
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[8] The values for the U.S.A. are drawn from a study by Bils and Klenow (2004), in which above all the volume of data covered differs from that of the studies on euro area countries.

[9] For an overview, see Dhyne et al. (2005).

Chart 1

Frequency of Price Changes and the Rate of Inflation

from January 1996 to December 2003

% Weighted average in %

- CPI Inflation rate (left-hand scale)
- Total price changes (right-hand scale)
- Increases (right-hand scale)
- Reductions (right-hand scale)

Source: OeNB, Statistics Austria.

down by price cuts and price increases, the peaks result especially from huge discounts typically offered in July and August. Again, this pattern plainly reflects sale markdowns, above all on clothing, at the end of the summer season. While the downward effect of winter sales in January is fairly similar to the impact of the summer sales, the rise of price increases in January is always below average. In other words, prices are raised more frequently in January than in other months (as shown in chart 1), but to a somewhat lesser extent than in the other months. This effect was especially pronounced in January 2002 (see section 3.2).

Chart 2

Frequency of Price Changes from January 1996 to December 2003

Weighted average in %

- Total price changes
- Increases
- Reductions

Source: OeNB, Statistics Austria.
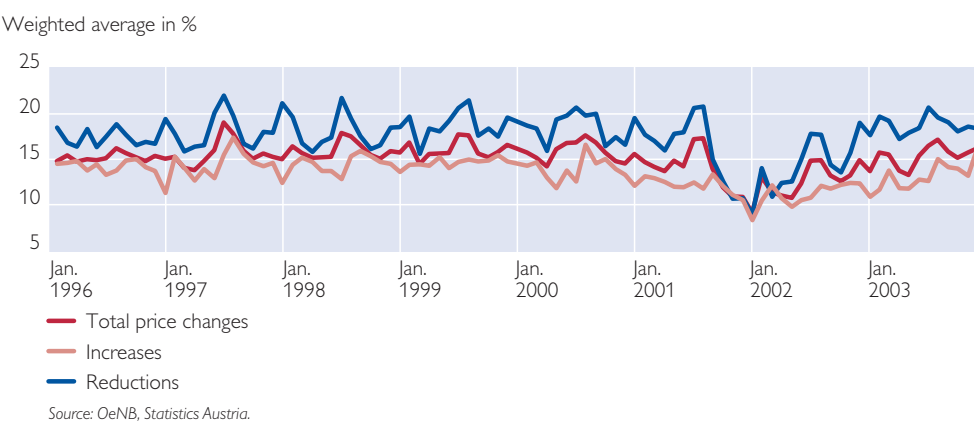
3.2 Price Changes during the Euro Cash Changeover

The analysis of charts 1 and 2 also allows for the examination of whether the cash changeover upon the introduction of the euro in January 2002 led to more frequent and/or to more pronounced price adjustments and thus had an influence on the rate of inflation. As to the frequency (chart 1), in January 2002 we could see a jump to close to 40%, which was more pronounced than during the first months of any of the other years. The evidence thus bears testimony to the fact that the introduction of euro cash resulted in more frequent price adjustments than in the previous years. 40% of the prices in the data set were changed during the euro cash changeover, which, however, also implies that some 60% of the prices remained unchanged, having been converted to euro at exactly the prescribed exchange rate for the Austrian schilling. What is more interesting, however, is to examine whether these price changes were mainly increases and thus exerted upward pressure on the inflation rate or not. We find almost exactly half of the price changes from December 2001 to January 2002 to have been increases, and the other half decreases; the overall effect on the rate of inflation was thus neutral.

The euro changeover also had a noticeable effect on the extent of price changes (chart 2): From mid-2001 onward, the average extent of price changes (increases and cuts) declined sharply, reached a low of less than 10% in January 2002, and returned to the previous level only toward the end of 2002. This means that consumer prices in Austria were changed more often but less strongly during the euro cash changeover period. A further notable feature during this period is that on average, the extent of upward and downward price adjustments was roughly equal.

The two charts therefore provide no evidence that the euro cash changeover had an effect on inflation, at least not in January 2002; at that time, more prices were adjusted than usual, but as many prices were raised as reduced. No asymmetry could be noted between the extent of price increases and price decreases, either. Hence, the micro data do not provide evidence of an impact of the euro cash changeover on inflation.[10]

4 Price Setting – Evidence from the Company Survey

This part of the study is based on data collected with a questionnaire sent to about 2,400 Austrian manufacturing and service-sector companies in January 2004, of which 873 firms (36%) contributed to the survey.[11] The companies were asked to base their answers on what they considered their "main product" (as a share of turnover). Thus, all data collected in the survey refer to pricing at the producer level, unlike the data presented in sections 2 and 3, and any discrepancies may well be attributable to the difference between consumer and producer prices.

The evidence gleaned from the responses to the questionnaire indicates that pricing occurs in two stages: In a first step, firms review the appropri-

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[10] At the macro level, earlier research did not provide any evidence of an impact of the euro introduction on the Austrian rate of inflation, either. See Fluch and Rumler (2005), in particular section 4 and the studies cited therein.

[11] The questionnaire was structured in 13 sections with a total of 79 questions on all aspects of pricing. See Kwapil et al. (2005) for further details about the survey and the questionnaire.

ateness of prices for the respective demand and cost situation; any deviation thus established would indicate that a price adjustment is in order. Second, once the price review has taken place, firms might change their prices. However, they do so considerably less frequently than they review prices. Prices are possibly left unchanged because there is no reason to change them. But perhaps prices remain unchanged because, even once firms have decided to incur the informational costs of the review, they think that there are additional costs of changing prices, which keeps them from adjusting prices.

4.1 Some 75% of All Companies Review Prices Once a Quarter at Most

The companies that regularly review their prices were asked how often these reviews are made. As table 3 shows,

about 25% of the respondents indicated that they check prices once a year, some 18% do so twice a year, around 28% review prices once a quarter and roughly 22% perform monthly assessments. The median thus reviews prices once a quarter.

This result signals that most companies do not check prices continuously but rather at greater intervals. About three quarters of the companies look at their prices at most four times a year. There may be various reasons for this approach. For one thing, it may not make sense to review prices more often because the required information – e.g. about changing costs – may become available only sporadically or because price reviews might entail "information costs" that firms do not want to incur more often (see e.g. Ball and Mankiw, 1994).

Table 3

Frequency of Price Reviews

	Number of firms	Share of firms in %
Less than yearly	2.74	0.9
Yearly	79.66	25.5
Half-yearly	54.48	17.5
Quarterly	88.52	28.4
Monthly	69.11	22.2
Weekly	12.36	3.9
Daily	5.13	1.6
	312.00	100.0

Source: Kwapil et al. (2005).

4.2 Some 75% of All Companies Change Prices Once a Year at Most

In addition to asking how often prices are reviewed, the questionnaire also asked how often prices were changed in a particular year (in this case 2003). About 22% of all firms stated that they had held prices stable, more than half of the respondents replied that they had changed prices once (see table 4). In this distribution – one price change

once a year – the median equals the mode. About three-quarters of the companies surveyed changed their prices at most once during 2003.

A comparison with other euro area countries shows (Fabiani et al., 2005) that at least 70% of the surveyed firms in Belgium, Spain, Italy, the Netherlands and Portugal indicated that they changed their prices at most once a year. In France (67%), Germany

Table 4

Frequency of Price Changes

	Number of firms	Share of firms in %
0	69.03	22.1
1	169.01	54.2
2 to 3	43.44	13.9
4 to 11	24.07	7.7
12 to 49	3.72	1.2
over 50	2.73	0.9
	312.00	100.0

Source: Kwapil et al. (2005).

(58%)[12] and Luxembourg (46%), the shares of this category of companies are somewhat lower. Similar surveys conducted outside of the euro area provide the following results: In the U.S.A., the share of companies that change their prices once a year at most came to roughly 50% (Blinder et al., 1998), in the United Kingdom, the share was 43% (Hall et al., 1997), in Canada it amounted to 35% (Amirault et al., 2004) and in Sweden the share ran to approximately 70% (Apel et al., 2005).

A comparison between the frequency of price reviews and of price changes demonstrates that prices are reviewed far more often than they are changed. More than half the companies check their prices at least once a quarter, but only about 10% of the enterprises actually change their prices as often. While the median company examines its prices once a quarter, it changes its prices once a year.

There are two ways to interpret this result. On the one hand, reviews could lead to the conclusion that prices do not need to be adjusted because the cost and/or demand situation has not changed. On the other hand, the company could forgo a price change recommended by the review because there are

reasons to keep prices constant. Both instances cause the number of price changes to lag the number of reviews.

5 Reasons for Price Rigidities

The survey included the following question: "If a change in costs or demand warrants a price increase, what considerations could keep you from raising prices immediately?" This question was also posed for price decreases. The results for price increases are presented in table 5.[13]

The respondents had the opportunity to state whether each of the ten explanations provided was applicable, rather applicable, hardly applicable or not applicable to their behavior. Depending on the degree of applicability, values ranging from 4 (applicable) to 1 (not applicable) were assigned. Column 1 in table 5 contains the mean value of all companies' responses and indicates how relevant the theories listed are for the companies' behavior. The theories in table 5 were ranked according to these values. Another approach could be to rank the responses by agreement (responses 3 and 4) and disagreement (responses 1 and 2). The consent ratio in column 3 calculated by using this ranking thus represents

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[12] The data for Germany are not taken from the German survey, but from the Ifo Business Survey.

[13] The result for price cuts is quite similar to that for price boosts. The main conclusions apply to both cases, which is why this study only goes into the reasons for price increases. For more details, see Kwapil et al. (2005).

Table 5

Ranking of Theories Explaining Price Stickiness in Price Increases								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Mean	H_0	Consent ratio in %	Apel et al.	Amirault et al.	Blinder et al.	Fabiani et al.	Hall et al.
Implicit contracts	3.04		77.37	1	2/7	4	1	5
Explicit contracts	3.02	***	73.42	3	3	5	2	1
Cost-based pricing	2.72		67.56	2	1	2	2	2
Kinked demand curve	2.69	***	62.77	4	×	×	×	×
Coordination failure	2.47	***	52.86	×	5/8	1	4	3
Information costs	1.61	**	12.21	13	10	×	9	×
Menu costs	1.52		13.39	11	10	6	8	11
Nonprice competition	1.49		11.19	×	4	3	7	8
Price readjustments	1.42	**	8.42	×	×	×	6	×
Pricing points	1.32		7.98	7	×	8	10	4

Source: Kwapil et al. (2005).
H_0 = The theory's mean score is equal to the score of the theory ranked just below it.
*** (**) [*] significant at the 1% (5%) [10%] level.

the share of companies that agree to the respective theory. The ranking by this criterion produces basically the same result.[14]

Overall, the tested theories may be classified in one of two groups. The theories in the first group received average valuations of far more than 2, and the consent ratio came to over 50%. We can thus assume that these approaches are very much in line with price setters' actual considerations. The theories in the second group received average valuations of far less than 2, and the consent ratios came to under 15%. Thus, these theories appear to be less relevant in practice. Columns (4) through (8) indicate the rankings determined in other studies.[15] The five theories that represent the first group in this study contain all first- and second-ranked theories in the other studies, which corroborates the overall robustness of the result of this study.

Implicit and explicit contracts represent the main reason for Austrian price-setters to postpone price changes. An implicit contract exists when a firm keeps prices constant to preserve or build long-term customer relationships. This theory, which goes back to Okun (1981), suggests that customers regard price increases in response to cost shocks as fairer than price adjustments in response to demand shocks. This is why enterprises avoid raising prices in response to strong demand for their product. By exhibiting this behavior, firms try to develop customer loyalty, and they secure future demand. Clearly, the companies which cited this theory as an important reason for sticky prices have a fairly large share of regular customers. The same line of reasoning applies to explicit contracts. In this case, however, the commitment to keep prices constant is explicitly laid down in writing. Explicit contracts are

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[14] The only difference is that according to the consent ratio criterion, the menu cost theory would be ranked sixth and the information cost theory seventh.

