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The opinions expressed in the section *"Studies"* are those of the individual authors and may differ from the views of the Oesterreichische Nationalbank.

REPORTS

Calendar of Monetary and Economic Highlights

Austria

November 2001

9 Following the monetary policy decisions taken by the *Governing Council of the ECB* on November 8, 2001, to cut the interest rate for the deposit facility by 0.50 percentage point to 2.25% and the interest rate for the *marginal refinancing facility* by 0.50 percentage point to 4.25% as of November 9, 2001, the following adjustments take effect in Austria on November 9, 2001, as required by the first euro-related amendment to civil legislation (Federal Law Gazette Part I No. 125/1998) and as specified in the corresponding regulation (Federal Law Gazette Part II No. 27/1999): The *base rate* is reduced to 2.75% and the *reference rate* to 4.50%, which constitutes a reduction by 0.50 percentage point in both cases.

January 2002

2 The new market segmentation on *Wiener Börse* in effect from January 2, 2002, imposes requirements on companies listed in the prime market that go beyond those of the Stock Exchange Act and therefore require agreements under private law between the stock exchange and the listed company.

European Union

October 2001

4 The *Bank of England* lowers its key interest rate by 0.25 percentage point to 4.50%.

5 Johnny Akerholm, Finland, is elected chairman of the *Economic and Financial Committee*.
Danmarks Nationalbank reduces its key interest rate by 0.05 percentage point to 4.10%.

11 The *Governing Council of the ECB* convenes for a decentral meeting in Vienna. ECB President Wim Duisenberg appeals to financial policymakers of the euro area to continue to adhere to their medium-term consolidation plans despite the economic slowdown. With the margins in the national budgets typically being very slim, very cautious policies are called for. In a long-term perspective, it will, moreover, take further structural reforms of public revenue and spending structures and of labor and product markets to raise potential output in the euro area.

15 The *Euro group* meets in Luxembourg. The main items on the agenda are the economic fundamentals of the euro area, the effects of the automatic stabilizers, the budget policies of the Netherlands, Spain, Finland and Austria as well as business investment in the euro area.

16 The EU ministers of finance and of justice and home affairs (JHA) agree on making money laundering provisions more stringent at a joint *Ecofin/JHA* meeting in Luxembourg. In the future, the obligation to report alleged attempts at money laundering to the

prosecuting authorities will be extended to lawyers, tax advisers and auditors, art dealers and casinos.
The ministers also discuss new provisions to prevent the misuse of the financial system, insider trading issues as well as the freezing of property of terrorist organizations or suspects.
The EU finance ministers call upon the European Commission to conduct negotiations with Switzerland, Liechtenstein, Monaco and other non-EU countries to adopt the EU's provisions on the taxation of income from savings and investments and on preventing capital flight.

17 In the United Kingdom, the *Lower House* ratifies the EU Treaty of Nice.

18 The *German Bundestag* ratifies the EU Treaty of Nice.

19 At an informal *European Council* in Ghent, Belgium, the EU heads of state or government confirm their consensus on calling a Convention to debate and propose EU reforms. The Convention will be composed of representatives of the national parliaments and governments of both EU and accession countries as well as the European Parliament and the European Commission. Other economic policy issues include an assessment of the economic situation, the state of preparations for the introduction of euro banknotes and coins and an appeal to the Ecofin Council to endorse a directive on harmonizing fees for national and international credit transfers before the Laeken European Council.

23 The *Austrian Nationalrat* ratifies the EU Treaty of Nice.

29 *Sveriges Riksbank* announces the sale of its printing works AB Tumba Bruk to the American company Crane&Co.

November 2001

5 The *Eurogroup* discusses the fiscal policies of Greece, Luxembourg, Ireland and Belgium. The cyclical slowdown will cause nominal deficits to deteriorate slightly in 2001 and 2002, while the euro area's cyclically adjusted deficit will remain largely unchanged in both years compared to the year 2000. An information exchange network is established in view of the forthcoming euro cash changeover.

6 The *Ecofin Council* discusses the following topics: budgetary challenges posed by ageing populations, methods of evaluating output gaps, statistical requirements within EMU, and tax obstacles existing in the Internal Market in 2001. An additional item under discussion are the budgetary measures taken by the Irish government in response to the Recommendation addressed to Ireland by the Council on February 12, 2001.
The *European Commission* presents its recently published third interim report on the implementation of the Risk Capital Action Plan.

8 The *Governing Council* of the ECB decides to lower the ECB's key interest rate from 3.75% to 3.25%. Furthermore, the two rates that form a corridor for money market rates are reduced by ½ percentage point to 2.25% for deposits and to 4.25% for overnight credits.
Both the easing of inflationary pressures and the growing uncertainty about the global macroeconomic environment in view of the current political situation are quoted as reasons for this interest rate cut, which aims at restoring confidence in the economy and at promoting growth.
The *Bank of England* reduces its key interest rate by 50 basis points to 4.00%.

9 In the wake of the ECB's interest rate move, *Dankmarks Nationalbank* cuts its key interest and discount rates by 50 basis points each, to 3.60% and 3.25%, respectively.

13 The *European Commission* publishes its regular reports on the progress towards accession by each of the candidate countries (progress reports). In the eyes of the Commission, the European Union is, in principle, well prepared for the accession of up to ten new Member States in 2004. Any further measures necessary will be taken in due course. The EU will conduct accession negotiations with those candidates that fulfill all membership criteria. In the present phase of the accession process, it is necessary to focus as much on the candidates' capacity to implement and enforce the *acquis communautaire* as on its transposition into law (giving special attention to the candidates' administrative and judicial capacity). In this context, the Commission is going to propose an action plan on institution building. To adhere to the road map, candidate countries will have to successfully continue their accession negotiations in particular with respect to the chapters agriculture, regional policy, and financial and budgetary provisions, for which the Commission will submit proposals to the Council early in 2002.

19 *Danmarks Nationalbank* introduces a new payment system (Kronos) to facilitate domestic interbank payment transactions.

21 The *European Commission* presents its Autumn 2001 Forecasts for 2001-2003. While euro area GDP still augmented by 3.4% in 2000, the Commission expects real GDP growth to come to only 1.6% in 2001 and to 1.3% in 2002 (compared to a growth of 2.8% and 2.9%, respectively, assumed in the Spring Forecast). The bursting of the speculative bubble in the ICT sector, the deceleration in global trade growth and the impact of an oil price-induced rise in interest rates, from 1999 to 2000, on aggregate demand are cited as the main reasons for the synchronized cyclical slowdown in all major economic regions. Furthermore, the terrorist attacks of September 11, 2001, have caused uncertainty with economic agents and international trade is set to decelerate as transport costs and insurance premiums increase. The euro area

economy may, according to the Commission, begin to rebound relatively early in 2002.

26 The *EU's Single Market Council* agrees on a price regulation committing banks to reduce the level of costs for cross-border payments and cash withdrawals abroad to the level of costs for similar domestic transactions. According to this regulation, charges for euro cash withdrawals will have to be harmonized across the participating Member States as of July 1, 2002. As of July 1, 2003, the costs of intra-euro area cross-border transfers in euro will have to be aligned to those of corresponding transfers at the national level. For the time being, this regulation only applies to amounts of up to EUR 12,500. As of January 1, 2006, it will cover amounts of up to EUR 50,000.

December 2001

3 The *Eurogroup* discusses economic conditions and prospects and further action to be taken in terms of stability programs. In this context, the European Commission (EC) points out that while, owing to cyclical developments, deviations from the respective stability programs occur in most Member States, their structural budget positions have remained essentially unchanged. The Commission does not expect any Member State to exceed the three percent budget deficit limit set to help ensure the euro's stability.

Moreover, the EC explains how the information exchange network on the euro cash changeover is intended to function.

4 In the runup to the European Council of Laeken, the *Ecofin Council* adopts a report on the objectives and methods of cooperation in pension policies and a report on structural indicators.

The discussion of the proposed directive on the taxation of interest income centers on the question whether those countries opting to apply a withholding tax instead of providing information will, after a transition period of seven years, automatically take part in the general exchange of information. A first formal round of negotiations with nonmember countries is scheduled for the next few months.

In its discussion on financial services, the EC outlines a solution for its institutional debate with the European Parliament on the Parliament's wish to receive authorization to revoke implementation measures set by the European Securities Committee.

Further topics under discussion are the current economic situation of the aviation sector (insurances) and the UN conference "Financing for Development."

In the course of the economic policy dialogue with the accession countries at Ministerial level, the *EC* presents the results of candidate countries' budget reports and pre-accession economic programs (PEPs). Compared to the first PEPs drawn up in spring 2001, the overall program quality and the soundness of the figures

have improved. It will be necessary, however, to improve the modeling of the macroeconomic scenarios used for the PEPs. Essential challenges for candidate countries' economic policies will be to achieve real convergence, tackle disinflation, avoid high current account deficits and reach sustainable fiscal consolidation. A joint communiqué is adopted, encouraging the applicant countries, inter alia, to continue their reform efforts with a view to fulfilling the Copenhagen criteria and to preparing for EU membership.

13 *The European Investment Bank (EIB)* and the *Federal Republic of Yugoslavia* sign a framework program creating the necessary conditions for a long-term financial commitment of the EIB in Yugoslavia.

In a second reading, the *European Parliament* agrees on the Council's memorandum of understanding on the regulation on cross-border payments in euro and adopts the draft regulation. This regulation will apply to amounts of up to EUR 12,500 (EUR 50,000 as of January 1, 2006) and provides that as of July 1, 2002, charges for cross-border electronic payments in euro will have to be adjusted to the level of the applicable charges for domestic payments; furthermore, as of July 1, 2003, at the latest, charges for cross-border and domestic credit transfers in euro will have to be harmonized.

14 At an informal meeting during the European Council of Laeken, the *Ecofin Council,* under participation of IMF managing director Horst Köhler, discusses the current economic situation and – based on the report presented by the Commission – the challenges of globalization.

In his speech before the informal Ecofin Council in Laeken, entitled "The Euro – An Emblem of the Success and Challenges of European Integration," Horst Köhler expresses his approval of the euro, pointing out that the European Central Bank (ECB) has so far been very successful in fulfilling its mandate. According to Köhler, the euro plays a vital role in promoting the stability of the international monetary system; its undervaluation is attributable to structural problems in the area of labor markets, the welfare system and public subsidies. Köhler explains his observations by stating that economic integration has been neglected and that there is a lack in political momentum and visions for the future of Europe.

14/15 With regard to enlargement, the heads of state or government, at the European Council of Laeken, confirm their intention to conclude negotiations by end-2002 with those countries that are sufficiently prepared for EU accession so that they can participate as Member States in the 2004 elections to the European Parliament.

The Council adopts a declaration on the future of the European Union, providing for a convention to be summoned in preparation

for the next intergovernmental conference and to be chaired by Valéry Giscard d'Estaing. In parallel, a forum is to be established to structurize and broaden the public discussion on the future of the European Union.

15 The frontloading of euro coins (so-called "starter kits") to consumers begins throughout the euro area.

January 2002

1 The changeover to *euro banknotes and coins* on Euro-day goes fairly smoothly. Politicians from the 12 euro area countries hail the euro as a historic milestone on the road to a politically and economically unified Europe.

Under the slogan "More Europe," *Spain* takes over the rotating six-month presidency of the Council of the European Union (EU) with a comprehensive agenda that is topped by the fight against terrorism.

The aim is that, by the end of 2002, EU entry negotiations should be completed with the most advanced accession countries, namely the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia.

Among other things, the spotlight of the Spanish Council presidency will be on economic and social developments in Europe. The Barcelona summit of mid-March 2002 will be devoted to deregulation in electricity and gas markets and to job creation. At the second EU-Latin America summit scheduled for May 2002 Spain hopes to act as a mediator between Europe and Latin America to reinforce the EU's relations with the Latin American states.

Towards the end of the Spanish presidency the so-called EU convention is to submit an initial report to the European Council of Seville. The convention, headed by former French President Valéry Giscard d'Estaing, shall prepare measures for an institutional reform that is to be adopted at the Intergovernmental Conference of 2004.

10 The *EU* signs an association agreement with the Lebanon under its strategy to create a free-trade area in the Mediterranean by 2010.

15 Pat Cox, Irish MEP and leader of the Liberal Democrat Group in the *European Parliament,* is elected to succeed Nicole Fontaine as President of the European Parliament.

The *European Commission* considers the Austrian stability program submitted in December 2001 to be in line with the EU's Stability and Growth Pact but notes that the zero budget deficit was achieved at the cost of a high increase of the tax burden. The stability programs of Belgium, Finland, Luxembourg, the Netherlands and Sweden are likewise considered unproblematic.

As envisaged by the Danish central bank act, 8 new members are appointed to the supervisory board of *Danmarks Nationalbank,* which consists of a total of 25 members.

16 Almost three weeks after the introduction of euro banknotes and coins the currency conversion has been largely completed in the 12 euro area countries. *The European Central Bank (ECB)* reports that cash transactions in euro have been developing faster than expected and that the conversion of vending machines is on schedule. Some 8.1 billion euro banknotes are now in circulation, which is more than 90% of the estimated number of euro banknotes needed to replace the national banknotes.

18 The *European Commission* presents a new economic indicator that draws on both real economic data and financial market information. Forecasts for this monthly indicator are to be published in the form of bandwidths.

21 The *European Commission* announces its intention to support the international reconstruction plan for Afghanistan with EUR 600 million in 2002.

The *Eurogroup* considers the current policy mix to be adequate amid the prevailing economic conditions. Now that the first signs of an economic revival are emerging, economic policies will have to be gradually adjusted.

The Eurogroup, the ECB and the European Commission issue a joint concluding statement on the successful introduction of euro banknotes and coins.

To avoid overlaps between the next EU Council presidencies of *Germany* and *Finland* scheduled for the second half of 2006/first half of 2007 and parliamentary elections coming up in both countries during this period, the two countries switch ranks.

22 The *Ecofin Council* discusses the following items:

The work program for the Ecofin Council under the Spanish presidency prioritizes the clarification of the issue of the euro area's external representation, the conclusion of negotiations with non-EU countries on the taxation of savings and the achievement of political consensus on the proposed financial services directives on pension funds, prospectuses and financial conglomerates; moreover, the proposed directives on financial collateral arrangements and market abuse and the proposed regulation on international accounting standards shall be adopted. The European Commission submits an ambitious blueprint for delivering full employment by 2010, to be discussed by the European Council of Barcelona. In particular, measures to reform the social systems, provide for more child care facilities and eliminate the early retirement option are to stimulate the job market in the EU. *Argentina* is called upon to implement a comprehensive stability program. According to a statement by the Ecofin Council, the immediate challenge faced by the Argentinian government is to lay the foundation for sound economic growth with low inflation while at the same time easing social tensions.

28 January 28 marks the end of the transition period during which both Dutch guilders and the euro are legal tender in the *Netherlands*.

30 The *European Commission* recommends that a budget deficit warning be issued to Germany for failing, by an increasing margin, to meet budgetary targets. A similar warning should be sent to Portugal. This is the first time that the Commission activates this preventive mechanism.

The *European Commission* submits its proposal for a "Common financial framework 2004–2006 for the accession negotiations." Accordingly, EUR 40 billion should be earmarked for the ten accession countries from 2004 to 2006. Thereof, only EUR 28 billion should be actually paid out in this period while the remainder should be set aside for long-term projects. Thus the European Commission would assign about EUR 2.5 billion less to the accession countries than pledged by the heads of state or government at the Berlin European Council in 1999.

Gerhard Fenz,
Martin Schneider,
Martin Spitzer

Editorial close:
February 15, 2002

1 Overview

Austria's economy lost considerable momentum in the course of 2001. After real GDP had still expanded by 2.7% year on year in the first quarter of 2001, growth slipped to just 1.0% in the second quarter and dropped further to 0.7% in the third quarter. Economic growth appears to have bottomed out in the fourth quarter. The first – tentative – signs of an incipient recovery can already be made out. Virtually all demand aggregates were implicated in this pronounced decline in growth. Consumer spending tumbled in the wake of burgeoning consumer prices and government austerity measures. Capital formation contracted noticeably against the same quarters of the previous year, sinking by 3.0% in the second and 1.2% in the third quarter. Government spending had already flagged or stagnated since the end of 2000, reflecting the public sector's consolidation measures. Foreign trade, which had been highly animated in 2000, subsided perceptibly in the course of 2001. Nominal merchandise exports hit a low of –4.6% in November. Tepid demand for imports let the current account deficit (on a cash basis) recover by EUR 1.42 billion to –EUR 4.12 billion in 2001 compared to the year before.

However, the outcome of the January 2002 business survey of the Austrian Institute of Economic Research (WIFO) offer hope that the economic slowdown has already reached rock bottom. While the bulk of the indicators in the survey are still below the average they had posted for many years, an end to the downtrend seems to be in view. The general confidence in the Austrian economy – expressed in terms of the European Commission's economic sentiment indicator – has also picked up continuously, though little, since its low in October.

National CPI inflation peaked at a seven-year high of 2.7% in 2001. In the first half of 2001 the rate of price increase was still picking up speed, culminating at 2.9% (HICP) and 3.4% (CPI) in May. Since then, inflation has been easing again. In December the CPI advanced by +1.9%, the HICP augmented by +1.8%.

The year 2001 marked a trend reversal for the labor market as well. For the first time since February 1999, registered unemployment had gone up from the year-earlier level in May 2001. This negative trend became stronger in the second half of 2001 and let up somewhat again in January 2002.

2 Output Growth Continues to Flag

After a brief intermediate high in June and July 2001, Austrian industrial output diminished persistently, with the decline gathering speed substantially from August (–1.3% year on year) to November (–5.5%). Production declined especially dramatically in November, slumping by 8.9% (seasonally adjusted, anualized, compared to the previous month). With output advancing by a mere 0.15% in the first eleven months of 2001 against the same period a year earlier, industrial production stagnated.

The breakdown of output developments in the first eleven months of 2001 by sectors indicates that manufacturing and construction are equally hard hit by the deceleration of economic activity. In manufacturing, capital

goods (–1.4% in the first eleven months of 2001 against the previous year) and consumer durables (–2.6%) were instrumental in producing the unfavorable output result. Orders booked in manufacturing rallied in October, only to slide to –7% in November. This decline may be pinpointed to consumer durables and intermediate goods, whereas orders for capital goods and consumer nondurables managed to post slight gains.

After construction had boomed in 1997 and 1998, growth began to suffer setbacks from 1999. By 2000, building output was diminishing by 0.3%. The construction output index (including the auxiliary construction business) still succeeded in augmenting by 4.5% in the first quarter of 2001, but in the two quarters after that, it shrank by –2.9% and –1.7%, respectively. Since the beginning of 2001 output by the sectors building construction and civil engineering has diverged. Civil engineering recovered again between June and September (seasonally adjusted) after having slumped severely from February through May 2001. More recently, however, the civil engineering output index has been pointing downward again. This sector progressed by 5.1% in the first eleven months of 2001 against the same period of 2000. During the same time building construction shrank by 2.9% year on year. New orders demonstrate the discrepant development of the two sectors: Whereas building construction orders were 4.8% below the year-earlier level in October 2001, civil engineering orders had skyrocketed by 25.7% in the same period. Especially tunnel construction, special construction and other civil engineering construction companies as well as hydraulic engineering firms procured numerous new orders. However, new bridge construction orders fell short of the level of October 2001. Total new construction orders were up by 5.9% on the year before in October 2001.

Trade, where turnover had risen by 2.7% in real terms in the year 2000, suffered a setback of 2.3% in the first eleven months of 2001. Wholesale trade was affected most severely (–3.3%). Motor vehicle sales could not shake off the doldrums either. After falling by 2.1% in 2000, real sales dipped by 1.8% from January through November 2001. New vehicle registrations also reflected faltering demand. The number of new vehicle registrations sank by 6.3% in 2001, which follows on a decline by 1.7% in 2000. With consumers pulling tight their pursestrings, retail sales in the first eleven months of 2001 edged down by –0.5% from the same period of 2000.

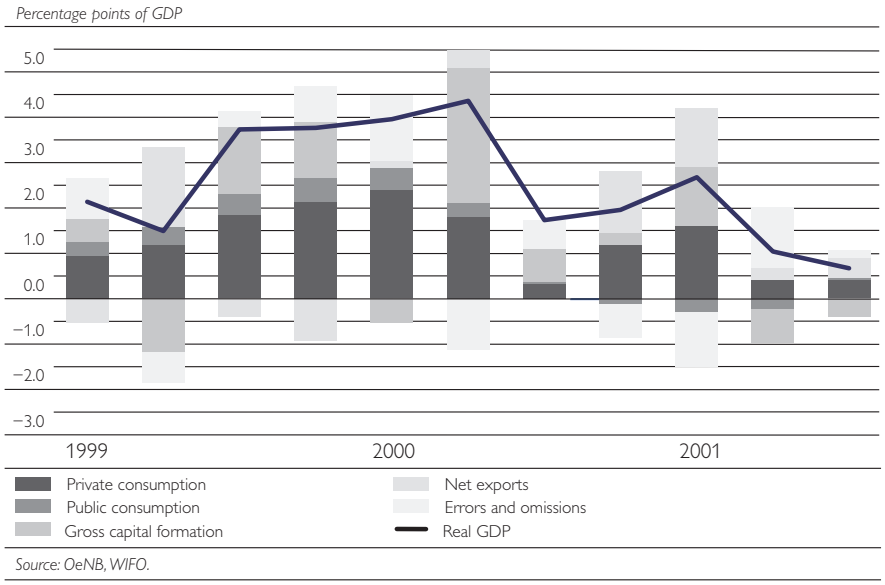
3 Domestic Demand Weak since the Second Quarter of 2001

Austria felt the impact of the global economic slowdown from mid-2001. The latest national accounts data covering the second and third quarters of 2001 are clear evidence of the slowdown of growth in Austria. Real GDP inched up by a mere 1.0% in the second and 0.7% in the third quarter year on year, down from 2.7% in the first quarter of 2001. Consumer spending and investment as well as net exports had been the mainstays of economic growth at the beginning of 2001, but the situation changed from the second quarter. Consumer spending accounted for a diminishing share of economic

growth: the contribution fell from 1.6 percentage points in the first quarter to 0.4 percentage point in the second quarter. Net exports also added less to growth, with the contribution sinking from 1.3 percentage points to 0.3 percentage point. Gross capital formation made a sharply negative contribution of –0.7 percentage point in the second quarter. The picture remained much the same in the third quarter of 2001: The growth contribution of net exports crept up to 0.5 percentage point, that of consumer spending stayed at 0.4 percentage point. Capital spending diminished steadily through the third quarter (–0.4 percentage point; see chart 1). Government spending, which had detracted from GDP growth in the first and second quarters (–0.3 percentage point and –0.2 percentage point, respectively) had a neutral impact on growth in the third quarter.

Chart 1

Real GDP Growth in Austria



Source: OeNB, WIFO.

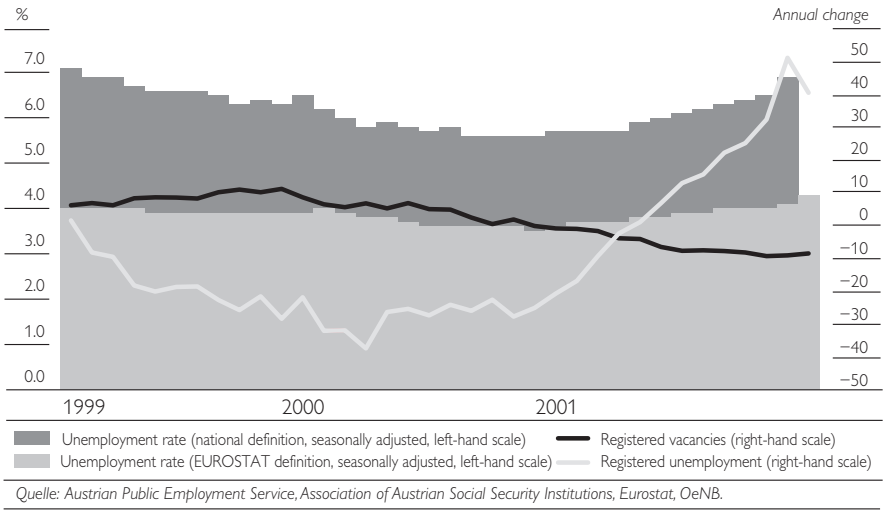
4 Conditions on the Labor Market Deteriorate Sharply

The Austrian labor market took a turn for the worse in 2001. Registered unemployment began to rise again year on year in May 2001 for the first time since February 1999. This downtrend accelerated in the second half of 2001; by December registered unemployment already exceeded the year-earlier figure by 23.3%. This negative trend slackened somewhat to 15.5% year on year in January 2002, but the ranks of the unemployed swelled to nearly 300,000 on account of seasonal effects.

The unemployment rate according to the national definition ran to 8.9% in January 2002 (7.7% in January 2001) and to 4.3% according to the Eurostat definition (3.6% in January 2001). Registered unemployment came to 297,830 persons in January 2002, some 40,000 more than a year earlier. This difference had been high at 50,000 in December 2001. The rise in unemployment is likely to have peaked at the turn of the year and is expected to lessen in the upcoming months. Nevertheless, seasonally

Chart 2

Austrian Labor Market Developments



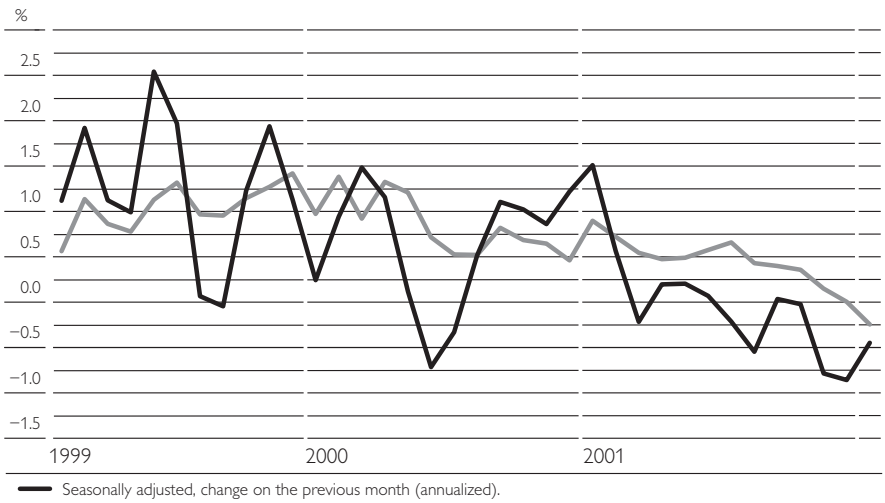
Quelle: Austrian Public Employment Service, Association of Austrian Social Security Institutions, Eurostat, OeNB.

adjusted jobless figures are set to continue rising in the first months of 2002.

Men account for more than two thirds of the 40,000 additional unemployed persons. The reason lies mainly in the protracted slump in construction, above all building construction. This sector was hardest hit by burgeoning unemployment in 2001 (+10%). A breakdown of unemployment by age groups reveals a substantial increase in the set of 15- to under 25-year-olds (+11%). Overall, more men (+7%) than women (+2%) were among the additionally unemployed. The number of vacancies, traditionally a reliable leading indicator, has been going down since December 2000. In January 2002 the number of vacancies stood at roughly 22,000, a 28.5% decline from the previous month.

Chart 3

Payroll Employment



Source: OeNB, Association of Austrian Social Security Institutions.