[15] Apel et al. (2005) for Sweden, Amirault et al. (2004) for Canada, Blinder et al. (1998) for the U.S.A., Fabiani et al. (2005) for the euro area and Hall et al. (1997) for the United Kingdom.

a very common practice among the surveyed firms. 75% of the respondents have concluded explicit contracts with their patrons. These contracts are typically in force for one year: 21% of the respondents have contracts with a duration of under one year, 68% have one-year contracts and 11% conclude contracts in effect for more than one year.

Another important reason for sticky prices is cost orientation in pricing. Firms move prices as a reaction to a change in input costs, but they do so with a delay rather than immediately. Hence, it might take a long time for the price of a final product to reflect cost increases if the production process has many stages.

The theories ranked fourth and fifth on our list have some similarities. A kink in the demand curve means that lifting prices would result in a disproportionately strong decline in demand whereas a cut in prices would generate hardly any additional demand. Firms confronted by such a scenario will therefore not change prices. Coordination failure is based on a similar line of reasoning. In this case, companies keep prices stable because if they raised prices, none of their competitors would do the same. As a consequence, they would lose customers. Conversely, if they reduced prices, all competitors would do the same and they would not be able to attract a single new customer. This perception of the market situation leads to rigid prices in the short run and also appears to be prevalent among price-setters in Austria.

6 Conclusions

The analysis of micro CPI data shows that consumer prices are adjusted roughly once a year on average in Austria. This is also the average determined by an analysis across the euro area countries. It follows that in a comparison across Europe, Austria has neither especially rigid nor especially flexible prices at the consumer level. However, the extent of price stickiness varies substantially among sectors, with food and energy prices being adjusted fairly often and service prices being changed far less frequently. Broken down by price increases and price decreases, 45% of all price changes prove to be price reductions (except in the service sector), which demonstrates that prices are not raised much more often than they are cut.

According to the recent economic literature, the heterogeneity of the extent of price stickiness among sectors may have implications for the choice of the price index as a monetary policy objective. Benigno (2004), Aoki (2001), and Goodfriend and King (1997), for example, contended in theoretical and in empirical works that it would be better to accord sectors with stickier prices a higher weight in the monetary policy target than sectors with more flexible prices. Applying this argument to the ECB's monetary policy target would mean dropping the sectors which exhibit the most volatile price developments from the index monitored for monetary policy purposes, which would be tantamount to providing an exclusion-based measure for the core inflation rate. While this consideration represents the theoretical rationale for the use of a core inflation rate as a basis for the monetary policy target, implementing it in practice is difficult. As Camba-Mendez (2003) among others argues, there is no consensus about how to evaluate the different measures of core inflation empirically, that is, how to define the core inflation rate and what criteria to use to select the different measures. This difficulty induced the ECB (ECB, 2001)

to define the monetary policy objective in terms of the entire basket of goods (the headline HICP) and to use core inflation (exclusion-based measures) only for additional information.

The results of the company survey also provide information about the frequency of price changes for a representative product of the respective respondent. The survey signals that the respondents adjusted prices about twice a year on average. The comparison of the survey and of the micro CPI price data reveals that producer prices are changed more often than consumer prices. This ties in with the typical findings of other studies conducted within the framework of the Inflation Persistence Network (e.g. Álvarez et al., 2005).

A more in-depth analysis of the frequency and rise of price changes during the euro changeover period on the basis of the micro CPI data shows a greater frequency of price adjustments in 2002, but the amount of upward and downward adjustments nearly offset each other. The extent of price changes in January 2002 also exhibits a symmetrical breakdown into price increases and price reductions. Hence, the euro cash changeover had no impact on aggregate inflation, at least not during the changeover month

of January 2002, which does not rule out that there may have been an inflationary effect in some sectors.

The results of the company survey lead to the conclusion that many firms do not review prices on a regular basis. In other words, price rigidities might be rooted to some extent in the very first stage of the price formation process, namely the price review stage. Two causes would appear possible: first, information costs may be involved; and second, information may be sticky. However, only 12% of all companies in the survey considered information costs to be relevant. With regard to the relevance of infrequently available new information, a survey by the Bank of Canada (Amirault et al., 2004) rules out sticky information as an important reason for infrequent price changes (only 13.5% of the sample recognized this explanation). Hence the real reasons for short-term price stickiness seem to lie in the second stage of the price formation process. Obviously firms keep prices constant even though cost and demand factors would warrant an increase, either because they do not want to endanger their customer relationships or because they fear a loss of market share.

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A Disaggregated Approach to Analyzing Public Finances in Austria

The budget elasticities derived in this study indicate that a 1% deviation of GDP from the long-term growth potential causes a purely cyclical change of 0.38% of GDP in Austria's budget balance.

The predominance of progressive income taxation in Austria is reflected in the estimated elasticity of direct taxes on households to average income of 1.3. We expected the elasticity of direct taxes on enterprises to gross operating surplus to come to 1, since the corporate income tax is a proportional tax; the computation result of 0.9 confirms our assumption. The elasticity of indirect taxes to private consumption of 0.97 documents both the high share of proportional taxes and the impact of specific taxes, while the elasticity values of social security contributions and pension insurance contributions to average income (0.99 and 1) reveal the close correlation of these budget categories with the macroeconomic base variable. The elasticity of unemployment benefits to the number of unemployed persons of 0.9 results from the rising average duration of unemployment.

Between 2000 and 2004, the general government's structural budget balance (i.e. the budget balance adjusted for cyclical effects and one-off measures) improved from −2.1% to −0.9% of trend GDP. The development of the structural budget balance in Austria is above all shaped by discretionary measures based on legislative changes. The deviation of budget categories' development from the underlying tax base, which is especially pronounced for progressive taxes, and the deviation of the tax base from GDP are only of minor importance in the development of public finances in Austria.

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1 Introduction

The primary government balance (fiscal balance less interest payments) is to a large extent determined by policy and decision-making processes. However, the budgetary outcome is also (substantially) shaped by factors outside the decision makers' (direct) sphere of influence. Cyclical fluctuations in macroeconomic activity, for instance, impact strongly on government balances via automatic stabilizers taking effect (passive stabilization policy). In a difficult economic climate, corporate profits deteriorate, unemployment rates rise and wage and employment developments are merely modest, causing revenues from taxes and social security contributions to drop while transfer payments increase. By contrast, economic upturns are characterized by disproportionately higher revenues and generally lower transfer payments (most notably unemployment and welfare benefits).

Assessments of the soundness and sustainability of public finances are usually based on cyclically adjusted budget balances; these focus purely on the development of the structural budget balance, which largely represents the result of discretionary fiscal policy.

Accordingly, section 2 of this study is dedicated to measuring cyclically adjusted budget balances for Austria using an approach developed by Bouthevillain et al. (2001) for the European System of Central Banks (ESCB). In section 3, we investigate the determinants of structural budget balances,[2] which allows us to single out the impact of both noncyclical macroeconomic developments and discretionary measures of fiscal policy. The fact that residuals remain after this disaggregation underlines the need to improve data quality.

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Deutsche Bundesbank.

2 Estimates of Cyclically Adjusted Budget Balances

A uniform, two-stage procedure used by the ESCB forms the basis for our estimation of cyclically adjusted budget balances in Austria.[3] In the first step, an error correction model is used to estimate the elasticities of various revenue and expenditure categories to their macroeconomic base variables. These elasticities specify the percentage changes in budget categories when the underlying base variables change by 1%. In the second step, the cyclical position of the economy is determined by calculating the cyclical gap, i.e. the extent to which each macroeconomic base variable deviates from its trend value, using the Hodrick-Prescott filter.[4] The cyclical component of the budget balance is calculated by multiplying the cyclical gap by the elasticities of the individual revenue and expenditure categories. The cyclically adjusted budget balance represents the budget balance under a "normal" growth path. Adjusting budget balances for cyclical effects makes it possible to analyze the development of structural budget balances and to assess the effects of discretionary fiscal policy.

The disaggregated approach we used has several advantages over methods that base estimates of the cyclical component exclusively on total GDP.[5] First, it takes into account the effects of changes in the composition of aggregate demand on public revenues and second, it allows for the fact that the various macroeconomic base variables do not necessarily follow synchronous cycles. If we consider only the cyclical fluctuations of total GDP, the asynchronous cyclical effects of various base variables on the different budget items would not be taken into account.

2.1 Budget Categories and Their Macroeconomic Base Variables

This analysis focuses on those budget categories that are directly (or automatically) influenced by the business cycle and cyclical fluctuations. These cyclically sensitive categories trace the development of selected macroeconomic base variables that in essence correspond to the respective tax base or have a direct causal link with the related budget items. While business cycle developments strongly affect government revenues in the form of indirect taxes, direct taxes on households and enterprises as well as social security contributions – around 90% of total revenues are sensitive to cyclical changes – their direct impact on government expenditures is limited to transfer payments to the unemployed. All other expenditure items (e.g. for education, research, public employment, health etc.) are not cyclically sensitive. However, pension payments in Austria used to be influenced by the business cycle: Until the turn of the year 2003 / 2004, pension payments had been coupled to the development of average net wages pursuant to §108 of the Austrian General Social Security Act. Thus, pension payments in Austria had been subjected to the same cyclical changes as wages.

We examined the relationships between the following macroeconomic base variables and budget categories:

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[3] See Bouthevillain et al. (2001).
[4] See, for instance, Bouthevillain (2001) for a description of the Hodrick-Prescott filter, its methodological short-comings and alternative approaches.
[5] See, for instance, Girouard and Andre (2005).

Table 1

Macroeconomic Base Variables and Budget Categories

Budget category	Macroeconomic base variable
Direct taxes on households	Employment rate and average income
Direct taxes on enterprises	Enterprises' gross operating surplus
Indirect taxes	Private consumption
Social security contributions	Employment rate and average income
Unemployment benefits	Number of unemployed
Pension payments	Average income

2.2 Data Set Harmonization

The underlying European System of Integrated Economic Accounts (ESA) data were adjusted to capture only the developments of the cyclical component and to make the data set as consistent as possible.[6]

— The data was adjusted for the impact of the government sector itself on the revenue and expenditure variables to make sure that the observed changes were actually caused by cyclical changes alone and not also by government reactions to economic developments. As public sector employment is directly and exclusively determined by the government, we excluded the share in total revenues of taxes and social security contributions that the public sector itself pays, i.e. the share of public employees' payroll tax and social security contributions. Furthermore, we excluded all public revenues that also appear on the expenditure side (e.g. EU contributions, indirect taxes paid by the public sector), with the exception of cyclical expenditure items determined above (unemployment benefits, pension payments).

— Direct taxes on interest income (capital income tax) are excluded a priori in accordance with the ESCB's approach. This is justified by the weak correlation between interest income and the business cycle, and it is legitimate for consistency reasons – as a rule, public interest payments are not cyclically adjusted either.

— In addition, the budget category must directly correlate with the macroeconomic variable (assessment base). In the absence of a direct correlation, the budget category in question must be reclassified. This means that the respective tax revenues are removed from the original tax aggregate and included in a tax aggregate with a suitable base variable. Unlike most indirect taxes, revenues from municipal tax payments, for instance, are based on the total wage bill and not on private consumption. These revenues are factored out of indirect taxes and included in direct taxes on households, with average income as the macroeconomic base variable.

This data harmonization ensures that the resulting elasticities are not biased by possible discretionary policy measures in response to the economic situation – they represent only the impact of the business cycle on tax revenues and the expenditure categories analyzed.

2.3 Budget Elasticity Estimates

Estimates of budget elasticity can be based on econometric methods or directly on correlations derived from

[6] This harmonization broadly follows the suggestions of Bouthevillain et al. (2001).

tax law. The second option uses tax rate design and taxable income data to derive theoretical elasticities of tax revenues. In this study, we chose the second approach to estimate the elasticity of social security contributions to employment (base variable), which was set to 1 in accordance with economic theory. The cyclical elasticities of the other budget categories were estimated using econometric methods (see box below).