Experience has shown that employment developments follow production changes with a time lag. During a downturn, enterprises are intent on avoiding the costs involved in termination and try to take advantage of natural attrition to reduce staff. Moreover, in 2001 many companies refrained from firing employees at first because of the scarcity of qualified personnel. The typical lag was observed during the downturn in 2001, although the delay period generally appears to have been contracting during the past few years. A proliferation of atypical work contracts and part-time work may be a key reason this reaction time has diminished. In the first six months of 2001 employment had still advanced (+0.6%), but the trend of the monthly data already signaled an incipient slowdown. In the second half, payroll employment inched up by just 0.3%. This development was recognizable in the seasonally adjusted data from March (see chart 3). Hence in January 2002, payroll employment came to 3,065,897 persons, a decline by 7,967 persons from the same month of 2001.

The surge in unemployment may be pinpointed first and foremost to the anemic economy, and to the recession in construction. However, other contributing factors were the historically high employment figures and the pronounced cutback in unemployment figures in 2000. In addition, the budget consolidation measures involve further layoffs of public servants.

5 Foreign Trade Growth Continued to Lose Momentum in the Course of 2001

In 2000 foreign trade had still posted record gains, but in 2001 the progressive worsening of international economic conditions dampened this dynamic growth. Nominal goods exports according to foreign trade statistics still surged by 15.6% in 2000. And while exports still mounted by a fairly robust 13.9% in the first quarter of 2001 year on year, export growth decelerated to 4.7% in the second and 4.6% in the third quarter.

A comparison of seasonally adjusted export rates month by month (see chart 4) shows that export growth already began to taper off mid-2000. In March 2001 goods exports slipped against the previous month for the first time (–0.3%). Export growth recovered slightly only in July and August.

Imports, too, expanded by an animated 14.7% in nominal terms, powered by healthy economic growth. Import growth began to slip very sharply in October 2000. Since February 2001 seasonally adjusted imports have been on the decline. Imports climbed by just 6.0% year on year in the first eleven months of 2001.

Tourism performed quite well in 2001. Although seasonally adjusted overnight stays stagnated against the previous year as the year 2001 got under way, overnight stays began to rise steadily in April, with growth accelerating until the end of the year. By December, annualized growth in bednights had accelerated to 7.6% against November. Over the entire year, overnight visits were up by 1.2% on the year 2000. Above all, tourists from abroad boosted overnight stays, whereas stays by Austrian vacationers developed at a below average rate.

The current account deficit (based on transactions) improved in the first three quarters of 2001, contracting by EUR 0.88 billion to –EUR 3.37

billion. The shortfall grew smaller compared to the same period of 2000 mainly because the goods and services subbalances rallied, shifting from a deficit of –EUR 1.08 billion (first through third quarter of 2000) to a slight surplus of +EUR 0.08 billion. This revival of goods and services came about in the wake of sagging import demand, and may be attributed most of all to weak domestic economic activity. Travel, the most prominent component of services, stagnated at the year-earlier level (EUR 1.53 billion).

Chart 4

Austrian Goods Exports and Imports in Nominal Terms

Source: Statistics Austria, OeNB.

Conversely, the income balance continued to deteriorate markedly. The shortfall on incomes climbed from –EUR 1.89 billion to –EUR 2.35 billion against the same period of 2000. This development may be attributed to expanding flows of income abroad from nonresidents' portfolio investment. However, both purchases of Austrian securities by foreign investors and vice versa attained record highs in 2000; net acquisitions diminished considerably in both cases in the first three quarters of 2001. Transfers (–EUR 1.10 billion) were quite stable, posting a EUR 0.18 billion lower deficit than in the like period of 2000.

The outcome of the current account (transaction basis) in the first three quarters is in line with the provisional results of the balance of payments (cash basis) for 2001. The current account shortfall shrank by EUR 1.42 billion to –EUR 4.12 billion, with the subbalances goods (+EUR 0.86 billion) and services (+EUR 0.69 billion) performing especially well and incomes deteriorating by EUR 0.31 billion.

6 Inflation Peaks at a Seven-Year High

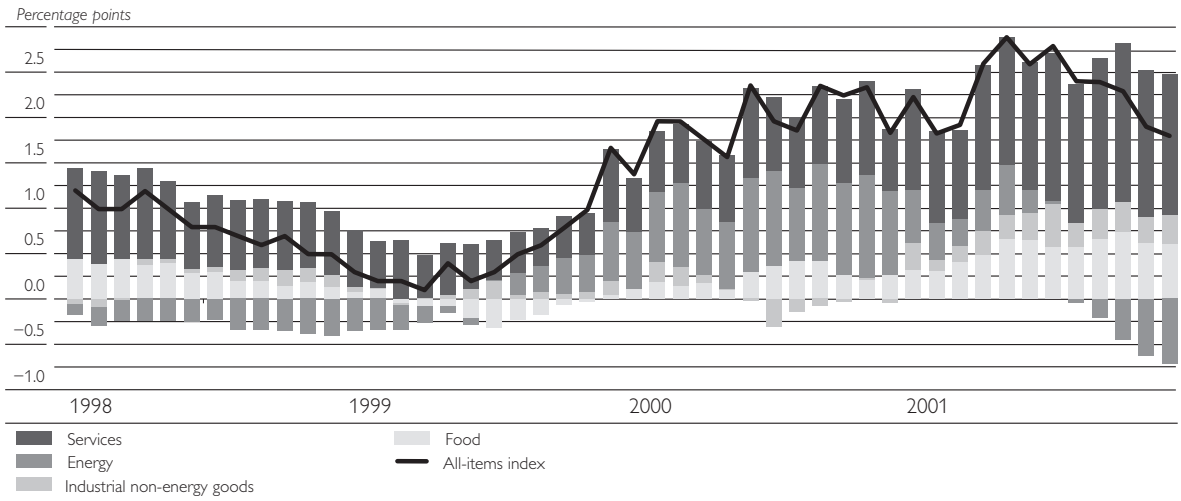
CPI inflation posted a record high of 2.7% in 2001, a rate last experienced seven years previously. Inflation as measured by the HICP ran to 2.3%. However, the rate of price increase has already crested. Inflation had still been quickening in the first half of 2001. It culminated at +2.9% (HICP)

and 3.4% (CPI) in May 2001. Since then, inflation has been easing again. In December, the CPI went up by 1.9% and the HICP mounted by 1.8%.

The factors which contributed substantially to inflation in 2001 were the indirect effects of higher oil prices, the development of service prices and the rise in food prices. Services became more costly because of discretionary measures, such as the introduction of the copayment for outpatient hospital visits in April 2001, and because prices for medical services and tourist services were hiked. Higher food prices were the result of the BSE crisis and the foot-and-mouth disease.

Chart 5

Contributions to Inflation (HICP)



Source: OeNB, Statistics Austria, ECB.

First analyses of the introduction of euro cash showed that the changeover had no significant effects on prices. Meticulous price monitoring and extensive media reports should prevent prices from surging in the wake of the introduction of euro notes and coins in the first few weeks of 2002.

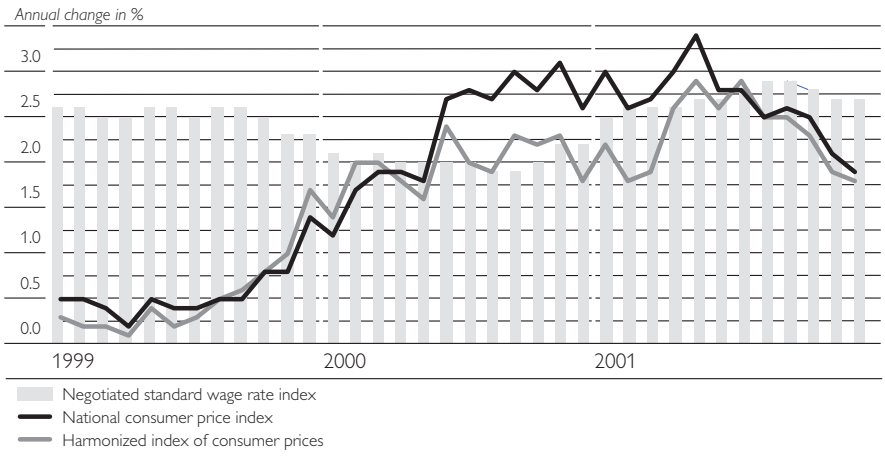
Several factors are expected to sustain the downtrend of inflation in the course of 2002. First, with the economy sluggish, no demand-side pressure on prices is likely to occur. Second, energy prices are anticipated to remain low in the immediate future. The second-round effects of inflationary impacts will peter out, which will act as a damper on price developments. Third, the impact of the BSE crisis and of foot-and-mouth disease on food prices will end. Fourth, the dissipation of the price effects of various fiscal policy measures, such as the boost in the price of highway toll stickers, the introduction of tuition fees and outpatient copayments will cause inflation to subside. Finally, the full liberalization of the power supply market in October 2001 and of the gas market in October 2002 are counted on to help dampen prices.

Between mid-2000 and mid-2001, employees suffered real income losses (see chart 6). In 2000 the rise in oil prices was the main root cause of these income losses, whereas in 2001 the effects of the animal diseases gave a fillip to food price increases. What is more, the burden on incomes of the

budget austerity measures were felt throughout both years. With inflation easing from May 2001, the rise in the negotiated standard wage rate index again exceeded the rise in the national CPI, which serves as the benchmark for wage negotiations. Real wages stagnated throughout the year 2001 – the standard wage rate index and the national CPI both advanced by 2.7%. The gap between wage and price growth enlarged markedly until the end of 2001. In December the 2.7% rise in the negotiated standard wage rate index outpaced the 1.9% gain in the national CPI. Thus real wages are on the up and up again.

Chart 6

Wage and Price Developments in Austria



Source: Statistics Austria.

The wage settlements agreed in the 2001 negotiations provide for increases between 2.5% and 3.1% for actual wages, just under the settlements concluded in 2001. Realizing that the outlook for economic activity was gloomy, employees waived demands for full compensation of real income losses caused by the supply shocks in 2000 and 2001 (oil price hikes, animal diseases). With inflation set to moderate in 2002, real wages should pick up again. As negotiated standard wages will be raised most, a negative wage drift (a gap between the rise in minimum wages and actual wages) on the order of 0.2 percentage point is likely to occur.

7 Confidence Indicators Signal an End to the Downturn

Although business activity in many sectors of the economy is still deteriorating, the confidence indicators suggest that the downtrend has bottomed out. The general confidence in the Austrian economy – expressed in terms of the European Commission's economic sentiment indicator – has also picked up marginally but continuously since its low in October. In January 2002 consumer confidence was up 5 points on the October 2001 value. Industrial confidence, which had dropped until the end of the year, gained strength again in January. The construction confidence indicator, which had worsened steadily in the course of the past year, jumped by a

powerful 8 points in January 2002 from December 2001. Only retail trade and services gave no sign of a revival of confidence.

The results of the business survey of the Austrian Institute of Economic Research (WIFO) of January 2002 also nurtured the hope that the economy would stabilize. While the bulk of the indicators in the survey are still below the average they had posted for many years, the downtrend seems to have ended. Although construction confidence is still in the doldrums, enterprises' assessment of manufacturing and of the future business situation is firming up again. The demand expectations of business services have improved in the past three months, though the sentiment on orderbooks kept sinking.

Development of Selected Economic Indicators in Austria

	2000	2001[1])	2002[1])	2003[1])	Last recently available period		
					2000	2001	2002
	Annual change in %						
Economic output, real GDP at 1995 prices					*3rd quarter*		
GDP	+ 3.0	+1.1	+1.2	+ 2.8	+ 1.7	+0.7	..
Gross capital formation	+ 3.6	−0.1	+0.5	+ 3.7	+ 2.8	−1.5	..
Private consumption	+ 2.5	+1.4	+1.6	+ 2.3	+ 0.6	+0.8	..
Public consumption	+ 0.9	−0.5	−0.3	+ 0.5	+ 0.2	+0.2	..
Exports	+12.2	+3.9	+3.5	+ 7.3	+ 9.8	+2.5	..
Imports	+11.1	+2.8	+3.2	+ 6.6	+ 9.7	+1.5	..
GDP per employee	+ 2.5	+0.6	+1.2	+ 1.9	+ 1.4	+0.8	..
Industrial output					*January to November*		
Output index incl. construction	+ 7.0	×	×	×	+ 7.0	+0.2	..
Productivity per hour	+ 7.3	+2.1	+2.5	+ 4.8	×	×	×
Labor market					*January*		
Payroll employment	+ 0.8	+0.5[7])	−0.2	+ 0.8	+ 1.0	+0.9	− 0.3
Registered unemployment	−12.4	+4.9[7])	+9.2	− 3.6	− 7.3	−7.5	+15.5
	%						
Unemployment rate							
EU definition	3.7	3.8[7])	4.2	4.0	3.9	3.6	4.3
National definition	5.8	6.1[7])	6.6	6.3	8.4	7.7	8.9
	Annual change in %						
Prices							
National CPI	+ 2.3	+2.7[7])	+1.4	+ 1.6	+ 1.2	+3.1	..
HICP	+ 2.0	+2.3[7])	+1.3	+ 1.6	+ 1.4	+2.2	..
Wholesale price index	+ 4.0	+1.5[7])	×	×	+ 2.2	+3.8	− 0.4
Wages							
Negotiated standard wage rate index	+ 2.1	+2.7[7])	+2.5[8])	+ 2.5[8])	+ 2.1	+2.5	..
Unit labor cost							
General	+ 0.6	+2.5	+0.9	+ 0.3	×	×	×
Manufacturing industry	− 5.1	+0.9	+0.5	− 1.7	×	×	×
Relative unit labor cost[2])							
Vis-à-vis major	− 5.8	−0.4	+0.2	− 1.5	×	×	×
Vis-à-vis Germany	− 2.4	−0.1	+0.0	− 1.7	×	×	×
Foreign trade (Statistics Austria)					*January to October*		
Imports, in nominal terms	+14.7	+6.5	+3.0	+10.2	+14.9	+6.4	..
Exports, in nominal terms	+15.6	+6.6	+4.5	+10.1	+17.1	+6.2	..
	EUR billion						
Balance of payments[3])					*January to November*		
Current account	−5.71	−5.19	−5.10	−5.30	− 5.5	−4.5	..
Goods	−3.00	−3.10	−2.10	−2.30	− 6.7	−6.4	..
Services	+1.00	×	×	×	+ 3.7	+4.5	..
Travel	+1.60	+1.54[7])	+1.86	+2.01	+ 1.5	+1.5	..
	%						
Interest rates					*January*		
EONIA	4.12	4.39[7])	×	×	3.04	4.76	3.32
Benchmark[4])	5.56	5.07[7])	4.60	4.90	5.75	5.10	5.08
	Annual change in %						
Effective exchange rate of the euro							
Nominal	−10.4	+1.7	×	×	−11.5	−1.4	− 1.3
Real	−10.1	+3.1	×	×	−11.1	−0.9	+ 0.1
Indicator of Austria's price competitiveness[5])	− 3.6	+0.1[7])	−0.3	− 0.1	*November* − 3.7	+1.4	..
	% of GDP						
Budget							
Net government debt[6])							
Central government	− 1.4	−0.7	−1.0	− 0.7	×	×	×
General government	− 1.1	−0.0	−0.4	+ 0.0	×	×	×

Source: OeNB, Statistics Austria, Austrian Institute of Economic Research, Austrian Public Employment Service, Association of Austrian Social Security Institutions.

[1]) WIFO forecast of December 2001.

[2]) Manufacturing industry, calculated in uniform currency.

[3]) Annual figures based on transactions, last recently available period on cash balances.

[4]) Secondary market yield of the most recently issued ten-year government bond.

[5]) Until December 1998: real effective exchange rate of the Austrian schilling.

[6]) According to the report of government deficits and debt levels of November 2001.

[7]) Effective value.

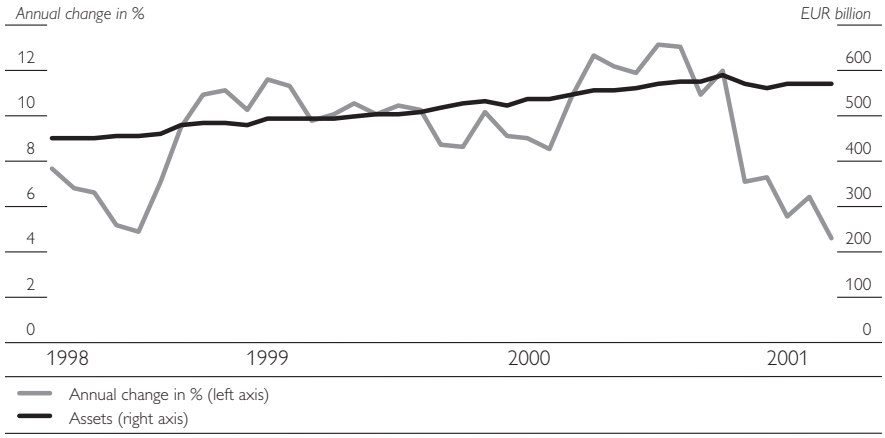
[8]) Change in gross earnings per employee.

Ralf Dobringer[1])

Slowdown in Asset Growth

After a highly successful year 2000, credit institutions operating in Austria experienced substantially more difficulties in 2001, particularly in the lending business; in part, this development was attributable to the international economic downturn. After having expanded by EUR 38.07 billion or 7.3% in 2000, asset growth decelerated to EUR 25.04 billion or 4.5% in the reporting year. One of the main reasons for this deceleration was the restructuring of Bank Austria AG (BA) in the course of its merger with Bayerische Hypo- und Vereinsbank AG (HVB)[2]). Exclusive of BA, total assets would have augmented by about 8%, i.e. at an even higher rate than in the previous year.

Domestic Banks' Total Assets



Source: OeNB.

The savings banks sector was the only sector to report a loss in market share in the year 2001, which was traceable to the restructuring of BA. Compared with 2000, this sector's total assets declined by 4.7%, while all other banking sectors reported a growth in assets. The strongest advances (in percent) were seen in the Volksbank credit cooperatives sector (+19.3%), followed by state mortgage banks (+12.2%) and Raiffeisen credit cooperatives (+10.5%).

With total assets climbing by merely 2.9%, only the building and loan associations grew at a slower-than-average rate.

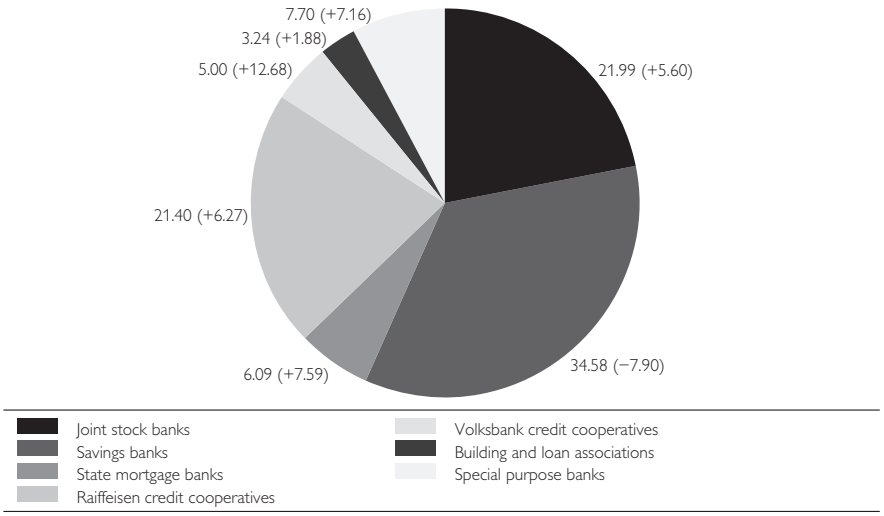
In 2001, the share of interbank transactions in asset growth was again above average owing to intrasector cooperation in multi-tier sectors. Given its specific business structure, the building and loan associations sector recorded the highest share of loans and deposits in total assets.

1 *In cooperation with Gudrun Mauerhofer and Walter Waschiczek.*

2 *In the course of restructuring BA, the following foreign branch offices were closed: Milan (as of March 31, 2001), London (as of June 3, 2001), Munich (as of June 30, 2001), and the branch offices in Singapore (as of December 12, 2001) and Hong Kong (as of January 1, 2002).*

Market Share of Banks Operating in Austria

% of total assets (as on December 31, 2001) and cumulative change since the beginning of 2001 in %



Source: OeNB.

At 3.6%, the assets of the five largest (individual) credit institutions grew at a markedly slower pace than total assets (+4.5%), which was mainly attributable to the previously mentioned restructuring of BA. As a result, their market share also shrank by 0.4 percentage point, to 45.5%, compared to the level recorded in December 2000.

Share of Loans/Deposits in Total Assets/Liabilities by Sector

	Loans	Deposits	Interbank transactions	
			Loans	Deposits
	%			
Joint stock banks	45.42	38.63	24.39	29.78
Savings banks	33.45	27.29	37.18	38.89
State mortgage banks	58.25	21.34	17.25	11.72
Raiffeisen credit cooperatives	39.80	37.39	35.74	41.76
Volksbank credit cooperatives	45.63	39.12	28.47	36.03
Building and loan associations	74.03	87.78	13.70	6.38
Special purpose banks	16.96	2.83	58.10	24.88
Banks total	39.61	32.25	33.26	33.57

Source: OeNB.

Banks' Balance Sheets Reflect Cash Changeover

Amounting to EUR 10.35 billion on December 31, 2001, and thus exceeding the corresponding 2000 value by 62.6%, cash and central bank balances held by Austrian banks exhibited the most striking development on the assets side. This was attributable primarily to the central bank balances subitem, which rose relatively sharply by EUR 3.92 billion or 105.2%. This rise is to be seen in connection with the introduction of euro notes and coins as, in the run-up to the cash changeover, banks had to deposit eligible cash collateral with the Oesterreichische Nationalbank to the amount of the

euro cash frontloaded to banks, but not yet debited to their current accounts.

Number of Banking Offices Continues to Decline

In the year 2001, the number of banking offices went down by 26 to 5,453. The number of head offices fell by 16 to 907, the number of branch offices was reduced by 10.

Banking Offices

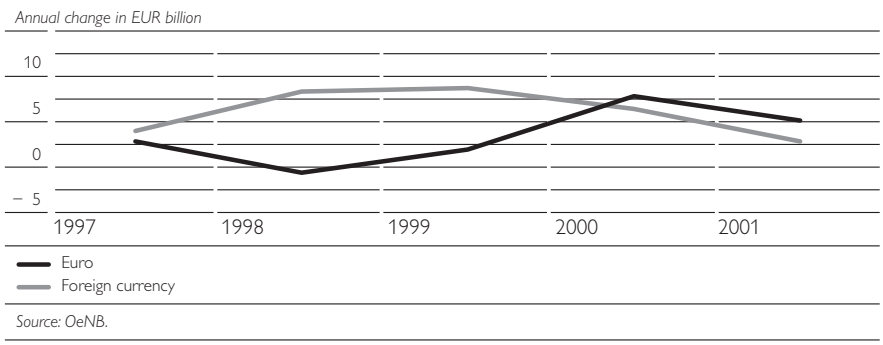
	Joint stock banks and private banks		Savings banks		State mortgage banks		Raiffeisen credit cooperatives		Volksbank credit cooperatives		Building and loan associations		Special purpose banks		Total	
	H	B	H	B	H	B	H	B	H	B	H	B	H	B	H	B
Austria	61	738	67	1,380	9	164	617	1,725	70	475	5	59	78	5	907	4,546
Austria H+B		799		1,447		173		2,342		545		64		83		5,453
Annual Change		−13		−20		+10		−24		+2		+25		−6		−26

Source: OeNB.
H = Head offices.
B = Branch offices and bureaux de change.

Noticeable Slowdown in Credit Growth

In line with the sluggish pace of the economy, loans contracted quite noticeably in 2001. While the year 2000 had still seen an expansion by EUR 14.09 billion (6.7%), loan growth practically halved in 2001 to EUR 7.92 billion (3.5%). Interest charges accrued in the fourth quarter likewise slightly declined to EUR 2.46 billion. While foreign currency loans had accounted for around 45% of credit growth in 2000, their share fell to about 36% in 2001. In absolute figures, foreign currency loans expanded by no more than EUR 2.83 billion in 2001, compared with a EUR 6.40 billion rise in the preceding year. Compared to an increase by 1.8 percentage points in 2000, the share of foreign currency loans in total lending thus inched up only marginally since the beginning of 2001, namely by 0.7 percentage point to 18.2%.

Loans to Domestic Nonbanks



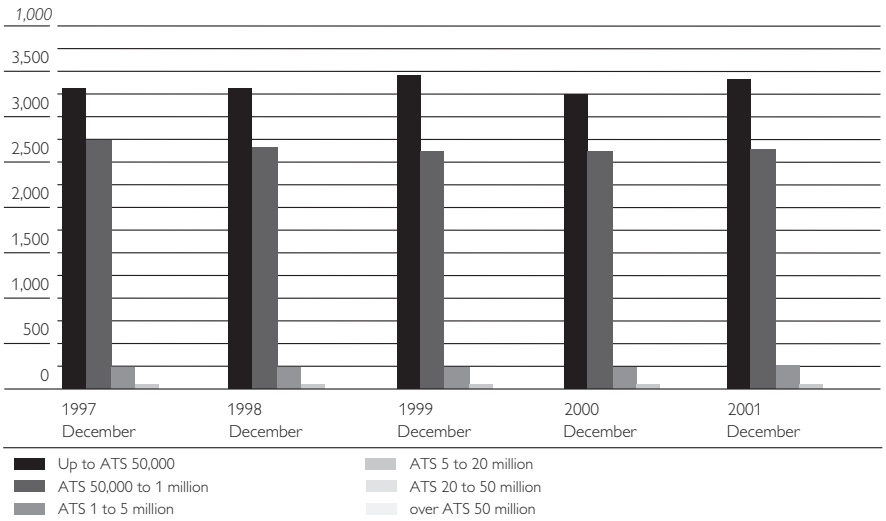
Source: OeNB.

The growth of euro-denominated loans also declined, albeit less heavily. While euro loans had still augmented by EUR 7.69 billion (4.3%) in the year 2000, they went up by no more than EUR 5.09 billion (2.7%) in 2001.

A sectoral breakdown shows the highly differentiated distribution of foreign currency loans. Owing more than 95% of its total credit growth to foreign currency loans, the savings banks sector clearly took the pole position, followed by Volksbank credit cooperatives (approximately 42%) and Raiffeisen credit cooperatives (just over 36%). Special purpose banks, by contrast, recorded the highest percentage growth (+12.6%) in aggregate loans (euro-denominated loans and foreign currency loans) in 2001, with Volksbank credit cooperatives coming in second (+7.0%), followed by building and loan associations (+6.0%). Joint stock banks and savings banks posted below-average growth in this segment.

Analyzing loans by size is very informative in this respect. In the segment of euro-denominated loans, smaller amounts of up to ATS 50,000[1]) (mainly overdrafts on checking accounts) were predominant, followed by loans ranging from ATS 50,000 to 1 million, while most foreign currency loans fell into the ATS 1 to 5 million category. This suggests that foreign currency loans are currently very popular among households and small- or medium-sized enterprises.