Cyclical Elasticity Estimates

We used a two-step error correction model (using the Engle-Granger approach) to make econometric estimates of the other categories' cyclical elasticities for the period from 1976 to 2004[1]. In the first step, the coefficient that indicates the long-term relationship between two variables is restricted to 1, since taxes cannot exceed their macroeconomic base variable (tax base) in the long run.[2] In order to determine the short-run relationship in the second step, the residuals of the long-term relationship are included as an explanatory variable, the coefficient of which can be interpreted as the speed of adjustment[3] (error correction). The estimation equation of the short-run relationship can be expressed in the following general form:

$$\Delta Y_t = \phi_1 \Delta X_t - \gamma(Y_{t-1} - \alpha - \beta X_{t-1}) + \varepsilon_t,$$ *where ΔY_t denotes the change in the logarithmed budget category at time t, $(Y_{t-1} - \alpha - \beta X_{t-1})$ represents the error correction term, i.e. the residual term, γ is the speed of adjustment, ΔX_t denotes the change in the logarithmed macroeconomic base variable, ϕ_1 is the coefficient of this explanatory variable (the elasticity value to be identified) and ε_t represents the error term.*

Coefficients of Dynamic Estimation Equations (Elasticities)[1]

	Budget Categories					
	Direct taxes on house-holds	Direct taxes on enter-prises	Indirect taxes	Social security contributions	Unemploy-ment benefits	Pension payments
Macroeconomic base variables[2]						
Average income	0.76**			0.99***		0.98***
Average income (lagged by 1 period)	0.54*					
Gross operating surplus of enter-prises (lagged by 1 and 2 periods)		0.90**				
Private consumption			0.97***			
Number of unemployed persons					0.88***	
Number of employed persons	1			1		
Share of average income in the maximum contribution base				1.00***		
Lagged cointegration term	−0.51***	−0.61*	−0.66***	−0.23***	−0.80***	−0.70***
Step dummy variables[3]						
1984 Tax rate increase				0.06***		
1989 Tax rate decrease	−0.15***					
1993 Pension insurance contributions					0.31***	
1995 Effects of EU accession			−0.08***			
2001 Interest charge on outstanding tax liabilities		0.42***				
2002 Tax relief/flood		−0.39**				

Source: OeNB.
*** *Significance level 1%* ** *Significance level 5%* * *Significance level 10%; 1 = restricted to 1.*
[1] *All equations were estimated in logarithms.*
[2] *The coefficients of the macroeconomic base variables are not statistically significantly different from 1 with the exception of the coefficients of direct taxes on households relative to average income and of unemployment benefits relative to the number of unemployed persons.*
[3] *Step dummy variables are used to adjust for one-off (outstanding) changes in growth rates.*

This table shows the elasticities (cyclical sensitivities) that were determined in the short-run estimation equations. Elasticities are basically measured as the ratio of the percentage change in the variable to be identified (the budget category) and the percentage change in the explanatory variable (the macroeconomic base variable). Thus, elasticities denote the percent change in a budget category in reaction to a 1% change in the respective macroeconomic variable. Including dummy variables allows for specific features in the budget categories' development (e.g. tax reforms and other discretionary measures), thus improving estimation results.[4] For instance, in 1984, indirect tax revenues in Austria were considerably influenced by the increase in value added tax rates as well as the increase in the motor vehicle tax, the road transport duty levied on heavy goods traffic and the sparkling wine tax, among others. In 1995, the country's indirect tax revenues were dampened by several fiscal measures in connection with Austria's EU accession, e.g. the abolition of the import turnover tax and the introduction of the EU's common external tariff.

The table shows that e.g. the elasticity of indirect taxes to private consumption comes to 0.97%; this means that indirect tax revenues increase (drop) by 0.97% when consumption expenditures rise (fall) by 1%.

[1] For direct taxes on households, the period under review was extended to 1970.
[2] Leibrecht and Schneider (2006).
[3] This term denotes the extent of adjustment (return to the long-term growth path after a shock) within one year.
[4] While taking into account all reforms that have impacted on tax revenues in our estimations, we have included only the corresponding, statistically significant dummies in our estimation equations.

The resulting sensitivity of the budget balance to GDP is 0.38 according to these estimations. This means that the budget balance will change by 0.38% of GDP for purely cyclical reasons when GDP deviates from the long-term growth potential by 1%.[7]

The results can also be used to decompose the general government budget into a structural and a cyclical component (see chart 1). Compared with other countries, the cyclical component plays only a minor role in Austria's general government budget, which is mainly attributable to the low progressivity of the tax system as a whole and to the low business cycle volatility (Url, 2000).

Chart 1

Structural and Cyclical Componant of the General Government Budget
in Austria

% of GDP

- Cyclical component
- Budget balance
- Cyclically adjusted budget balance
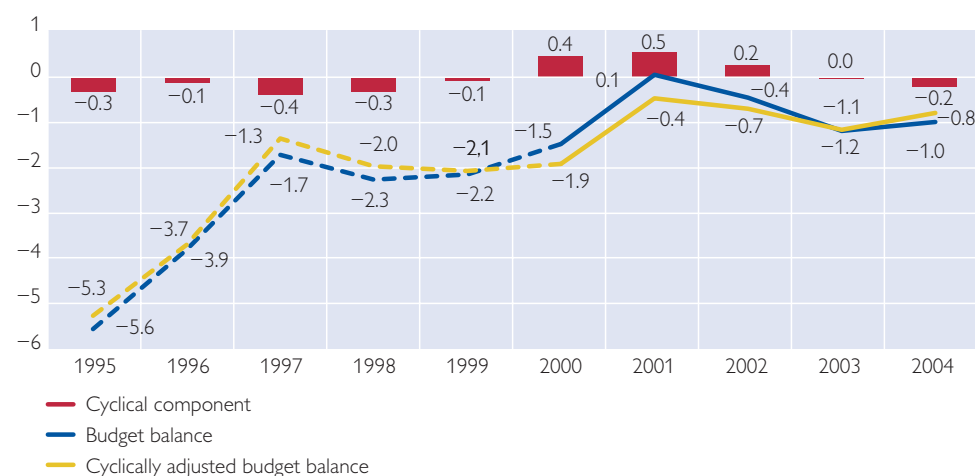
Source: OeNB, Statistics Austria.

[7] For a description of the approach used to derive sensitivity, see Bouthevillain et al. (2001).

2.4 Interpreting the Estimation Results

Revenue elasticities close to 1 may be expected for proportional taxes, as the level of the average tax rate is independent of the respective macroeconomic base (tax assessment base) – the average and marginal tax rates are identical. The revenue elasticity of progressive taxes is higher than 1, since rises in the tax assessment base cause the average and marginal tax rates to increase. The more progressive a tax system is (i.e. the higher the ratio of marginal tax rate and average tax rate is), the higher its elasticity is (Lehner, 2002).

The elasticity of *direct taxes on households* to average income (sum of the two coefficients of the table in the box) is greater than 1, which reflects the predominance of progressive income taxation (payroll tax and assessed personal income tax) in this revenue category in Austria. When we add self-employed income to the household sector's results, the average income level lagged by one period provides a statistically significant explanation for tax revenue developments, since assessed personal income tax is usually levied on self-employed income. Given the March 31 deadline of the following year for filing tax returns with the tax authorities (or May 15, if part of the income is subject to payroll tax), the income situation of the previous year also impacts on the tax revenues of the current year. The estimation results for elasticities of direct taxes on households released by the various national and international institutions differ considerably in some respects (e.g. Url, 2000; Girouard and Andre, 2005). This is mostly attributable to large differences between the un-derlying data sets, e.g. regarding sector delimitations, adjustment methods or the period under review.

It is almost impossible to narrow down the elasticity of *direct taxes on enterprises* a priori, since the relationship between tax revenues and gross operating surplus is nonlinear (given the option of carrying forward or back losses; enterprises in Austria, however, are only permitted to carry forward losses). In Austria, the required adjustments limit this budget category essentially to corporate income tax revenues. Since it is a proportional tax (proportional rate of 34%, of 25% as of 2005), we may assume elasticity to be close to 1. The determined value of 0.9 is in line with this assumption.[8]

Owing to the large share of proportional taxes, the elasticity of *indirect taxes* to private consumption may be expected to be close to 1, too. However, the fact that indirect taxes include specific taxes with a lower proportionality to private consumption suggests that elasticity will remain below 1. The estimation result for indirect taxes of 0.97 confirms this assumption. If, for instance, an increase in private consumption is only attributable to higher prices (with demand quantity remaining unchanged), tax revenue developments will remain below nominal private consumption growth.

The development of *social security contributions* is basically determined by the development of wages and salaries, the number of employed persons (i.e. those paying compulsory contributions) and the maximum contribution base. Since social security contributions in Austria are computed as a proportional share of income up until the maximum contribution base (appli-

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[8] *The result of the Wald test (which tests the statistical significance of the coefficient) also confirms that the coefficient is not statistically significantly different from 1.*

cable to about 8% of employees), the estimated coefficient of 0.99 of average income is in line with economic theory.

The elasticity of *unemployment benefits* to the number of unemployed persons was estimated at 0.9, which is, among other things, attributable to the longer average duration of unemployment: The long-term unemployed receive lower transfer payments (social assistance), so that elasticity may be expected to remain below 1.

In the past, *pension payments* in Austria had been coupled to the development of average net wages (less social security contributions) pursuant to § 108 of the General Social Security Act.[9] Our estimation result confirms the expected elasticity of 1.

The estimated elasticities are summed up in table 2 and compared with the ECB's results for Austria (Bouthevillain et al., 2001; Url, 2000).[10]

Table 2

Comparing the OeNB's Elasticity Estimations with the ECB's Results for Austria

Budget category	Macroeconomic base variable	OeNB results	Bouthevillain et al. (2001) and Url (2000)
Direct taxes on households	Employment	1.00	1.00
	Average income	1.30	1.34
Direct taxes on enterprises	Gross operating surplus of enterprises	0.90	1.11
Indirect taxes	Private consumption	0.97	0.93
Social security contributions	Employment	1.00	1.00
	Average income	0.99	0.90
Unemployment benefits	Number of unemployed	0.88	0.91
Pension payments	Average income	0.98	1.00

Source: Bouthevillain et al. (2001), Url (2000), OeNB.

3 Analysis of Structural Budget Balances

3.1 Analytical Framework

We opted for a disaggregated approach to analyzing both the budget balance (the primary balance) and the individual revenue and expenditure categories to identify the key determinants of budgetary developments in Austria. In consistency with the method of measuring cyclically adjusted budget balances in section 2, individual budget items were first adjusted for cyclical influences and temporary measures. The resulting structural revenues and expenditures are indicated as percentage ratios of revenue and expenditure to nominal trend GDP (table 3).[11] Then we analyzed the driving forces behind the annual changes in the structural revenue ratio by determining the contributions of factors that are believed to account for the bulk of total changes (table 4):

— *Fiscal drag (deviation in a budget category's development from the underlying macroeconomic base variable)*: If the elasticity of a revenue category

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[9] From 2004, the inflation rate has been the adjustment basis for pension payments.

[10] We refrained from comparing our data with the OECD's estimation results, given the different methodological approaches (among other things, differences in the data set definitions, macroeconomic variables and observation periods).

[11] Fiscal indicators are usually expressed in relation to GDP at market prices for the sake of better international comparability. Given the cyclical adjustment of the budget categories, the representation of revenue and expenditure categories (i.e. the budget balance) is based on normal economic conditions. To ensure data set consistency, it is therefore justified to use nominal trend GDP.

to its base variable does not equal 1, the development of revenues from a tax deviates from that of the underlying tax base. The following two examples illustrate why and how fiscal drag occurs. The payroll tax is usually a progressive tax with a revenue elasticity of above 1 and thus exemplifies positive fiscal drag. Since tax brackets (different tax rates as a percentage of income) are usually also defined by fixed nominal benchmark values, both wage gains that only compensate for inflation and real wage gains steadily raise the proportion of incomes in higher tax brackets. Thus, an increase in average nominal income leads to a disproportionate increase in tax revenue to the tax base.