Euro-Denominated Loans to Domestic Nonbanks



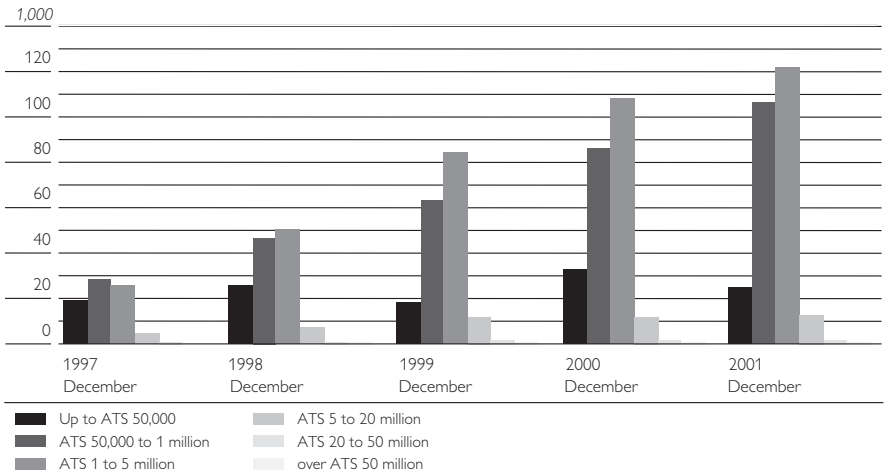
Source: OeNB.

In December 2001, slightly more than half of all foreign currency loans (50.6%) were denominated in Swiss francs. At end-2000, the corresponding figure had still been 58.7%. Even though the Swiss franc appreciated against the euro, the volume of Swiss franc-denominated loans dropped by 8%. Japanese yen-denominated loans, by contrast, remained in great demand: Their share in aggregate foreign currency lending rose by one third, from 34.0% to 42.1%, in the course of the year 2001. As the Japanese yen's exchange rate fell by about 5% over the same period, the increase in real terms was even more significant. In 2001, the share of U.S. dollar loans in total foreign currency lending went up by 1 percentage point

1 Up to December 2001 (reporting date), the classification of loan categories was based on schilling amounts.

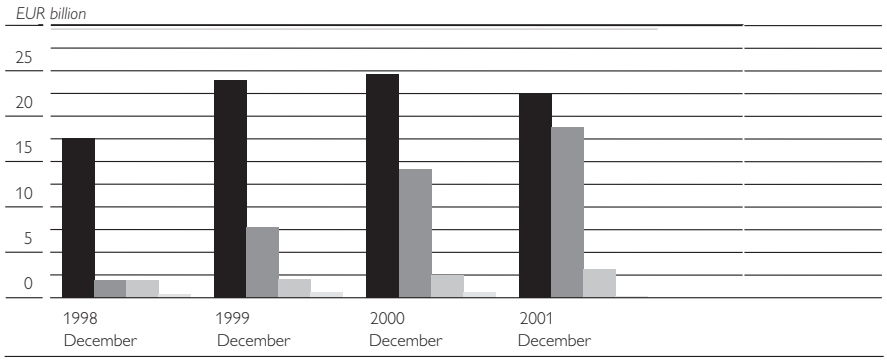
to 6.9%. At least part of this advance was, however, traceable to exchange rate fluctuations.

Foreign Currency Loans to Domestic Nonbanks



Source: OeNB.

Structure of Foreign Currency Loans



Source: OeNB.

The share of foreign currency loans in total lending was noticeably lower in the eastern parts of Austria[1]) (15.3%) than in the west (31.2%), even though in 2001 foreign currency loans grew at a significantly faster rate in eastern Austria (+12.6%) than in the western states (+7.9%).

Augmenting by EUR 3.63 billion (+3.6%), closed-end loans, i.e. nonrevolving loans with a set amount of money to be repaid at a specific time, posted the highest growth compared to other loans in terms of volume. Around half of all loans extended fell into this category. The second

1 *The eastern states are Lower Austria and Burgenland. Vorarlberg, Tyrol and Salzburg are classified as the western states.*

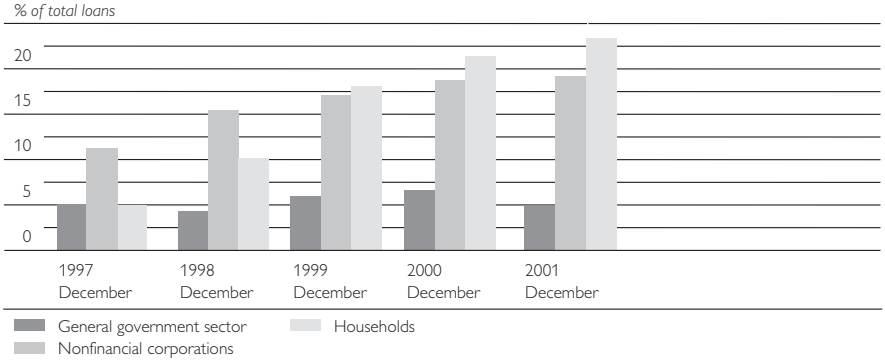
most important type of loans were overdrafts[1]), which grew by EUR 3.34 billion (+5.6%) in the reporting year. Advances, by contrast, contracted by EUR 1.08 billion (5.4%) in 2001 compared to a EUR 1.78 billion (9.9%) expansion in the corresponding period of 2000.

A breakdown by economic sectors shows that at end-2001, nonfinancial corporations were again the largest group of borrowers, accounting for a share of approximately 56% in the total volume of lending. Their borrowings increased by 2.7% in 2001, after having augmented by 7.1% in the previous year. Around 80% of lending to corporate borrowers was euro-denominated, even though foreign currency loans grew at a faster pace. Since December 2000, the average interest rate for business loans fell by 1.15 percentage points to 5.80%.

The public sector was the only sector to reduce its liabilities during the review period (by 1.6%). This compares with a 2.5% rise in the year 2000. The regional authorities in particular reduced their borrowing from banks by 14.7%, whereas the local authorities increased their bank liabilities by 4.0%. Both social security funds and the central government raised their borrowing above 2000 levels (by 9.6% and 1.1%, respectively). Since December 2000, the average interest rate for loans to public sector entities declined by 0.97 percentage point to 4.31%.

Households were the economic sector that recorded the highest rate of credit growth, namely 6.1%. In the year 2000, however, the rise in lending to households had been even more dramatic (+9.6%). Unlike the public sector, which raised more than 95% of its borrowings in euro, the share of foreign currency loans extended to households was above 23%, and rising fast. By comparison, the share of foreign currency loans in lending to nonfinancial enterprises came to around 19% at end-2001. Since December 2000, the average interest rate for personal loans went down by 0.92 percentage point to 6.89%.

Share of Foreign Currency Loans



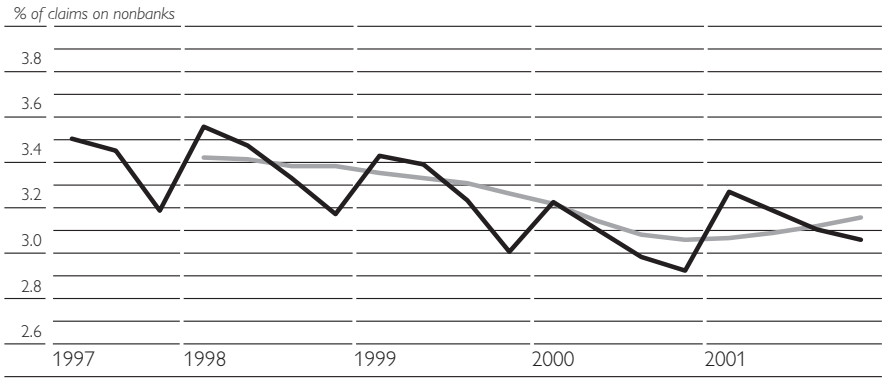
Source: OeNB.

1 *Overdrafts are credits which may be accessed at any time and up to a specified amount for the duration of an agreement. This definition also covers overdrafts on current accounts.*

Augmenting by EUR 2.29 billion (5.6%), the percentage growth of home and home improvement loans was faster in the year 2001 than that of loans. The share of foreign currency-denominated loans in home loans climbed from 8.0% to 9.3%. At end-2001, by comparison, 18.2% of all loans were foreign currency-denominated; credit growth in this segment had advanced by only 0.7 percentage point, however. Since December 2000, the average interest rate on euro-denominated home loans fell by 0.74 percentage point to 5.64%.

Given the difficult economic situation both in Austria and abroad and the consequently higher number of bankruptcies, 3.06% of claims on nonbanks required adjustment (up 0.14 percentage point vis-à-vis December 2000). As in previous years, the majority of these adjustments took place in the decentralized sectors (Volksbank credit cooperatives: 4.36%; Raiffeisen credit cooperatives: 3.64%; savings banks: 3.45%). At the other end of the spectrum were building and loan associations (0.36%) and special purpose banks (1.00%).

Value Adjustments



Source: OeNB.

Unlike loans, the volume of securitized lending shrank by 12.2% in the reporting year, compared to a contraction by no more than 3.3% in the corresponding period of 2000. Of all securitized loans, other public sector debt instruments (–12.8%) and Federal Treasury bills (–75.4%) decreased particularly sharply. Broken down by sector, savings banks recorded the most substantial portfolio reduction (–23.1%), while Volksbank credit cooperatives stepped up their securitized lending by 21.1%. In December 2001, around 1% of all securitized loans was foreign currency-denominated.

Deposits

Following a rather modest EUR 3.99 billion (+2.3%) rise in 2000, the deposit intake by domestic nonbanks increased to EUR 13.77 billion (+7.8%) in the reporting year – a growth rate last reached in the early 1990s. While foreign currency deposits fell by 19.1%, deposits in euro

climbed by 8.4%. In 2000, credit institutions had still reported a 7.3% increase in foreign currency deposits.

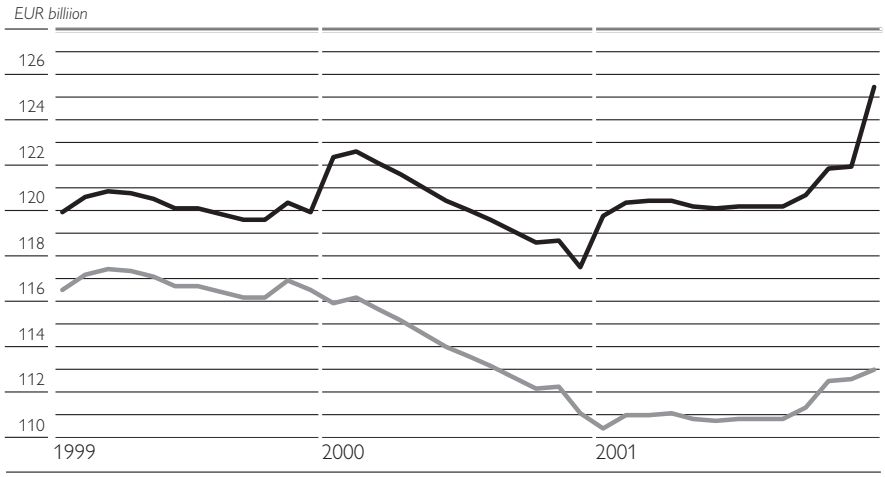
Special purpose banks recorded the highest percentage rise in deposits (+27.4%), followed by state mortgage banks (+21.9%), Volksbank credit cooperatives (+10.9%), Raiffeisen credit cooperatives (+9.4%) and joint stock banks (+8.5%). Savings banks and building and loan associations registered lower-than-average growth (+4.9% and +2.9%, respectively) in the reporting period.

Augmenting by EUR 2.97 billion (8.3%), sight deposits (including personal checking accounts) recorded the slowest growth in absolute terms, compared to an expansion by EUR 4.53 billion (14.4%) in 2000. Households held just under 50% of all sight deposits in euro, thus stepping up these holdings by 11.5%, i.e. by a slightly lower rate than in 2000. The average interest rate on deposits in personal checking accounts was reduced by 0.08 percentage point to 0.25%. Nonfinancial corporations, which held about 38% of all sight deposits, and the public sector increased their sight deposit holdings by 3.3% and 10.2%, respectively, i.e. at a slower pace than in the previous year.

Time deposits followed an opposite trend: After advancing by EUR 2.09 billion or 11.6% in the year 2000, time deposits went up by EUR 5.07 billion (25.1%) in the reporting year. At end-2001, nonfinancial corporations held just over half of all euro-denominated time deposits, i.e. their holdings increased at a noticeably faster rate (+30.4%) than in 2000 (+6.9%). The public sector, which held around 30% of all euro-denominated time deposits, stepped up its holdings by 49.5%, following a slight reduction in 2000. Households were the only economic sector to reduce its holdings of euro-denominated time deposits (–7.5%).

Despite the abolition of anonymous savings accounts and falling interest rates, the traditional passbook savings account experienced a revival in 2001. After a pronounced downturn in 2000 (–EUR 2.63 billion or –2.2%), which was also attributable to a shift in portfolios towards mutual funds as investors were seeking higher returns, the year 2001 witnessed a EUR 5.73 billion (4.8%) growth – the best result in many years. Although the average interest rate on savings deposits declined, the substantial growth in deposits drove up the level of interest credited to savings deposits as at December 31, 2001, by 0.18% to EUR 3.12 billion. This figure indicates that even net of interest credited, savings deposits would have grown by about EUR 2.80 billion.

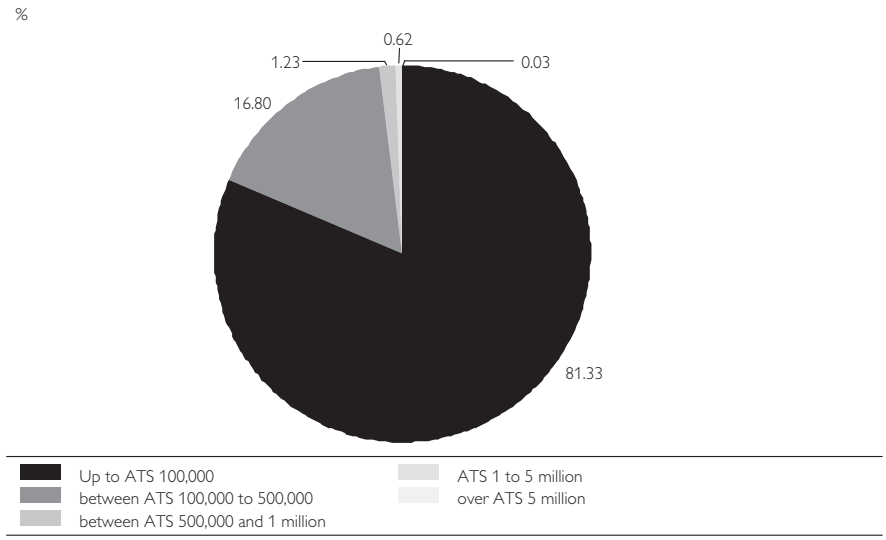
Savings Deposits of Domestic Nonbanks



Source: OeNB.

In view of the tight situation in international capital markets, many investors obviously turned toward types of investment yielding lower but safer returns.

Breakdown of Savings Deposits by Size



Source: OeNB.

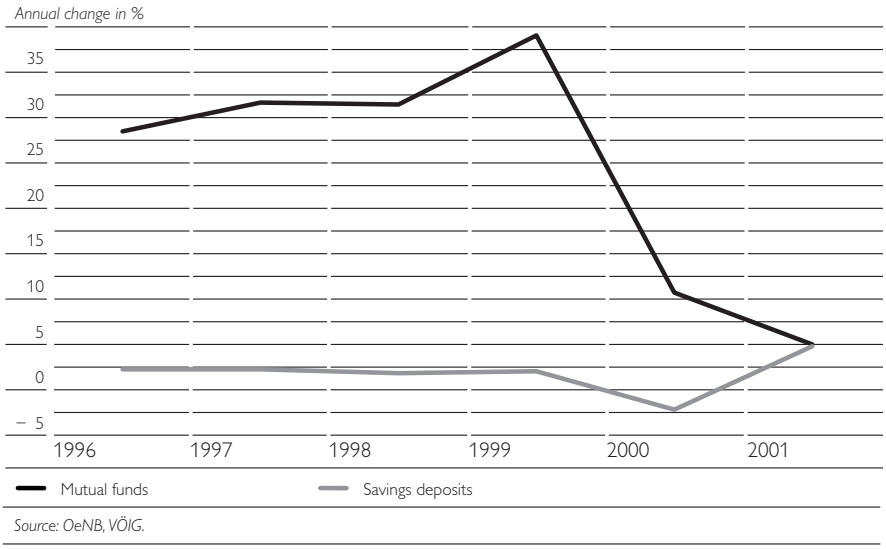
A breakdown of savings deposits by size does not reveal any major changes vis-à-vis December 2000. As in the previous year, more than 80% of all savings deposits fell into the category of less than ATS 100,000[1]). The number of savings accounts in the category between ATS 100,000 and ATS

1 *Up to December 2001 (reporting date), the classification of savings deposit categories was based on schilling amounts.*

500,000 increased slightly over the reporting year, while there was a slight reduction in the number of savings deposits of over ATS 1 million. This slight shift may be attributable to the abolition of anonymous savings accounts, as savings deposits of up to an amount of ATS 200,000 may still be held as so-called "password savings books[1])."

In contrast to savings deposits, developments in mutual funds[2]) were less satisfactory in the year 2001. After augmenting by EUR 8.02 billion (10.7%) in the previous year, mutual funds expanded by no more than EUR 4.15 billion (+5.0%) in the reporting period. As of December 2001, assets managed by domestic investment companies totaled EUR 87.37 billion.

Volume Changes in Savings Deposits and Mutual Funds



Source: OeNB, VÖIG.

In 2001, domestic issues of credit institutions operating in Austria increased by EUR 2.29 billion or 4.4%, at less than half the rate registered in the previous year (+EUR 5.17 billion or +11.0%). Euro-denominated issues accounted for around half of the overall increase (2000: over 80%). Of all types of banks' own issuances, debt securities issued recorded the highest growth rate (+7.6%), thus maintaining a level similar to 2000.

External Business

After Austrian banks' external business had reached a preliminary peak in mid-2001, external assets declined by EUR 1.47 billion (0.9%) over the entire year 2001, which was in part attributable to the above-mentioned closure of a number of BA branch offices. Excluding BA, external assets would have been up by approximately 16%. In 2000, however, banks had still recorded more than 20% growth in external assets. The share of external assets in banks' total assets decreased from 28.0% to 26.6%. Total

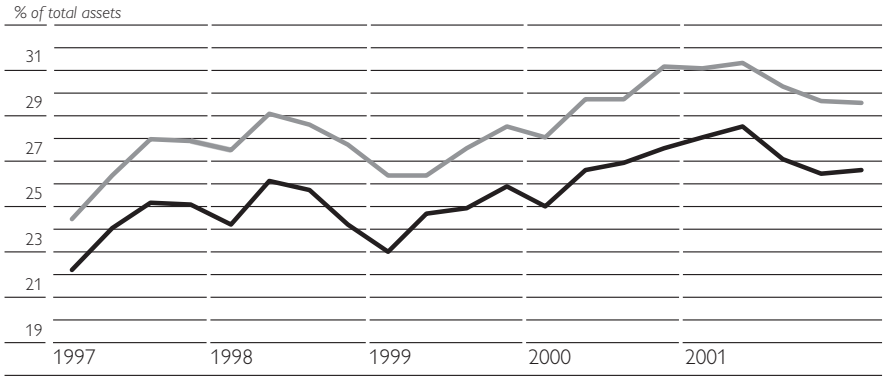
1 *Bearers whose identity is known to the respective credit institution may make withdrawals from these passbooks upon statement of the password.*

2 *Source: VÖIG.*

assets of Austrian banks' foreign branches halved, down to EUR 19.50 billion or 3.3% of total banking sector assets. Within external assets, debt securities and other fixed-income securities of foreign issuers went down most sharply, by 24.3%. In 2000, this category had still augmented by 55.2%. International interbank transactions, by contrast, expanded further (+3.5%), albeit less vigorously than in 2000 (+18.9%).

On the liabilities side, banks reduced their external liabilities by 0.6% compared with 18.7% in 2000. Exclusive of BA merger-related events, external liabilities would have expanded by about 15%, thus almost mirroring asset-side developments. Of all types of external liabilities, securitized external liabilities contracted most markedly, by 2.9%. Measured as a percentage of total assets, domestic banks' external liabilities fell by 1.3 percentage points to 29.6% from the level of December 2000.

Austrian Banks' External Transactions

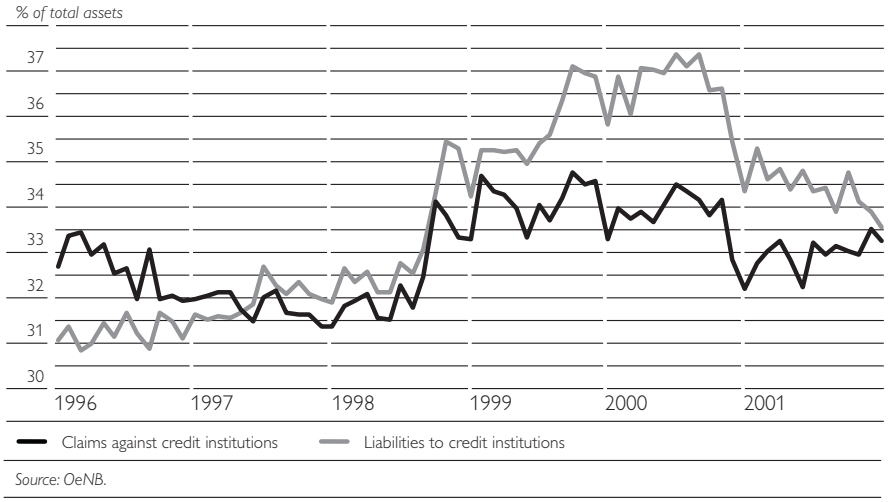


Source: OeNB.

Interbank Transactions

While claims against domestic credit institutions had still declined by EUR 6.08 billion (–5.6%) in 2000, they picked up by EUR 11.47 billion (+11.2%) in 2001 – faster than any other asset item. By contrast, the growth curve of claims against foreign credit institutions was noticeably flatter in 2001, at +3.5%, than in 2000 (+18.9%). On the liabilities side, growth in foreign interbank transactions even plunged to 0.1% in 2001 from 11.0% in 2000 - a downturn which must mainly be seen in connection with the above-mentioned closure of a number of BA branch offices abroad. In general, interbank transactions accounted for 33% to 34% of total assets at end-2001, thus reaching marginally lower levels than in the preceding years.

Interbank Transactions

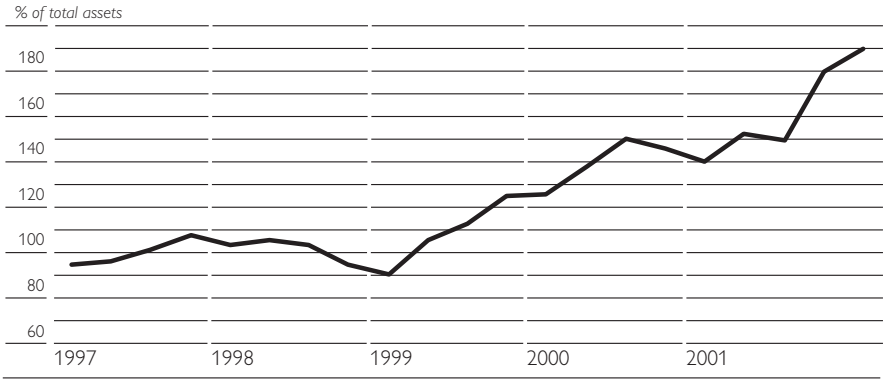


Source: OeNB.

Derivatives Transactions

Transactions in derivatives, in particular interest rate derivatives, have expanded significantly since the beginning of EMU. In 2001 alone, their volume increased by EUR 323.67 billion or 41.1%. Derivatives transactions as a percentage of total assets have therefore gone up by 49 percentage points to 189% since December 2000.

Specific Off-Balance-Sheet Transactions



Source: OeNB.

Capital Held by Austrian Banks

As at December 31, 2001, the capital held by banks operating in Austria amounted to EUR 41.98 billion, i.e. EUR 4.55 billion (12.1%) more than at the beginning of the year 2001. Accordingly, the capital ratio (unconsolidated capital as a percentage of the assessment base) went up as well, by 0.7 percentage point to 14.6%. Broken down by sector, special purpose banks and savings banks were above this average, while all other sectors were below. About 65% of total banking sector capital consist of core capital, the highest-quality type of capital (tier 1 capital). Compared

with December 2000, banks' tier 1 capital ratio[1]) moved up slightly by 0.4 percentage point to 9.5%. Eligible capital, i.e. core capital and supplementary capital less deductible items, grew by 11.9% in 2001 to a level of EUR 39.56 billion. Tier 3 capital, which may only be used to cover market risks, went up relatively strongly by 53.2% to EUR 2.41 billion.

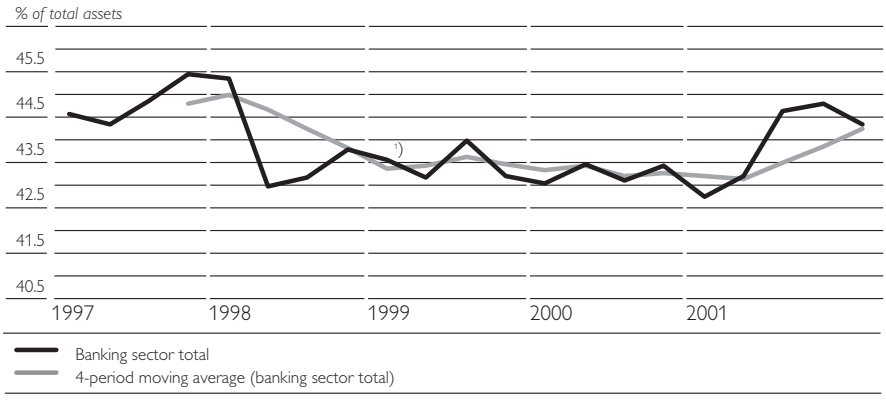
Capital

	Capital in % of assessment base	*Tier 1 capital ratio*	*Risk-weighted assets in % of total assets*
Joint stock banks	12.7	8.4	48.0
Savings banks	17.7	9.8	41.0
State mortgage banks	11.0	7.0	45.1
Raiffeisen credit cooperatives	12.9	9.4	52.9
Volksbank credit cooperatives	12.9	9.5	57.1
Building and loan associations	9.7	8.0	40.1
Special purpose banks	25.7	22.1	18.0
Banks total	14.6	9.5	44.3

Source: OeNB.

As risk-weighted assets[2]) grew by EUR 20.04 billion (+8.3%) and thus at twice the rate of total assets (+4.5%) in the reporting year; risk-weighted assets as a percentage of total assets likewise rose, namely by 1.6 percentage points to 44.3%. For Volksbank credit cooperatives, Raiffeisen credit cooperatives, joint stock banks and state mortgage banks, this ratio was above the overall average.

Risk-Weighted Assets



Source: OeNB.
1) Change in Austrian Banking Act.

1 *The core capital ratio is calculated by dividing core capital by the assessment base. The minimum requirement under the Austrian Banking Act is 4%.*

2 *These are value-adjusted assets which are to be weighted by risk categories according to Section 22(3) Banking Act.*

Balance of Payments in the First Three Quarters of 2001[1])

René Dell'mour,
Patricia Fahrngruber,
Christine Stecyna,
Patricia Walter,
Isabel Winkler,
Robert Zorzi

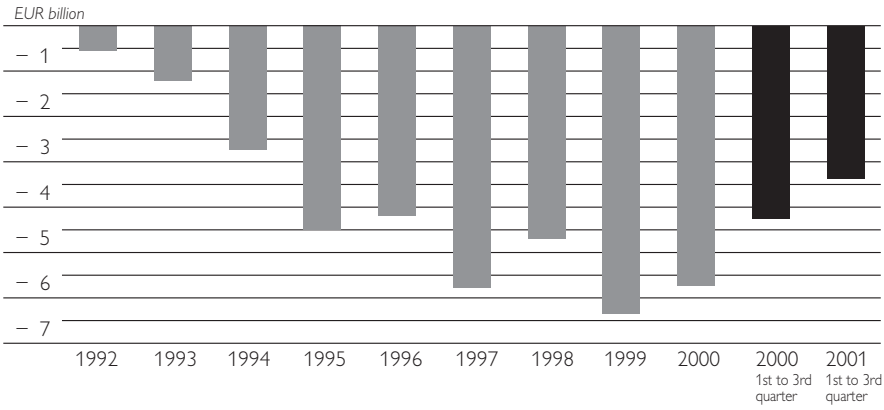
- Current account deficit decreases year on year.
- Investment income outflows to the euro area contrast with inflows from Eastern Europe.
- Austrian direct investment activity in Central and Eastern Europe remains lively.
- Portfolio investment and other investment activity lose considerable momentum.