However, an increase in the macroeconomic base variable (tax base) that is only attributable to inflation may be accompanied by dropping tax revenues (negative fiscal drag). This is especially true of specific excise duties (e.g. the mineral oil tax or the alcohol tax).

The following simplified method can be used to calculate the contribution of fiscal drag to the change in a revenue category's structural revenue ratio:[12]
$\frac{(\varepsilon-1)g_t R_{t-1}}{Y_t}$ where ε denotes the elasticity of revenue category R to its macroeconomic base variable, g represents the nominal trend growth rate of the tax base, Y is nominal trend GDP and t denotes the period of time. If the estimated elasticity does not equal 1, fiscal drag exists and is represented by $(\varepsilon - 1)$. In order to determine the contribution of fiscal drag to total change, it is multiplied by the change in the structural revenue ratio $\left(\frac{(g_t R_{t-1})}{Y_t}\right)$.

— *Decoupling of the tax base from GDP:* This factor identifies the degree by which the trend growth rate of the tax base (macroeconomic variable) deviates from nominal trend GDP. If trend GDP grows more strongly than the tax base, the resulting drop in tax revenues in percent of GDP is indicated as the decoupling effect. Sometimes, this effect is also attributable to attempts to improve price competitiveness: In Germany, for instance, the path of wage moderation in recent years has clearly caused the growth of the payroll tax base to deviate from GDP development in general. The contribution of the decoupling effect to changes in the structural revenue ratio (of individual revenue categories) is calculated as follows:

$\frac{(g_t-\gamma_t)R_{t-1}}{Y_t}$ with γ denoting the growth rate of nominal trend GDP (in addition to the notation indicated above). This effect exists when the two growth rates deviate $(g_t - \gamma_t \neq 0)$; it explains that part of the change in the structural revenue ratio that is consistent with the degree of decoupling.

— *Impact of legislative changes on revenues:* The impact of legislative changes on the general government's revenues from taxes and social security contributions is also indicated separately. This analysis thus includes the expected or estimated effect of tax rate changes on revenues (in percent of trend GDP).

— *Residual*: When the total changes in individual revenue categories are

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[12] See Kremer et al. (2005) for a detailed formal description of changes in structural revenue ratios.

not fully attributable to the sum of the three factors listed above, the resulting residual should be used to identify possible special factors that can (or should) be considered to explain the total change.

An individual revenue category contributes to budget consolidation when its structural component increases, whereas public finances deteriorate when this component decreases.

Expenditure categories were not analyzed in detail. All expenditure items with the exception of (cyclically adjusted) unemployment benefits were directly included in table 4. An expenditure category contributes to budget consolidation when the percentage ratio of its structural component to trend GDP decreases. The use of nominal trend GDP instead of nominal GDP also adjusts the denominator of the expenditure ratio for cyclical developments.

3.2 Decomposition of Fiscal Developments – Results for 2000 to 2004

The following analysis examines the determinants of change in Austria's structural budget balance as defined above from 1999 onward. The data presented in table 3 serves as a basis for decomposing the revenue and expenditure ratios into the above-mentioned components. Total government revenue and expenditure were adjusted for cyclical influences and temporary measures (e.g. investment subsidy, expenditures in the wake of the flood in 2002) and expressed in percent of nominal trend GDP.

Between 2000 and 2004, the structural budget balance (i.e. the general government budget balance adjusted for cyclical effects and temporary measures) improved from –2.1% to –0.9% of trend GDP. This improvement is attributable to reduced interest expenditure on the one hand, and to the strong increase in the primary surplus in 2001 and 2002 on the other. Even though the structural primary surplus gradually declined over the following years, its value in 2004 was still noticeably above that recorded in 2000.

Budget consolidation was achieved despite the marked decrease in the structural revenue ratio from 50.9% to 49.2% of trend GDP.[13] In 2001, this decrease was primarily caused by a drop in public sales, whereas in the following years, it was ascribable also to lower tax revenues especially from corporate taxes and direct taxes on households. The structural revenue ratio from social security contributions and indirect taxes also declined.

Table 4 shows the changes in individual budget categories (revenue and expenditure ratios), broken down by the four explanatory factors. An analysis of the structural revenue ratio shows that payroll and income taxes, owing to their progressive nature, contribute positively to the structural primary balance (*fiscal drag*), whereas corporate taxes (in this case, corporate income taxes) cause it to deteriorate slightly given the elasticity of below 1. Specific taxes, which are responsible for the negative fiscal drag of indirect taxes, do not play a significant role. All in all, the positive fiscal drag of direct taxes on households offsets the negative fiscal drag of all other tax categories under review.

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[13] *The unadjusted revenue ratio increased considerably in 2001, which is mainly attributable to temporary measures that pushed up revenues.*

Table 3

Total Revenue and Expenditure of the General Government in Austria,

Adjusted for Cyclical Influences and Temporary Measures

% of trend GDP

	1999	2000	2001	2002	2003	2004
Deficit (−) or surplus (+)	**−2.3**	**−2.1**	**−0.9**	**−0.6**	**−0.9**	**−0.9**
Total revenue	*52.0*	*50.9*	*50.7*	*50.1*	*49.4*	*49.2*
Total current revenue	51.7	50.7	50.5	49.9	49.2	49.1
Total capital revenue	0.3	0.2	0.2	0.2	0.2	0.2
Total expenditure	*54.3*	*53.0*	*51.6*	*50.7*	*50.2*	*50.2*
Total current expenditure	50.1	49.5	47.9	47.3	47.2	46.6
Total capital expenditure	4.2	3.5	3.7	3.4	3.0	3.5
Primary deficit (−) or surplus (+)	**1.3**	**1.6**	**2.7**	**2.8**	**2.2**	**2.0**
Deficit (−) or surplus (+)	−2.3	−2.1	−0.9	−0.6	−0.9	−0.9
Interest payable	3.6	3.7	3.6	3.4	3.1	3.0
Total current revenue	**51.7**	**50.7**	**50.5**	**49.9**	**49.2**	**49.1**
Direct taxes	*13.3*	*13.2*	*14.1*	*13.5*	*13.5*	*13.4*
of which by corporations (S.11+S.12)	2.1	2.3	2.9	2.4	2.4	2.4
of which by households (S.14+S.15)	11.2	10.8	11.3	11.1	11.1	11.0
Indirect taxes	*15.8*	*15.2*	*15.1*	*15.3*	*14.8*	*14.8*
of which VAT	8.5	8.1	8.0	8.1	7.8	7.9
of which taxes on energy	1.6	1.6	1.7	1.7	1.8	1.8
Social contributions	*17.1*	*16.7*	*16.3*	*16.2*	*16.2*	*16.3*
of which employers' contributions	7.2	7.0	6.8	6.8	6.8	6.8
of which employees' contributions	6.2	6.1	6.1	6.0	6.0	6.0
Other current transfers receivable	*2.5*	*2.6*	*2.9*	*2.9*	*2.7*	*2.6*
of which interest receivable	0.6	0.8	0.8	0.8	0.7	0.7
Sales	*3.0*	*2.9*	*2.0*	*2.0*	*2.0*	*2.0*
Total current expenditure	**50.1**	**49.5**	**47.9**	**47.3**	**47.2**	**46.6**
Current transfers	*30.0*	*29.8*	*30.3*	*30.1*	*30.2*	*29.9*
Social payments	23.7	23.7	23.4	23.7	23.9	23.8
of which old age pensions − COFOG 10.2.0	3.6	3.5	3.4	3.5	3.7	3.8
of which unemployment benefits − COFOG 10.5.0	0.0	0.1	0.1	−0.0	−0.0	−0.1
Subsidies	3.5	3.4	3.5	3.7	3.7	3.3
Other current transfers payable	2.8	2.7	3.4	2.7	2.6	2.7
Interest	*3.6*	*3.7*	*3.6*	*3.4*	*3.1*	*3.0*
Compensation of employees	*11.3*	*11.1*	*9.8*	*9.5*	*9.5*	*9.4*
of which employers' contributions	0.8	0.8	0.7	0.8	0.8	0.8
Intermediate consumption	*5.2*	*4.9*	*4.2*	*4.3*	*4.4*	*4.4*
Gross savings	**1.6**	**1.2**	**2.5**	**2.6**	**2.0**	**2.4**
Total capital revenue	**0.3**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**
of which capital taxes	0.1	0.1	0.1	0.1	0.1	0.1
Total capital expenditure	**4.2**	**3.5**	**3.7**	**3.4**	**3.0**	**3.5**
Gvernment investment	1.7	1.5	1.2	1.3	1.2	1.3
Other net acquisitions of nonfinancial assets	−0.0	−0.4	−0.0	−0.0	−0.1	0.0
Capital transfers	2.5	2.5	2.6	2.1	1.9	2.3

Source: Kremer et al. (2005), OeNB.

It is primarily in the development of revenues from social security contributions, most notably in 2001, that the *decoupling of tax bases from GDP growth* becomes evident. The strong decoup-ling of the payroll tax base (average income multiplied by employment) in 2001 is chiefly attributable to public sector developments. The new calculation method for imputed social secur-

Table 4

Change in Total Revenue and Expenditure of the General Government in Austria,

Adjusted for Cyclical Influences and Temporary Measures

% of trend GDP

	2000	2001	2002	2003	2004	2000 to 2004	Average 2000 to 2004
Unadjusted balance (improvement +, worsening −)[1]	**0.7**	**1.8**	**−0.5**	**−0.9**	**0.0**	**1.1**	**0.2**
Cyclical component	0.5	0.1	−0.3	−0.3	−0.2	−0.1	0.0
Temporary measures	0.0	0.5	−0.5	−0.3	0.1	−0.2	0.0
Balance (improvement +, worsening −)	**0.2**	**1.2**	**0.4**	**−0.3**	**−0.1**	**1.3**	**0.3**
Interest payments	0.2	−0.1	−0.2	−0.3	−0.1	−0.6	−0.1
due to changes in average interest rate	*0.1*	*−0.1*	*−0.2*	*−0.2*	*0.0*	*−0.5*	*−0.1*
due to changes in debt level	*0.1*	*0.0*	*0.0*	*−0.1*	*−0.1*	*−0.1*	*0.0*
Primary balance (improvement +, worsening −)	**0.3**	**1.1**	**0.1**	**−0.6**	**−0.2**	**0.8**	**0.2**
Total revenue	**−1.1**	**−0.2**	**−0.6**	**−0.8**	**−0.1**	**−2.7**	**−0.5**
Direct taxes paid by corporations	**0.2**	**0.5**	**−0.4**	**0.0**	**0.0**	**0.3**	**0.1**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	−0.1	0.0
Decoupling of base from GDP	0.0	0.1	0.1	0.1	0.1	0.4	0.1
Legislation changes	0.0	0.5	0.3	0.0	0.1	0.9	0.2
Residual	0.2	0.0	−0.9	−0.1	−0.2	−0.9	−0.2
Direct taxes paid by households	**−0.4**	**0.4**	**−0.2**	**0.0**	**−0.1**	**−0.2**	**0.0**
Fiscal drag	0.1	0.1	0.1	0.1	0.1	0.4	0.1
Decoupling of base from GDP	0.0	−0.1	0.0	0.0	0.0	−0.1	0.0
Legislation changes	−0.5	0.4	0.0	0.0	−0.1	−0.3	−0.1
Residual	0.0	0.0	−0.2	−0.1	0.0	−0.2	0.0
Social contributions	**−0.4**	**−0.4**	**−0.1**	**0.0**	**0.1**	**−0.8**	**−0.2**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decoupling of base from GDP	0.0	−0.6	−0.2	−0.1	0.0	−0.9	−0.2
Legislation changes	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Residual	−0.3	0.2	0.1	0.1	0.0	0.0	0.0
Indirect taxes	**−0.5**	**−0.1**	**0.1**	**−0.4**	**0.0**	**−0.9**	**−0.2**
Fiscal drag	0.0	0.0	0.0	0.0	0.0	−0.1	0.0
Decoupling of base from GDP	0.0	0.0	−0.1	0.0	0.0	−0.2	0.0
Legislation changes	0.0	0.0	0.0	−0.1	0.1	−0.1	0.0
Residual	−0.5	0.0	0.2	−0.3	−0.1	−0.7	−0.1
Taxes and social contributions overall	**−1.1**	**0.4**	**−0.6**	**−0.5**	**0.0**	**−1.7**	**−0.3**
Fiscal drag	0.1	0.1	0.0	0.0	0.1	0.3	0.1
Decoupling of base from GDP	0.0	−0.6	−0.1	0.0	−0.1	−0.8	−0.2
Legislation changes	−0.6	0.9	0.3	−0.2	0.2	0.6	0.1
Residual	−0.5	0.1	−0.8	−0.3	−0.2	−1.8	−0.4
Non-tax-related revenue[2]	**0.0**	**−0.6**	**0.0**	**−0.3**	**−0.1**	**−1.0**	**−0.2**
Total primary expenditure	**−1.4**	**−1.3**	**−0.7**	**−0.2**	**0.1**	**−3.5**	**−0.7**
Social payments	0.0	−0.3	0.3	0.2	−0.1	0.1	0.0
of which old-age pensions	*−0.1*	*0.0*	*0.1*	*0.2*	*0.1*	*0.2*	*0.0*
of which unemployment benefits	*0.1*	*0.0*	*−0.1*	*0.0*	*0.0*	*−0.1*	*0.0*
of which social transfers in kind	*0.0*	*−0.1*	*0.0*	*0.0*	*0.0*	*−0.1*	*0.0*
Subsidies	−0.1	0.2	0.1	0.0	−0.3	−0.2	0.0
of which EU[3]	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Compensation of employees	−0.3	−1.3	−0.2	−0.1	−0.1	−2.0	−0.4
Intermediate consumption	−0.3	−0.7	0.1	0.1	0.0	−0.8	−0.2
Government investment	−0.2	−0.4	0.1	−0.1	0.1	−0.5	−0.1
Other[4]	−0.6	1.2	−1.1	−0.3	0.5	−0.3	−0.1
of which EU[5]	*−0.1*	*0.0*	*−0.1*	*0.0*	*−0.1*	*−0.3*	*−0.1*
Memorandum items							
Health care[6]	0.0	−0.2	0.1	0.0	0.0	−0.2	0.0
Trend growth of real GDP	2.2	2.1	2.0	1.9	2.0	×	2.0
Change in GDP deflator	1.8	1.8	1.3	1.4	1.9	×	1.6
Change in number of public employees	−0.5	−11.1	−0.6	−0.5	−0.4	×	−2.6

Source: Kremer et al. (2005), OeNB.

[1] Change in unadjusted balance, cyclical component and temporary measures as percentage of nominal GDP. Due to the diffe-rent denominator the change in the ratio of the adjusted balance to trend nominal GDP might deviate slightly from the change in the ratio to nominal GDP of the unadjusted balance less cyclical component less temporary measures.

[2] Other current transfers receivable, sales and total capital revenue.

[3] Expenditure paid from EU funds that is spend under category „Subsidies".

[4] Other current transfers payable, other net acquisitions of non-financial assets and capital transfers.

[5] If country is a net payer to EU budget: net payments to EU budget less expenditure paid from EU funds that is not spent under category „Other". If country is a net receiver from EU budget: expenditure paid from EU funds that is spent under category „Other."

[6] Social benefits, social transfers in kind and other current transfers that can be allocated to the function of the provision of public health care services.

ity contributions, which has been in use since 2001, is a key factor.[14] Furthermore, the Austrian federal government's measures to downsize the public sector (as specified in the 2000 to 2003 and 2003 to 2006 government programs) took effect in 2001. They included measures such as not filling vacancies caused by retirement and substantial outsourcing. These changes alongside very modest wage increases in the public sector caused the wage bill to decrease by 5% while trend GDP grew by 4%. Even though the private sector displays an – albeit small – positive decoupling[15] (i.e. the wage bill is growing faster than GDP), this effect will not be sufficient to offset the developments in the public sector. Decoupling in the private sector had generally been characterized by a positive sign until 2003; this trend seems to have come to an end: Now the wage bill in the private sector, too, is growing at a slower pace than GDP, primarily because GDP growth in recent years has been chiefly fueled by net exports. However, the contribution of net exports to wage bill growth is not necessarily as high as that to GDP growth.

Even though the underlying macroeconomic base is the same, the rise in direct taxes on households does not deviate as strongly from GDP growth as that in social security contributions. One possible explanation for this phenomenon (with the exception of 2001 for methodological reasons) is that whereas pension payments are subject to payroll tax (so that revenues from payroll tax remain basically unchanged, as pension payments to retired civil servants, for instance, are

calculated as a proportion of their last active income), they are not subject to social security contributions or accident insurance premiums.

The impact of *legislative changes* accounts for the bulk of changes within the individual revenue categories. The impact of this explanatory component on annual total revenues comes to between 0.2% and 0.9% of trend GDP. In every year of the observation period, this impact is stronger than the significance of the other explanatory components. In 2001, for instance, the introduction of interest charges on outstanding tax liabilities of 5.75% p. a. had a positive structural effect – the tax authorities received about EUR 1 billion from enterprises seeking to avoid paying these interest charges. This improvement in tax morale may be regarded as a permanent change, as it was observed throughout the period under review. Still, the effect of this legislative change decreased over time. In 2002, other legislative changes (e.g. the abolition of the investment allowance, the limitation on the use of loss carryovers) further drove up revenues.

While tax revenues from households (and subsequently also the primary surplus) were dampened by the reform of payroll taxation and assessed income taxation in 2000, revenues were driven up in 2001 by the reduction of tax credits in payroll and income taxation as well as the increase in the prepayment of income tax.

Given that the *residuals* – correlations not accounted for in these estimations – are generally small, the explanatory power of the three factors listed

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[14] *Decoupling effects are caused by changes in the calculation method of imputed social security contributions, as wage bills are calculated on the basis of the compensation of employees.*

[15] *It seems that the positive decoupling resulting from the outsourcing measures was not more pronounced in the private sector as many people decided to retire before the pension reform of 2000 became fully effective.*

above may be regarded as high in most cases. However, individual residual items (e.g. in corporate taxes in 2002) came to as much as 0.9 percentage points of GDP. The surge in corporate tax revenues in 2001 was attributed to the above-mentioned introduction of interest charges on outstanding tax liabilities. Still, as the assumptions on the long-term effects of this measure were clearly too high for 2002, the contribution to growth of legislative changes in 2002 does not provide an explanation for the actual developments, which caused the residual to increase.

As a matter of fact, the macroeconomic base variable for enterprises' gross operating surplus is merely a rough approximation of the tax base for the corporate income tax. Hence, the largest residual may be expected for direct taxes on enterprises.

The comparatively large negative residuals for social security contributions might be ascribable to the elimination of social security contributions that were levied pursuant to the Continued Payment of Wages and Salaries Act, whereas the positive residual in 2001 may be attributable to the increase in civil servants' pension insurance contributions in 2000, which caused revenues to go up especially from 2001 onward, and to the abolition of premium-free coverage of childless nonworking spouses by the national health plan. These factors should have been included in the explanatory component "legislative changes"; owing to a lack of reliable estimates of budgetary effects, however, it was impossible to single out the relevant data. Thus, the measures' effects contribute to the residual.

Unfortunately, a similarly detailed analysis of the spending structure is not feasible, given that public spending is shaped by discretionary decisions to a much larger extent than revenues. Generally speaking, budget consolidation when the revenue ratio is sinking is only possible if expenditure is cut, too. The structural expenditure ratio declined from 53.0% to 50.2% of trend GDP in the period under review, with structural cost savings focusing on expenditures for civil servants and intermediate consumption.

4 Conclusions

The budget elasticities derived in this study indicate that a 1% deviation of GDP from the long-term growth potential causes a purely cyclical change of 0.38% of GDP in Austria's budget balance.

The estimated elasticity of direct taxes on households to average income comes to 1.3, reflecting the predominance of progressive income taxation in Austria. The elasticity of direct taxes on enterprises to gross operating surplus may be expected to come to 1, since the corporate income tax is a proportional tax; the calculated elasticity of 0.9 corroborates this assumption. The elasticity of indirect taxes to private consumption of 0.97 documents both the high share of proportional taxes and the impact of specific taxes. The elasticity of social security contributions and pension insurance contributions to average income comes to 0.99 and 1, respectively, which documents the close correlation of these budget categories with the macroeconomic base variable. The elasticity of unemployment benefits to the number of unemployed persons of 0.9 is determined by the longer average duration of unemployment. The econometric estimations of short-run and long-run relationships between the individual budget categories and the respective macroeconomic base variables pro-

duced statistically significant results. What is more, they are in line with expectations based on tax theory.

Both the cyclical fluctuations of the Austrian economy and the changes in the budget balance in reaction to these fluctuations are smaller in Austria than, for instance, in the Scandinavian countries (see e.g. Bouthevillain, 2001). This means that the structural component of revenue and expenditure accounts for a bigger share of the unadjusted budget balance in Austria than in the Scandinavian countries.

Between 2000 and 2004, the general government's structural budget balance (i.e. adjusted for cyclical effects and temporary measures) improved from –2.1% to –0.9% of trend GDP. This is attributable to lower interest expenditures on the one hand and to the strong increase in the primary surplus in 2001 and 2002 on the other. Even though the structural revenue ratio (adjusted for cyclical effects and temporary measures) declined notably from 50.9% to 49.2% of trend GDP, the budget was consolidated, as the structural expenditure ratio (adjusted for temporary measures) dropped from 53.0% to 50.2% of trend GDP. Structural cost savings were achieved primarily by reducing expenditures for civil servants and intermediate consumption.

Fiscal drag (i.e. the deviation in a budget category's development from the underlying macroeconomic base variable) makes a positive, albeit small, contribution to the development of Austria's primary balance. This results from the structure of the Austrian tax system: The proportion of progressive taxes is comparatively small, as is their degree of progressivity. Still, the progressive nature of payroll and income taxation contributes positively to the development of the structural primary balance. These effects more than offset the negative contribution of the corporate income tax and of specific taxes (as a subaggregate of indirect taxes) to fiscal drag.

With a few exceptions, the decoupling of macroeconomic base variables from GDP is only of minor importance for the development of public finances in Austria.

The development of the structural primary balance in Austria is primarily attributable to discretionary measures (based on legislative changes). In the period under review (2000 to 2004) numerous discretionary measures caused both increases and shortfalls in revenues.

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Highlights

The European Integration Process –
A Changing Environment for National
Central Banks

Paul Schmidt

On October 21, 2005, the Oesterreichische Nationalbank (OeNB) held a high-level workshop labeled "The European Integration Process – A Changing Environment for National Central Banks" for an international audience.[1] The workshop provided an overview of the changing role that national central banks (NCBs) play in Europe, with a focus on the institutional and legal challenges the individual NCBs face. Moreover, it provided a platform for exchanges among NCB representatives of countries currently undergoing different stages of European integration.[2]

In his opening remarks, *Josef Christl (OeNB)* drew attention to the decentralized nature of the European System of Central Banks (ESCB) and the Eurosystem and pointed out that the credibility NCBs enjoyed in their respective countries decisively contributes to the success of the euro and hence of the European integration process. Christl called for a reinforcement of NCB cooperation in Europe and assessed the workshop as a step toward reaching this target. In times of institutional uncertainty and during the phase of reflection about the EU Constitutional Treaty, Christl emphasized, it is particularly important to have a stable currency which promotes a common European identity far beyond the confines of Economic and Monetary Union (EMU). The single currency plays a key role as a catalyst for political integration and continuous economic reforms and represents a successful step toward European integration.