1 Current Account

The deficit on the Austrian current account based on transactions (table 1) contracted by EUR 880 million in the first three quarters of 2001 against the same period of the previous year, standing at EUR 3,370 million;[2]) the narrowing of the deficit was largely attributable to the improvement of the goods and services account. On the whole, the current account reflects the economic slowdown in Austria and in main trading partner countries throughout 2001.

The growth rate was positive in the first quarter of 2001 and basically on a par with the value recorded in the fourth quarter of 2000, stagnated afterwards and turned negative in the third quarter. The OeNB fall forecast put the growth rate for the full year of 2001 at a modest 1.2%.

Austria's Current [1])



Source: OeNB.
[1]) Up to 1999 final data, 2000 revised data, 2001 provisional data.

The deficit on Austria's current account with the *euro area countries* decreased from EUR 5,830 million to EUR 5,240 million, while the surplus on the current account with countries outside the euro area increased from EUR 1,580 million to EUR 1,880 million, which is chiefly attributable to an improvement of the services subaccount (+EUR 650 million). According to

1 *Based on transactions. Editorial close: February 15, 2002*

2 *Contrary to the cash balance, whose purpose is to provide a quick overview, the transaction balance complies with high quality standards requiring period adjustments and other adjustments. The transaction balance confirms the improvement of results which the cash balance had already reflected.*

the ECB, the current account deficit of the euro area as a whole shrank from EUR 26 billion to EUR 23 billion, mostly thanks to a higher surplus on goods and services.

1.1 Goods and Services

The favorable result of the goods and services subaccounts can be traced to – on average – smaller import than export growth rates, as the hefty expansion in exports and imports recorded in the first quarter of 2001 lost considerable momentum afterwards (first quarter of 2001: exports +13%, imports +12%; second quarter of 2001: exports +5%, imports +6%, third quarter of 2001: exports +2%, imports –2%). Thus, the EUR 1,080 million deficit posted in the analogous 2000 period turned into a EUR 80 million surplus.

1.1.1 Goods

According to preliminary calculations by Statistics Austria, the external trade performance of Austria, while continuing to improve on the comparable periods of 2000, clearly trended downwards during the first three quarters of 2001. The slowdown in Austrian export growth is ascribable to the increasing cooling of the economy in the main trading partner countries while Austrian exporters' prices were competitive. Import growth was hit by the domestic economy losing steam.

The following analysis of the geographic distribution of Austria's external merchandise trade (table 2) is based on the foreign trade data provided by Statistics Austria:

Exports to and imports from *euro area countries*[1]*)* increased by 7% and 5%, respectively. In absolute figures, merchandise shipments to the euro area amounted to EUR 29,850 million, while Austrian goods imports from euro area countries came to EUR 35,030 million, reducing the Austrian foreign trade deficit against these countries by EUR 500 million to EUR 5,180 million. Austria improved its balances against all trading partners, except for Ireland, Spain and Portugal.

Exports to *countries outside the euro area* augmented by 6% and imports from these countries grew by 8% in the first three quarters of 2001 against the same period of the previous year, with the former totaling EUR 24,430 million and the latter EUR 22,770 million. The surplus, thus, contracted by EUR 440 million to EUR 1,660 million. Exports to Eastern European countries continued to increase in the reporting period (by 8% or EUR 660 million), whereas exports to other European countries – especially to Switzerland – were on the decline.

Imports from countries outside the euro area advanced by 8%, with goods from developing countries (excluding OPEC countries) and from Eastern European countries surging by 32% and 10%, respectively.

1 Since January 1, 2001, including Greece; the analogous 2000 figures were calculated backwards.

1.1.2 Services

The surplus on the services subaccount increased by EUR 560 million to EUR 1,450 million in the first three quarters of 2001. The negative balance of the unclassified transactions item,[1]) which is part of the services subaccount, widened by EUR 420 million to –EUR 3,080 million in the first three quarters of 2001.

1.1.2.1 Travel

In 2001, incoming tourism again recorded a good winter season (foreign tourist bednights: +3.9%) followed by a slow summer season (May to October) marked by falling foreign tourist bednight figures, especially in June (–5.1%) and September (–8.3%). Except for 1998, the number of foreign tourist bednights was on the decline throughout the past decade. In absolute figures, it was a rather dramatic decrease from more than 59 million (1991) to less than 41 million within ten years. In the third quarter of 2001, the number of foreign tourist bednights shrank by 500,000 to 28.3 million; thus, the gap between the summer high season and the winter peak (January to March 2001: 29.7 million bednights) widened considerably. Still, the first nine months of 2001 recorded an increase by 0.9% to 71.9 million foreign tourist bednights (table 4).

According to Statistics Austria, guests from the Netherlands (+260,000), Switzerland (+135,000) and Italy (+115,000) accounted for bednight increases by more than 100,000. At the same time, the number of visitors from the U.S.A. (–210,000) and other overseas markets slumped. The events of September 11, 2001, have left their mark on the bednight statistics; however, it should be noted that the number of guests from overseas had been decreasing also in the previous months.

In contrast to the number of foreign tourist bednights, travel receipts increased by 11% in the third quarter (+5.9% in the first quarter, +9.4% in the second quarter). In the first nine months of 2001, travel receipts came to EUR 9,260 million, EUR 720 million more than in the comparable period of the previous year (table 3). Since price hikes and heightened demand for high-quality services do not fully explain the divergence between bednight figures and travel receipts, it cannot be ruled out that the introduction of euro banknotes and coins had a distorting effect.[2]) The figures given in this balance of payments are subject to revision. Receipts from international passenger transport, which are no longer included in the travel account, augmented by 15.7% to EUR 1,450 million.

1 *The unclassified transactions item derives from an imbalance between banks' reported import and export payments for goods and the sum of merchandise import and export payments according to the foreign trade statistics compiled by Statistics Austria, with the former outweighing the latter. In line with international practice, the goods item of the balance of payments is calculated from the foreign trade statistics provided by the national statistical office. The unclassified transactions item thus corresponds to the difference between merchandise payments and foreign trade figures.*

2 *Austrians' changing their foreign cash into euro adds to travel receipts because this cash is considered to be a variable for receipts.*

Owing to the cash changeover, the robust growth of Austrians' travel expenditure might have been slightly overestimated.[1]) Travel expenditure increased by more than 11% in the third quarter of 2001 and by 10.5% to almost EUR 7,730 million from January to September. At EUR 1,520 million, the surplus on the travel account remained roughly unchanged compared to the analogous 2000 period. Expenses for passenger transport came to EUR 640 million, about the same amount as in 2000.

1.1.2.2 Other Services

On balance, the deficit on other services contracted by EUR 580 million to EUR 70 million in the first three quarters of 2001. Balances improved for a number of individual items (table 1): the surplus on *international passenger transport* (+EUR 210 million), *merchanting* (+EUR 110 million), *technical consulting* (+EUR 380 million), and *government services* (+EUR 220 million) increased, and the shortfall on *other trade-related services* (+EUR 120 million) as well as *insurance services* (+EUR 180 million) either shrank or even turned into a surplus.

1.3 Income

In the first three quarters of 2001, the income subaccount posted a net deficit of EUR 2,350 million, thus reaching the highest cumulative value ever recorded over the first three quarters. *Compensation of employees* recorded a surplus similar to the ones of the previous periods; *investment income* again posted a deficit (EUR 2,740 million), which was 20% higher than in the comparable period of the previous year.

The regional breakdown of net investment income shows that the bulk of receipts went to the euro area and the highest share of net capital income came from Eastern Europe. In the first three quarters of 2001, two thirds of the balance on total investment income (chart Components of Austria's Investment Income) were determined by income on interest-bearing investment,[2]) one third was derived from income on venture capital-oriented investment.[3])

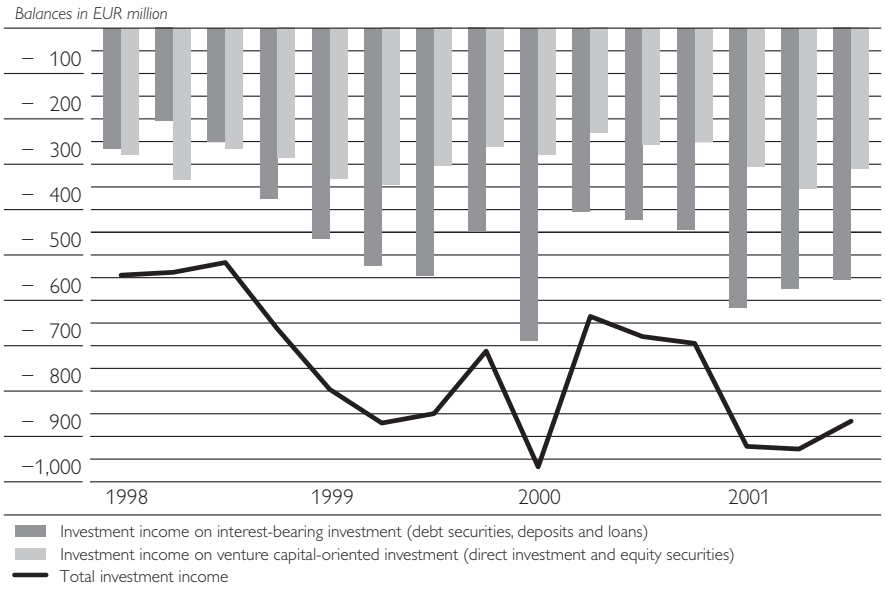
Broken down by major subaggregates (table 5), income on direct investment and income on portfolio investment both posted net deficits (EUR 890 million and EUR 2,590 million, respectively), whereas income on other investment recorded a surplus of EUR 740 million. The decrease of income on portfolio investment by EUR 640 million year on year was only partly offset by the improvement of income on deposits and loans (EUR 220 million) and the OeNB's investment activities.

1 *The repatriation of schilling banknotes is a variable for determining Austrians' travel expenditure. However, since this amount also comprises schilling banknotes that have been hoarded abroad, the result has been distorted upwards.*

2 *Income on debt securities (fixed-interest debt instruments, deposits and loans, notwithstanding whether they are included in the functional categories direct investment, portfolio investment, other investment, or reserve assets).*

3 *All income on investment made in the form of equity capital and equity securities.*

Components of Austria's Investment Income[1])



Source: OeNB.
[1]) 1999 final data, 2000 revised data, 2001 provisional data.

In the first three quarters of 2001, Austrian direct investment enterprises abroad posted net revenues of EUR 1,240 million, some EUR 210 million more than in the comparable period of 2000. At the same time, revenues from foreign direct investment in Austria augmented by EUR 230 million to EUR 2,140 million, slightly enlarging the preliminary deficit of *income on direct investment* to EUR 890 million. Despite relatively high profit distribution on both sides, reinvestment amounted to EUR 380 million (Austrian direct investment abroad) and EUR 950 million (foreign direct investment in Austria), respectively, according to current estimates.

As cross-border securities transactions have intensified considerably over the recent years, income on *portfolio investment* now plays a crucial part in investment income. Income on foreign investment came to EUR 3,610 million in the first three quarters of 2001 (first to third quarter of 2000: EUR 3,380 million) and was thus clearly surpassed by Austria's external debt position of EUR 6,200 million (first three quarters 2000: EUR 5,330 million).

The key driving force in both cases is the item income on bonds and notes. In the first nine months of 2001, Austria recorded interest income of EUR 3,410 million, while Austrian borrowers faced interest payments of EUR 5,760 million. Both these figures are the highest cumulative values recorded for the first three quarters. A sectoral breakdown of these items shows that the general government and banks are net contributors, whereas the sector other investors, in particular institutional investors, are net recipients.

Income on other investment and reserve assets posted a surplus of EUR 740 million in the first three quarters of 2001, up EUR 220 million on the same period of the previous year. A sectoral breakdown of this item shows that

the banking system (OeNB and banks) are net recipients, while nonbanks (general government and other sector) are net contributors. A breakdown by financing instruments for the sectors banks, general government and other sector reveals that loans resulted in net receipts whereas deposits resulted in net expenditure.

1.4 Current Transfers

At EUR 1,100, the deficit on current transfers was EUR 180 million smaller in the first three quarters of 2001 than in the same period of 2000 (table 1).

Transactions with the EU played the biggest part in current transfers of –EUR 950 million in the public sector. Austria's contributions to the EU amounted to EUR 1,600 million during the reporting period, while its receipts (excluding EU contributions to infrastructure projects) came to EUR 790 million, resulting in a net payment of EUR 810 million compared to EUR 990 million in the same period of 2000.

The deficit on private transfers stood at EUR 150 million vis-à-vis EUR 130 million year on year.

2 Capital Account

Capital transfers closed both the reporting period and the same period of 2000 at a deficit of EUR 290 million.

General government capital transfers in kind comprise, above all, receipts from the EU that are earmarked for infrastructure measures and are thus not part of current transfers; in the first three quarters of 2001, these transfers amounted to approximately EUR 60 million compared to EUR 120 million in the analogous period of 2000.

Private sector capital transfers in kind basically consist of remissions of debts. With Austria's remissions of debts shrinking in the reporting period, outflows were lower (EUR 210 million compared to EUR 370 million in the analogous period).