By linking the supranational and national levels, the Eurosystem NCBs represent the communication interface of the European single currency. Moreover, the decentralized structure of the ESCB/Eurosystem enables the NCBs to contribute to the stability-oriented monetary and economic policy and to secure financial stability across the EU and at the national level.

According to Christl, the integration of the NCBs into the European decision-making mechanisms and forums changes these bodies' working methods at all hierarchical levels and in all areas of their work. The closer the cooperation among NCBs is, the more opportunities they have to develop and benefit from best practice. Efficient cooperation within the ESCB/Eurosystem and flexible, specialized NCBs are essential for Europe and the success of the euro.

In his keynote speech, *Tommaso Padoa-Schioppa (former member of the Executive Board of the European Central Bank)* laid the groundwork for the individual panels in the workshop by analyzing the changing tasks of NCBs in Europe in a historical context and highlighting different trends.

Historically, NCBs were monopolists who were solely responsible for the issue of banknotes. Central banks used the term "national" in their designations because it was the nation-state that had the right to issue banknotes from the end of the 18th century onward. The term "central" referred to central banks' uniqueness, to centralized state structures and to a centralized exercise of power by the state. However, the central bank of the euro is not a national bank, nor is Europe a state. Had the economic and fiscal

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[1] The OeNB will publish a separate workshop issue containing the contributions presented at this workshop. It is scheduled for publication in the first quarter of 2006 and will be available in print and online on the OeNB's website (www.oenb.at).

[2] The opinions voiced by the speakers at this workshop are their own views and do not necessarily reflect the official position of the institution they represent.

policy environment in Europe not evolved, no consensus could have been reached on the introduction of the euro and the building of the ESCB and the European Central Bank (ECB), nor would it have been possible to invest the terms "central" and "national" with new meaning.

What changed especially dramatically is the NCBs' role in fiscal policy-making and in commercial banking. The central banks' concentration on monetary policy tasks and the trend toward independence are achievements of the Treaty of Maastricht; hence, they are quite recent developments. The ESCB and Eurosystem are more independent than the individual NCBs, as it is not accountable to a single political body; any change in the ESCB/ECB Statute requires the consent of all 25 Member States.

Another trend, noted Padoa-Schioppa, is the internal reorganization of the NCBs. While the Bank of England never established a branch network, the structure of the Banque de France includes around 200 branches. Consequently, the introduction of the euro cannot be blamed for the closure of branches in some EU Member States. Additionally, changes in NCBs are also set in motion by global development, and some of them should be seen independently of European integration, e.g. new tasks in safeguarding financial stability. Some areas in which NCBs have traditionally been active are changing, but the NCBs continue to play a key role within the ESCB/Eurosystem.

Preparing for EU/ESCB Membership

Panel I was entitled "Institutional challenges for central banks – comparing experiences." Central bank representatives from Croatia, Romania, Estonia and Austria provided an overview of organizational changes and new institutional requirements facing their banks.

Alfred Matejka (Hrvatska narodna banka), whose country has now begun EU accession negotiations, explained that Hrvatska narodna banka had just established an EU division and had restructured its banking supervision operations. Moreover, open market operations had just been introduced as a new monetary policy instrument. Within the framework of the Stabilisation and Association Agreement, Croatia is taking further steps to liberalize capital transactions.

Cristian Popa (Banca Națională a României) clarified that the Banca Națională a României, as the central bank of an acceding country, was focusing on internal restructuring activities that included a definition of the bank's core competences, the closure of branches and the improvement of internal communications. Further challenges extend in particular to making progress with the liberalization of capital transactions, introducing inflation targeting, reforming the electronic payment system and redenominating the currency.

Martin Pöder (Eesti Pank) noted that ever since Estonia joined the EU and its central bank became a member of the ESCB, Eesti Pank has been faced with a heavier workload, the manifold topics that the ESCB deals with and a greater coordination effort at the national level. The greatest challenges that Eesti Pank is confronted with is the fulfillment of the convergence criteria, the logistical and organizational preparation of the introduction of the euro and the justification of Eesti Pank's role to the public.

Isabella Lindner (OeNB) provided a résumé of the impact of Eurosystem membership on the OeNB: In legal

terms, the OeNB has transferred monetary sovereignty, whereas in real terms, it has gained influence on European monetary policymaking. The OeNB has remained responsible for the implementation of monetary policy at the national level. The demands on OeNB staff have risen. ESCB-wide harmonization, also at the legal level, is increasingly affecting many of the OeNB's business areas. The OeNB has found niches and areas within the Eurosystem in which it can specialize. Another consequence is greater intercultural networking, lobbying and increased competitive pressure – albeit with a team spirit – within the Eurosystem.

Panel II dealt with "Adjusting central bank legislation – legal challenges." Central bank representatives from Austria, Bulgaria, Turkey and Macedonia discussed the need to amend central banking legislation when adopting the EU treaties. *Sandra Dvorsky (OeNB)* provided an overview of the legal challenges for the three Southeastern European countries represented on the panel. *Rossen Grozev (Bulgarian National Bank), Derya Yesiladali (Türkiye Cumhuriyet Merkez Bankası)* and *Toni Stojanovski (National Bank of the Republic of Macedonia)* presented the reform steps their banks had already taken or were preparing to take.

As each of these three countries is at a different stage of the European integration process, progress with legal adaptation also differs. Bulgaria's central banking law has largely been adapted to the EU Treaty provisions, whereas Turkey and Macedonia need to make further efforts to adapt legislation to EU standards. Above all, the central banks' independence needs to be strengthened, and the possibility of direct influence of the national government (Turkey) or parliament (Mac-

edonia) on monetary policymaking must be limited.

The Role for NCBs in an Enlarging Eurosystem – a Dynamic Environment

In this session, *panel I* covered "The ECB and NCBs – relations within the Eurosystem." Speakers of the ECB, the Banque de France, De Nederlandsche Bank and the OeNB analyzed the development of the division of responsibilities between the ECB and the NCBs within the Eurosystem.

In his statement, *Roman Schremser (ECB)* provided insights into the federal structure of the Eurosystem and emphasized the importance of the NCBs in all three stages of decision-making, namely the preparation of decisions in the NCBs and in the committees, decision-making at the level of the ECB Governing Council and the decentralized implementation of these decisions.

Philippe Bonzom (Banque de France) sees the decentralized structure of the Eurosystem as a guarantee for a level playing field between the individual centers. It takes into account the multicultural and multilingual plurality that is Europe and puts the expertise, credibility and legitimacy of the NCBs at the disposal of the Eurosystem in its entirety. Moreover, NCBs also have responsibilities outside the scope of the Eurosystem, such as banking supervision or representation at the International Monetary Fund (IMF).

Carel van den Berg (De Nederlandsche Bank) emphasized that the system of checks and balances in place between the NCBs and the ECB currently favored the NCBs, but could become a central subject of debate again. In the future, the Executive Board of the ECB will gradually gain influence in the domain of international financial relations. On the other hand, the role

of the ESCB/Eurosystem committees, in which the NCBs play an important role, may also be strengthened. Moreover, the NCBs' responsibilities in addition to their ESCB tasks will continue to gain importance.

Alexandra Schober-Rhomberg (OeNB) examined the development of the role that the NCBs play in the Eurosystem and explained that the flexible institutional structure of the Eurosystem allows for a different division of responsibilities in different business areas. Various organizational models which have developed over time are represented in the different business areas of the Eurosystem. In the decentralized model, a specific function is exercised by all NCBs and is coordinated by the ECB; in the consolidated model, one central bank (an NCB or the ECB) exercises a task; and in the pooling model, a group of NCBs acts on behalf of the other Eurosystem members. In the end, size, expert knowledge, specialization, location and legal as well as economic framework conditions at the national and at the EU level are the main factors which will determine an NCB's standing within the Eurosystem.

During *Panel II,* which was entitled "Decision-making in central bank systems," speakers from the Freie Universität Berlin, the U.S.A. and Belgium commented on institutional decision-making scenarios for central bank systems.

Helge Berger (Freie Universität Berlin) welcomed the reform of voting modalities in the Governing Council of the ECB. In an international comparison, however, the number of Governing Council members remains high. Therefore, additional reforms could be made if the EU is enlarged further

and the euro is introduced in all EU Member States.

In his speech, *Dominique Servais (Nationale Bank van België/Banque Nationale de Belgique)* pointed out that the Treaty of Nice had decisively limited the adjustment of voting arrangements in the Governing Council of the ECB. The Treaty of Nice did not provide a legal basis for a change in the composition of the Governing Council of the ECB and of the division of responsibilities between the Governing Council and the Executive Board of the ECB. Much rather, it established a system for voting right reform dependent on the sequencing of euro area enlargement. As Servais noted, the voting rights model that the ECB uses combines efficiency with political rationale. The difficulties involved in the ratification process of the EU Constitutional Treaty demonstrate the need for a decentral ESCB/Eurosystem. The efficiency of the Eurosystem and trust in institutions is decisively influenced by the latters' proximity to the people.

Nathan Sheets (Federal Reserve Board) presented an overview of the institutional setup of the Federal Open Market Committee, the highest decision-making body of the Federal Reserve System (Fed). The correspondence between voting rights and economic strength is not unique to the reformed voting rights model of the Governing Council of the ECB; a voting rights model of this type also applies to the Fed. The decentralized nature of the Fed and the decentralized structure of the ESCB/Eurosystem are comparable only up to a point, Nathan Sheets cautioned.

Fiscal Spending Rules in Europe

Bernhard Grossmann,
Eva Hauth,
Silvia Pop

A workshop on Fiscal Spending Rules hosted by the Austrian Government Debt Committee in cooperation with the Oesterreichische Nationalbank (OeNB) on September 29, 2005, explored two major issues: First, whether national fiscal rules that tie in with the EU fiscal framework can help sustain sound fiscal policies in Europe, and second, what aspects must be taken into consideration when designing such spending rules. Additionally, contributors presented two proposals for the implementation of fiscal spending rules in Austria.

Interest in rule-based fiscal policies aimed at sustaining sound budgets and curbing debt growth has steadily increased in recent years, as *Josef Christl (OeNB)* pointed out in his introductory statement. For the EU Member States, fiscal rules were first established by the Maastricht Treaty in 1992 and subsequently substantiated and strengthened by the Stability and Growth Pact (SGP). The EU-wide fiscal framework has established reference values for the government deficit (3% of GDP) and debt (60% of GDP). While the legal framework of the EU does not explicitly provide for any numerical budget commitments at the national level, empirical experience from several OECD countries would support the introduction of national rules along these lines (above all for capping public expenditure). Medium-term statutory spending caps at the national level would appear to be a workable solution for compensating free-rider and moral hazard problems that weaken the disciplining effect of fiscal policies in the euro area, and for counteracting the inherent tendency of policymakers to run up higher deficits. Given the weakening fiscal discipline of EU Member States, all measures to strengthen compliance with the EU's Stability and Growth Pact and the credibility of European fiscal policy are to be welcomed.

National Fiscal Spending Rules in the Context of the EU's Fiscal Policy Framework

The first session dealt with the effectiveness of, and the design requirements for, national expenditure rules that supplement the EU-wide fiscal framework.

Peter Wierts (European Commission) presented an empirical study he produced with coauthors on "National Expenditure Rules and Expenditure Outcomes: Empirical Evidence for EU Member States," which examined the effectiveness of such rules in EU countries with descriptive and statistical means. Wierts recalled that in recent years increasing budget deficits and spending overruns had characterized budgetary developments in EU countries. The national stability program updates that EU countries have to submit annually to the European Commission with data indicating the budgetary development of the current year and targets for the three years ahead show that actual public expenditure deviated significantly more from projected figures than public revenues. Hence, one might ask whether stricter controls of public expenditure in the form of national spending rules might not improve compliance with the stability programs – in other words, whether national spending tools might not be effective tools.

Wierts and his coauthors compiled a questionnaire to collect data about the tools individual countries use to

control public expenditure and developed a strength index on the basis of responses. In a next step, panel regressions were run to estimate the impact of these national fiscal rules on public expenditure growth and deviations from the spending projections of the stability programs. The questionnaire covered design principles (target, concept, coverage and time horizon of the fiscal rule), the institutional framework (legal force, enforcement and surveillance mechanism, competences of the finance minister, degree of independence of the controlling authority) and public awareness of the fiscal rule. The data collected were used to generate a strength index for fiscal spending rules. The authors found the United Kingdom and Sweden to have the highest score on this index, followed by the Netherlands, Finland and Denmark. The United Kingdom and Sweden have adopted numerical statutory targets; these targets impose binding annual public expenditure volumes for a medium-term horizon, are monitored by independent institutions and are endowed with correction mechanisms in the case of spending overruns. By contrast, multiyear spending targets that are not binding (like those set by Germany or France) were identified as "weak" fiscal rules.

According to Wierts, the results of the strength index corresponded to national experience with the effectiveness of spending rules. Countries with a low index typically considered their spending rules to have little impact on actual spending performance, whereas countries with a comparatively high score tended to qualify their rules as effective. Empirical analyses of the impact of medium-term budget rules on deviations from spending projections published in the stability programs or on actual spending also confirm that medium-term national spending rules typically contribute to dampening spending dynamics, and that these rules tend to be more effective the stricter the fiscal rules are. In concluding, Wierts stressed that noncompliance with the spending paths projected in the stability programs is not attributable to the weaker than expected economic performance in recent years. The negative regression coefficients for economic growth disprove the argument put forth by EU Member States that downward revisions of forecasts had necessitated higher spending.

In his comment, *Peter Mooslechner (OeNB)* noted that the numerous academic papers on this issue as well as practical experience with rule-based fiscal policies have produced highly mixed results. Furthermore, political economy and monetary policy teach us that the institutional framework is the determinant of effectiveness. While the authors had chosen innovative and impressive approaches to analyze the effectiveness of fiscal policy rules, the results were not conclusive. The econometric estimates clearly show that the impact of fiscal spending rules on the development of public expenditure and on the extent of budget overruns (compared with stability program targets) was very limited. Further weak points included the low significance of the estimates and the short observation horizon (1998 to 2003). Finally, the actual budget outcomes in the EU in fact discredit the effectiveness of fiscal spending rules: almost 60% of all EU Member States that apply such rules according to this study reported budget deficits of 3% or more of GDP in 2004 and 2005 — but of those EU countries that do not

apply fiscal spending rules less than 40% exceeded the budget limit of 3% of GDP.

Jürgen von Hagen (Center for European Integration Studies) focused on political economy aspects in his presentation on the effectiveness of fiscal spending rules. In his view, political and institutional structures or processes determine the fiscal stance more strongly than numerical rules. At the same time, the effectiveness of fiscal rules very much depends on the institutional framework. Spending caps as such are no guarantee for sustainable, sound budget policies. They can only be effective and promote fiscal discipline if they are integrated in an effective institutional framework.

Common pool models of public budgeting, to which von Hagen referred, presume that vested interests dominate the political process in a democracy. In pushing through their plans, vested interest groups consider only the costs and benefits for their own group but neglect the impact or external effects on other social actors. The common pool problem is thus a problem of coordination, and it arises in fiscal policymaking. While public spending programs benefit specific groups, they are tax-financed by the entire population. As the interest groups bear only part of the cost, they have a great incentive to place excessive demands on the budget. To be able to internalize such external effects, multiparty governments might be well advised, according to von Hagen, to adopt an approach that strengthens the political will to pursue sound budget policies, the fiscal contract approach. This political economy approach focuses on the budget process and underlines the importance of negotiating the budget with all cabinet ministers. The only way to arrive at

a comprehensive economic view of fiscal policy measures is through negotiations. The effectiveness of the fiscal contract model hinges on the following factors: a binding commitment to the negotiation results (binding numerical spending caps for every minister), widespread competence of the finance minister with regard to budget implementation, a system of strong parliamentary surveillance, and a high degree of transparency. To conclude, von Hagen noted that empirical studies confirm the impact of a process-oriented institutional framework of budget preparation on fiscal discipline. Calculations analyzing the relationship between budget balances and the institutional framework (Index of Budgetary Institutions) have produced significant results with correlation coefficients of around 0.4.

In his comment, *Daniele Franco (Banca d'Italia)* focused on two areas: first, on empirical findings on the effectiveness of the fiscal contract approach and the Index of Budgetary Institutions developed by von Hagen, and second on conceptual issues of fiscal rules. Franco questioned the validity of von Hagen's country ranking based on institutional framework conditions, criticizing that it makes assessing the effectiveness of the fiscal contract more difficult. The construction of the index meant to measure the strength of a country's institutional framework was based on arbitrary valuation approaches. Any resulting country ranking thus strongly reflected the underlying methodology. Furthermore, the results did not imply a straightforward relationship between a country's institutional strength and its fiscal policy. Countries with a strong institutional framework according to the index, such as France, Germany or Greece, had repeatedly breached

the Maastricht deficit limit of 3% of GDP in recent years, whereas countries with low index values, such as Denmark or Finland, showed above-average budget discipline. Overall, the budget performance of EU Member States is likely to reflect above all the economic policy and, of course, country-specific factors. Franco also recalled that the European Commission had qualified fiscal spending rules as not very effective in its report "Public Finances in EMU" of 2003. In addition, Franco underlined that national fiscal spending rules were unsuitable as a substitute for the EU's fiscal policy framework. Fiscal rules embedded in a specific institutional framework tailored to national needs and subject to different forms of self-commitment (nominal or real upper limits, general government or regional government commitments) are not adequate for use as EU-wide targets, concluded Franco.

Fiscal Spending Rules for Austria

The focus of the second session was on two specific proposals for the implementation of fiscal spending rules in Austria.

Helmut Frisch (Austrian Government Debt Committee) presented a proposition developed with coauthors for a general government fiscal spending rule for Austria, namely a so-called debt brake based on a Swiss model; its purpose is to balance the budget over the business cycle. The rule provides for an annual spending cap which equals the sum of public revenues adjusted for a cyclical factor. Accordingly, public spending may exceed public revenues in economic downtimes, while it should be lower than revenues when the economy thrives. In other words, boom periods are meant to produce budget surpluses, while budget deficits are acceptable during recessions. This interaction contributes to stabilizing cyclical developments and the nominal debt, and to reducing the debt-to-GDP ratio over the business cycle. Such an approach makes it possible to distinguish between the cyclical component of the budget deficit (which is evened out over the budget cycle) and the structural component. The latter remains unaffected by cyclical developments and represents a permanent increase in debt.

Structural budget deficits or surpluses resulting from overspending or underspending as well as revenue forecasting errors are to be recorded in a balancing account. The structural deficit recorded in the balancing account must be cut back once it has reached a specific limit. The authors recommend the adoption of targets established by the EU as an upper limit. For Austria, this would imply an annual upper limit on the structural budget deficit of approximately 2% of GDP. Exceptional events (natural disasters, severe recessions) will not be taken into account for the debt brake calculations and should affect neither the spending cap of the debt brake nor the balancing account. Here, too, the proposal mirrors the concept of the EU's Stability and Growth Pact.

In his comment, *Peter Siegenthaler (Swiss Federal Finance Administration)* underlined above all the importance of fiscal spending rules for the consolidation success of Switzerland's general government. He briefly described the fiscal policy conditions that had led to the introduction of a debt brake in Switzerland in 2003 and emphasized the need for strict fiscal discipline. Given the burdens that demographic developments are anticipated to put on the budget in the foreseeable future demand, it is critical to ensure

adequate fiscal leeway. The big advantage a debt brake has over deficit rules is that it removes (consolidation) pressure from the revenue side and puts the focus on expenditure-side consolidation. To allow automatic stabilizers to take effect not only on the revenue but also on the expenditure side, it would appear advisable to exclude cyclically sensitive public expenditure, such as unemployment benefits, from the spending cap of the debt brake. The real challenge of the debt brake proposal for Austria, according to Siegenthaler, was its application to all levels of government. In Switzerland, the success of fiscal federalism hinged primarily on location and tax competition between individual cantons. Moreover, several cantons had put in place their own fiscal rules to ensure that sound public finances are established and maintained.

In assessing the expediency of implementing medium-term fiscal spending rules in Austria, *Gerhard Steger (Austrian Federal Ministry of Finance)* favored implementing a spending rule meant to complement the existing fiscal rules (EU fiscal rules including the SGP and the Austrian Stability Pact). Steger argued that the spending pressure inherent in the traditional budgeting process would necessitate a rule-based approach to spending decisions. This spending pressure reflects the friction between having to limit spending to clearly defined (groups of) recipients and having to tax a broad base to generate the required revenues, and also reflects the incrementalism prevailing in fiscal decision-making and the high significance of rigid spending categories that can be changed only at great political cost.

Steger presented a new fiscal policy framework for the federal government's budget, developed by a group of experts of all political parties represented in parliament, the Federal Ministry of Finance, the Federal Chancellery and the Court of Audit, which is scheduled to be enshrined in law with a federal constitutional act. This concept envisages a four-year fiscal framework that is binding for budget preparation and execution. The fiscal framework covers the major policy areas in which expenditures arise. The spending caps reflect both fixed targets and – in the case of cyclically sensitive expenditure – flexible, indicator-based targets subject to annual reviews and, if necessary, adaptations. Individual areas will receive more or fewer funds in line with broadly based targets (sustaining public finances, ensuring macroeconomic balance and gender mainstreaming). In the interest of an efficient use of public funds, not only the appropriation of public funds but also the envisaged outcome and efficiency of measures (performance budgeting) should be subjected to the parliamentary decision-making process. Linking input and output (or outcome) and using a flexible global resource framework has led to very positive results in pilot projects and should, as Steger sees it, considerably enhance the quality of public finances.

In commenting on this contribution, *Bruno Rossmann (Federal Chamber of Labor)* argued that spending rules should be given preference over fiscal rules based on the budget balance (deficit). Spending rules with a medium-term horizon left room for improving fiscal discipline in good economic times, allowed deficits in bad economic times (automatic stabilizers), and strengthened the credibility of fiscal policy. The weaknesses of deficit rules become manifest in the implementation of the EU's fiscal framework (convergence criteria, SGP): They lack

coordination mechanisms to counter asymmetric shocks and cause uncertainty about fiscal requirements in economic upturns (which leads to the promotion of a procyclical fiscal policy). Moreover, the EU had failed to integrate its Lisbon strategy in its fiscal framework. At the same time, Rossmann cautioned that spending rules may also have deficiencies. For instance, rules cast into stone might promote the procyclical behavior of fiscal policymakers and overly limit cyclically sensitive or investment expenditure. Steger's concept of a medium-term expenditure framework for the Austrian federal government did not extend to tangible methods for determining the spending paths. Indeed, economic experience did not provide for any clear-cut approach. Yet the economic assumptions underlying the growth path and the method used to set upper limits were of paramount importance for the success of such rules, i.e. for the effective control of budgetary expenditure.

The Relevance of Fiscal Rules for EU Budget Policymaking

The workshop concluded with a panel discussion on "EU Budget Policymaking: Do Sustainable Sound Fiscal Policies Require National Fiscal Rules?", following introductory remarks by *Klaus Liebscher (OeNB Governor)*. He noted that national und stability-oriented fiscal rules could contribute decisively to achieving sound public finances and complying with the SGP. Such rules would, moreover, enhance the credibility of fiscal policies in the euro area. From a monetary policy perspective, clear statutory fiscal targets at the national level that are in line with the SGP and above all call for

budget consolidation when the economy thrives are highly welcome.

Karl-Heinz Grasser (Austrian Federal Minister of Finance) viewed national fiscal rules complementing existing EU rules as an indispensable tool for sustaining sound public finances. Grasser described the Austrian Stability Pact as a successful example of national budget coordination. At a broader level, though, it would take a comprehensive fiscal framework, based on top-down budgeting, balancing the budget over the business cycle and strict budget execution, to keep Austria's fiscal policymaking a success. At the time of the workshop, the finance ministry was in the midst of preparing a budget law reform meant to support a sustained, stability-oriented fiscal policy by focusing on expenditure targets. These reform efforts were aimed at a multi-year orientation of the budget, determining binding spending limits and stepping up performance budgeting.

Sepp Rieder (Vice Mayor of Vienna) discussed the government's challenge of meeting the rising need for funds (e.g. investment) while stabilizing the budget. Apart from the basic commitment to sound budget policies, Rieder recalled the need to remain flexible in the execution of budget plans to be able to respond adequately to cyclical developments. To this end, the fiscal framework must allow the required room for maneuver whenever the need arises without violating medium-term targets. Specifically, Rieder saw a need for extending the horizon of the Austrian Stability Pact. The stability targets should apply to the whole reference period so as not to limit the annual leeway from the outset. Such an approach should enable decision-makers to pursue a growth-oriented budget policy and not to limit fiscal

policymaking to a search for loopholes in the Maastricht budget framework.

Peter Siegenthaler (Swiss Federal Finance Administration) considered Switzerland's rule-based fiscal policy a necessary (but insufficient) precondition for sustainable fiscal policies. The introduction of the debt brake, with an approval rating of 85% established by referendum, was triggered by two fiscal asymmetries – the revenue intake is governed by the constitution, while all expenditure decisions only require simple majorities in parliament; cyclical revenue increases are spent rather than used to bring down the budget deficit. In combination with short-term and sustained spending cuts, this spending rule contributed to a rapid reduction of the structural deficit. Siegenthaler underlined the need for further structural reforms in dynamic spending areas (e.g. welfare and retirement provision) with a view to improving the quality of the budget and stabilizing the budget in the long run. The shift in the spending structure observed in the past two decades toward transfer payments (pensions, healthcare, other social benefits) and interest payments on outstanding debt came at the cost of growth-enhancing spending categories (capital formation, education). Rule-based fiscal policies are expected to retain the existing room for maneuver with a view to ensuring funding for the highly necessary comprehensive reform and growth agenda.

In the view of *Gerhard Schwödiauer (Otto-von-Guericke-Universität of Mag-* *deburg)* the SGP supports an anticyclical budget policy by requiring Member States not to exceed a zero deficit over the medium term. He termed concerns that the SGP was an obstacle to adequate fiscal stabilization policies unwarranted. Compliance with the SGP ensured that deficits amassed during economic downturns would be offset by surpluses accumulated during economic upturns. Germany, however, had failed to achieve sufficient budget surpluses from 1998 to 2000 when the German economy was strong, thus laying the foundation for Germany's current fiscal troubles. The deficit rule underlying the SGP may create the wrong incentives, in the opinion of Schwödiauer. Both theoretical and empirical evidence tell us that anticyclical changes to taxes (tax cuts in economic downswings, tax increases in economic upswings) reduce welfare and growth. Consequently, fiscal policies on the revenue side should limit themselves to letting the automatic stabilizers of the tax system work but on the expenditure side should include anticyclical stabilizing measures that go beyond the in-built stabilizers. National spending rules could contribute significantly to implementing the requirements of the SGP, provided they were credible and binding. To be able to stop the debt spiral, Germany needs to implement fiscal adjustments, and most of all it needs to cut public consumption and social transfers (taking into account growth and employment effects).

Notes

Abbreviations

ACH	automated clearing house	GSA	GELDSERVICE AUSTRIA Logistik für Wert-gestionierung und Transportkoordination GmbH (Austrian cash services company)
ARTIS	Austrian Real Time Interbank Settlement (the Austrian RTGS system)		
A-SIT	Secure Information Technology Center – Austria	HICP	Harmonized Index of Consumer Prices
ASVG	Allgemeines Sozialversicherungsgesetz – General Social Security Act	IBAN	International Bank Account Number
		IBRD	International Bank for Reconstruction and Development
A-Trust	A-Trust Gesellschaft für Sicherheitssysteme im elektronischen Datenverkehr GmbH	IDB	Inter-American Development Bank
ATM	automated teller machine	IFES	Institut für empirische Sozialforschung GesmbH (Institute for Empirical Social Research, Vienna)
ATX	Austrian Traded Index		
BCBS	Basel Committee on Banking Supervision (BIS)	ifo	ifo Institute for Economic Research, Munich
BIC	Bank Identifier Code	IGC	Intergovernmental Conference (EU)
BIS	Bank for International Settlements	IHS	Institut für Höhere Studien und Wissenschaftliche Forschung – Institute for Advanced Studies, Vienna
BOP	balance of payments		
BSC	Banking Supervision Committee (ESCB)	IIF	Institute of International Finance
CACs	collective action clauses	IIP	international investment position
CEBS	Committee of European Banking Supervisors (EU)	IMF	International Monetary Fund
CEE	Central and Eastern Europe	IRB	internal ratings-based
CEECs	Central and Eastern European countries	ISO	International Organization for Standardization
CESR	Committee of European Securities Regulators	IWI	Industriewissenschaftliches Institut – Austrian Institute for Industrial Research
CIS	Commonwealth of Independent States		
CPI	consumer price index	IT	information technology
EBA	Euro Banking Association	JVI	Joint Vienna Institute
EBRD	European Bank for Reconstruction and Development	LIBOR	London Interbank Offered Rate
		M3	broad monetary aggregate M3
EC	European Community	MFI	monetary financial institution
ECB	European Central Bank	MRO	main refinancing operation
Ecofin	Council of Economics and Finance Ministers (EU)	MÖAG	Münze Österreich AG – Austrian Mint
EEA	European Economic Area	MoU	memorandum of understanding
EFC	Economic and Financial Committee (EU)	NCB	national central bank
EIB	European Investment Bank	ÖBB	Österreichische Bundesbahnen – Austrian Federal Railways
EMS	European Monetary System		
EMU	Economic and Monetary Union	OeBS	Oesterreichische Banknoten- und Sicherheitsdruck GmbH – Austrian Banknote and Security Printing Works
EONIA	Euro OverNight Index Average		
ERM II	Exchange Rate Mechanism II (EU)		
ERP	European Recovery Program	OECD	Organisation for Economic Co-operation and Development
ESA	European System of Accounts		
ESAF	Enhanced Structural Adjustment Facility (IMF)	OeKB	Oesterreichische Kontrollbank (Austria's main financial and information service provider for the export industry and the capital market)
ESCB	European System of Central Banks		
ESRI	Economic and Social Research Institute		
EU	European Union	OeNB	Oesterreichische Nationalbank (Austria's central bank)
EURIBOR	Euro Interbank Offered Rate		
Eurostat	Statistical Office of the European Communities	OPEC	Organization of the Petroleum Exporting Countries
FATF	Financial Action Task Force on Money Laundering		
		ORF	Österreichischer Rundfunk – Austrian Broadcasting Corporation
Fed	Federal Reserve System		
FFF	Forschungsförderungsfonds für die Gewerbliche Wirtschaft – Austrian Industrial Research Promotion Fund	ÖBFA	Austrian Federal Financing Agency
		ÖNACE	Austrian Statistical Classification of Economic Activities
		PE-ACH	pan-European automated clearing house
FMA	Financial Market Authority (for Austria)	PISA	Programme for International Student Assessment (OECD)
FOMC	Federal Open Market Committee (U.S.A.)		
FSAP	Financial Sector Assessment Program (IMF)	POS	point of sale
FWF	Fonds zur Förderung der wirtschaftlichen Forschung – Austrian Science Fund	PRGF	Poverty Reduction and Growth Facility (IMF)
		RTGS	Real-Time Gross Settlement
GAB	General Arrangements to Borrow	SDR	Special Drawing Right (IMF)
GATS	General Agreement on Trade in Services	SDRM	Sovereign Debt Restructuring Mechanism (IMF)
GDP	gross domestic product	SEPA	Single Euro Payments Area
GNP	gross national product	SPF	Survey of Professional Forecasters

STEP2	Straight-Through Euro Processing system offered by the Euro Banking Association	UNO	United Nations Organization
STP	straight-through processing	VaR	Value at Risk
STUZZA	Studiengesellschaft für Zusammenarbeit im Zahlungsverkehr G.m.b.H. – Austrian Research Association for Payment Cooperation	WBI	Wiener Börse Index
		WEF	World Economic Forum
		WIFO	Österreichisches Institut für Wirtschaftsforschung – Austrian Institute of Economic Research
S.W.I.F.T.	Society for Worldwide Interbank Financial Telecommunication	WIIW	Wiener Institut für internationale Wirtschaftsvergleiche – The Vienna Institute for International Economic Studies
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer	WKO	Wirtschaftskammer Österreich – Austrian Federal Economic Chamber
Treaty	refers to the Treaty establishing the European Community	WTO	World Trade Organization
UNCTAD	United Nations Conference on Trade and Development		

Legend

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

Discrepancies may arise from rounding.

List of Studies
Published in Monetary Policy & the Economy

For further details on the following publications see *www.oenb.at*

Issue Q4/04

Growth Stimulus from Tax Reform in 2005 to Overshadow Weaker Global
Economic Momentum – Economic Outlook for Austria from 2004 to 2006
(Fall 2004)

Gerhard Fenz, Martin Schneider

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Werner Dirschmid, Ernst Glatzer

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Walter Waschiczek

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the Start of Monetary Union

Gabriel Moser, Wolfgang Pointner, Gerhard Reitschuler

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Vanessa Redak, Helene Schuberth, Beat Weber

Macroeconomic Models and Forecasts for Austria

Gerhard Fenz, Martin Schneider

A Constitutional Treaty for an Enlarged Europe: Institutional and
Economic Implications for Economic and Monetary Union

Paul Schmidt

Longer Working Hours? More Flexibility Work Schedules?
Do Austrian Economic Policymakers Need to Act?

Alfred Stiglbauer

Issue Q1/05

Slowdown in Global Economic Momentum
Asia and the U.S.A. To Remain Growth Drivers of World Economy in 2005

*Johann Elsinger, Gerhard Fenz, Ingrid Haar-Stöhr, Antje Hildebrandt,
Thomas Reininger, Gerhard Reitschuler*

Demographic Fluctuations, Sustainability Factors and Intergenerational
Fairness – An Assesment of Austria's New Pension System

Markus Knell

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Jürgen Janger

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in 2002 and 2003

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Financial Crisis Prevention and Resolution

Andrea Hofer

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Walpurga Köhler-Töglhofer, Margit Schratzenstaller, Andreas Wagener

Issue Q2/05

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Overcome Fast, but Downside Risks Increased – Economic Outlook
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Overall Economic Assessment
Peter Mooslechner

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to the European Union
Matthias Fuchs

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Franz Pauer

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Jarko Fidrmuc

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Jürgen Janger

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Manfred Fluch, Helmut Stix

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Results of a Representative Survey
Jürgen Janger, Claudia Kwapil, Wolfgang Pointner
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Euro Area, Need for More Extensive Coverage of the New EU Member States
Maria Antoinette Silgoner
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Conference of the Oesterreichische Nationalbank
Stefan W. Schmitz

Issue Q4/05

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from 2005 to 2007 (December 2005)
Gerhard Fenz, Martin Schneider
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National Central Banks
Paul Schmidt
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Statistiken – Daten & Analysen   quarterly

This publication contains reports and analyses focusing on Austrian financial institutions, cross-border transactions and positions as well as financial flows. The contributions are in German, with executive summaries of the analyses in English. The statistical part covers tables and explanatory notes on a wide range of macroeconomic, financial and monetary indicators. The tables including additional information and data are also available on the OeNB's website in both German and English. This series also includes special issues on selected statistics topics that will be published at irregular intervals.

Monetary Policy & the Economy   quarterly

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Financial Stability Report   semiannual

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Focus on European Economic Integration   semiannual

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Annual Report   annual

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For further details see *ceec.oenb.at*

Newsletter of the Economic Analysis and Research Section   quarterly

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

For further details see *hvw-newsletter.oenb.at*

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