In terms of volume, capital transfers in cash do not play any role in Austria's balance of payments statistics.

3 Financial Account

The Austrian financial account (table 6) recorded significantly declining net sales in the first three quarters of 2001. Both Austrian investment abroad and foreign investment in Austria halved in the reporting period compared to the first three quarters of 2000. While the process of internationalization and portfolio rebalancing following the introduction of the euro had pushed up cross-border investment in 1999 and 2000, these effects came to a halt in 2001. Austria's external financial claims came to a mere EUR 20,770 million in the first three quarters of 2001 (first to third quarter 2000: EUR 40,710 million), financial liabilities to EUR 22,030 million (first to third quarter 2000: EUR 44,630 million).

Broken down *by regions,* the Austrian financial account shows that in the first three quarters of 2001, net inflows from the *euro area* diminished to EUR 7,750 million on the year (table 7). Austria's claims vis-à-vis the euro

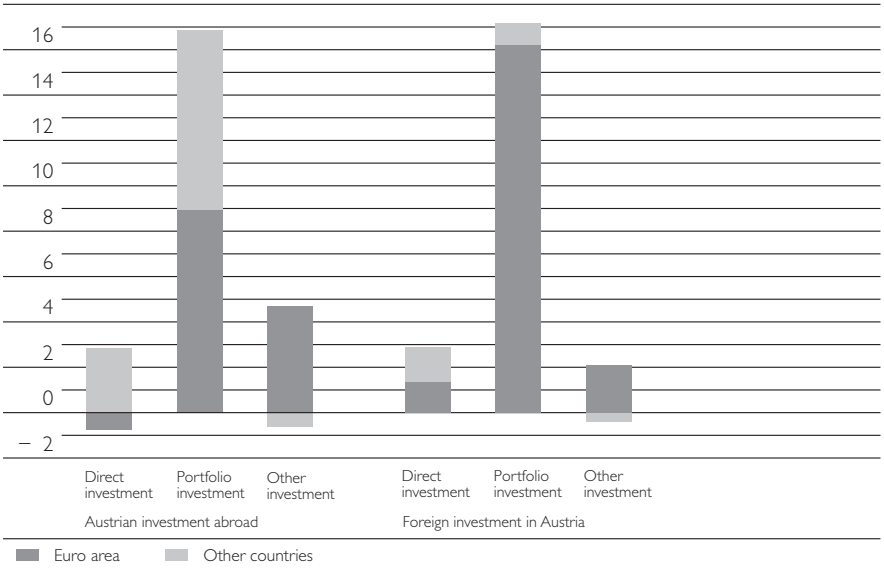
area were cut by some 50% to EUR 11,910 million, Austrian borrowers' liabilities vis-à-vis the euro area shrank by approximately 45% to EUR 19,660 million.

Austrian investment vis-à-vis non-euro area countries amounted to net capital exports of EUR 6,490 million (analogous 2000 period: EUR 8,620 million), which shows that Austrian investors' willingness to invest outside the euro area was diminishing in the first three quarters of 2001. Hence, capital outflows came to EUR 8,860 million, after EUR 17,880 million in the first three quarters of 2000. Capital inflows from countries outside the euro area had declined even more considerably in the reporting period, amounting to net capital inflows of EUR 2,370 million, compared to EUR 9,260 million on the year.

Austria's Financial Account in the First Three Quarters of 2001

(Selected Net Subaccounts)

EUR billion



Source: OeNB.

Broken down by *economic sectors,* the analysis of the Austrian financial account shows that in the first three quarters of 2001, banks (including the OeNB) recorded outflows of EUR 230 million, whereas nonbanks (general government and other sectors) accounted for inflows worth EUR 1,500 million. The smaller transaction volumes were reflected in particular in the external claims and liabilities of the sector *OeNB and banks:* External claims increased by EUR 4,030 million in the reporting period, liabilities by EUR 3,800 million (analogous 2000 period: EUR 16,960 million and EUR 27,450 million, respectively). The *general government* sector augmented its claims by EUR 4,620 million in the first three quarters of 2001, while reducing its external liabilities (EUR 11,800 million against EUR 13,290 million in the first three quarters of 2000). On balance, the general government registered net capital imports to the tune of EUR 7,180

million. The *other sector*[1]) exported net capital amounting to EUR 5,680 million in the reporting period, about a third of the value recorded in the first three quarters of 2000. This decline is attributable to the marked slowdown in asset growth (EUR 12,110 million) and the concomitant accelerated build-up of liabilities (EUR 6,430 million).

A breakdown of external assets and liabilities by *interest-bearing financial assets*[2]) *and venture capital-oriented*[3]) *investment,* shows that in the first three quarters of 2001 domestic investors focused their investments totaling EUR 13,500 million on interest-bearing financial assets. The share of interest-bearing financial investment in Austria's total external assets dropped to 65%. By comparison, in the first three quarters of 2000, investment in interest-bearing financial assets had amounted to EUR 30,290 million, or 75% of total external assets.

Interest-bearing investment also made up the largest part of total inward investment in Austria, totaling EUR 17,730 million (80% of total investments). Venture capital-oriented investments recorded net capital outflows of EUR 2,970 million over the reporting period.

3.1 Direct Investment

Contrary to widespread expectations, both inward and outward direct investment flows showed some resilience against the adverse global economic conditions.

Outward direct investment of Austrian enterprises abroad came to EUR 760 million in the third quarter of 2001 and to EUR 2,130 million (net) in the first three quarters of 2001 (table 6), thus trailing the figures recorded in the analogous 2000 period by only 10% and – in a long-term context – marking the third highest end-of-period results. This amount is made up of EUR 1,770 million of equity capital and EUR 380 million of reinvested earnings, while loans to affiliated companies reduced the amount of outward FDI by EUR 30 million. The given amount of equity capital includes gross new investment of some EUR 3,430 million, compared to EUR 1,650 million in disinvestment. The relatively high amount of disinvestment must be viewed in the context of the restructuring of a major European financial group, which resulted in net disinvestment within the EU of EUR 690 million and, vice versa, in significant acquisitions of equity stakes (EUR 670 million) overseas (offshore financial centers).

An unprecedented large share of FDI (EUR 1,670 million) went to Central and Eastern Europe. By mid-2001, the amount invested already surpassed all year-end results recorded so far, with the exception of the year 2000: the Slovak Republic (EUR 570 million) topped the list of Eastern European target countries, followed by Hungary (EUR 290 million), Slovenia (EUR 230 million), Poland (EUR 150 million), Croatia (EUR 140

1 *Including other financial institutions, insurance companies and pension funds as well as enterprises and households.*

2 *Fixed-income debt instruments, deposits and loans, notwithstanding whether they are included in the categories direct investment, portfolio investment, other investment, or reserve assets.*

3 *Investment in equity stakes and equity securities.*

million) and the Czech Republic (EUR 130 million). FDIs of EUR 220 million and EUR 150 million going to Germany and Switzerland/ Liechtenstein, respectively, are also noteworthy. The most attractive industry for direct investors by far was the financial services sector, followed by telecommunications and trade. However, the manufacturing sector also undertook a number of small- and medium-sized new investments or expansions of existing investments abroad.

The high *direct investment inflows* in the third quarter of 2001 (EUR 1,710 million mark the fourth highest quarterly figure ever recorded) are attributable chiefly to the sale of the Austrian state holding company ÖIAG's share in Austria Tabak AG to the British Gallaher group. Thus, FDI inflows in Austria came to EUR 2,920 million in the first nine months of 2001, only slightly less than the maximum recorded in 2000 (January to September: EUR 3,010 million). Net new investment resulted from gross investment in equity capital worth EUR 2,600 million, which contrasted with disinvestment of EUR 450 million, reinvested earnings of an estimated EUR 950 million and loans to affiliated companies which led to deductions of funds worth EUR 180 million.

As usual, Germany was the largest investor, accounting for 33% of the capital invested (EUR 970 million), followed by the United Kingdom (28% or EUR 810 million), the U.S.A. (15% or EUR 440 million), the Netherlands (12% or EUR 360 million) and Switzerland (8% or EUR 240 million); these countries account for more than 96% of direct investment inflows to Austria. Apart from the privatization of Austria Tabak AG, the German electricity group RWE's acquisition of equity stakes in Kärntner Landeselektrizitätsgesellschaft represented the largest single investment. Further targets of foreign investment were business services and banks, and – in the manufacturing sector – electronics, mineral products, printing and publishing, chemicals and machinery.

3.2 Portfolio Investment

On balance, cross-border transactions related to the acquisition and sale of securities at home and abroad recorded capital imports of EUR 300 million in the first three quarters of 2001. The corresponding gross figures indicate that compared to the analogous 2000 period, both Austrian investment in foreign securities and foreign investment in Austrian securities declined significantly (by EUR 6,150 million or 27% and by EUR 11,830 million or 41%, respectively). The present data do not allow conclusions about the impact of the events of September 11, 2001, on the financial markets; the end-of-year figures will be more useful in this respect.

Austrian investors purchased foreign securities with a market value of EUR 16,920 million, with debt securities accounting for around 71% of purchases. The sectoral breakdown of portfolio investment abroad shows that the majority of investors were institutional investors.[1])

1 *Including other financial institutions (e.g. mutual funds), insurance companies and pension funds.*

Domestic issuers sold EUR 17,220 million worth of securities abroad, 93% of which were debt securities; foreign investors tended to purchase securities issued by the general government and banks.

3.2.1 Portfolio Investment in Foreign Securities

In the first three quarters of 2001, Austrian investors purchased *foreign equity securities* worth EUR 4,960 million, down 41% on the comparable period of 2000.

Austrian investors preferred foreign shares (EUR 4,270 million) to foreign mutual fund shares, i.e. chiefly quoted shares of the financial, industrial, and technological sectors. Corporate shares from the U.S.A. and the EU were the most attractive form of investment (47% each). The euro area accounted for 38% (especially corporate shares from Germany, the Netherlands and France), with institutional investors accounting for the lion's share of these securities acquisitions.

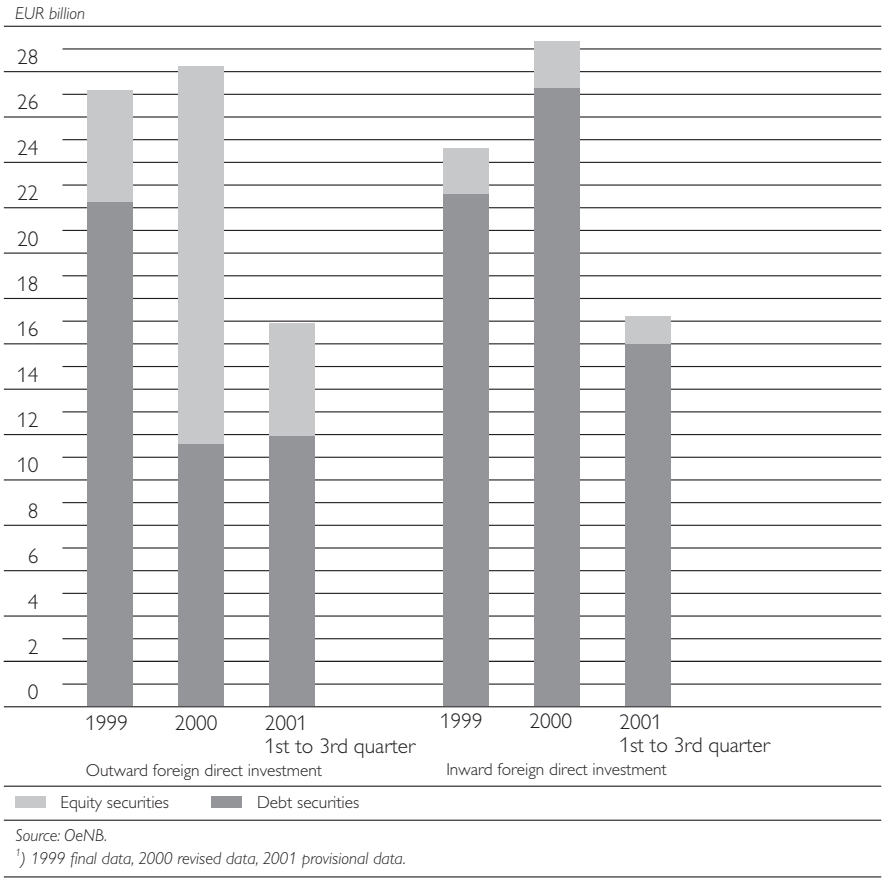
Investment in *foreign mutual fund shares* came to EUR 650 million in the first three quarters of 2001, down 85% on the comparable period of 2000. A breakdown by regions shows that Austrians continued to purchase mainly mutual fund shares issued in Luxembourg, followed by Irish and British issues. According to a sectoral analysis of this type of security, the Austrian banking system (OeNB and banks) reduced its portfolio holdings, whereas nonbanks, mainly Austrian mutual funds, continued to build up their portfolios. Austrians invested primarily in foreign equity and balanced funds and sold foreign fixed income funds.

Debt securities were the most sought-after type of foreign securities purchased by Austrian investors (EUR 11,950 million). In the first three quarters of 2001, 60% of cross-border investments in securities were accounted for by *bonds and notes* (EUR 9,900 million). Some two thirds of the capital invested were debt securities from the euro area; Austrians chiefly opted for German, French, Italian and Dutch issues. Apart from that, Austrians invested in the U.S.A. (17%) and the United Kingdom (7%). The largest groups of investors were the other sector (55%) – mainly institutional investors – and Austrian banks (some 40%), with the latter reducing their portfolio in the third quarter of 2001 by the amount which they had purchased in the second quarter of 2001. Investment was made almost exclusively in euro-denominated securities. Debt securities denominated in U.S. dollars played a minor role, accounting for a share of 3%, which equals the share of debt securities denominated in Hungarian forint.

Austrians purchased *foreign money market instruments,* first and foremost commercial paper and certificates of deposits, to the tune of EUR 2,050 million, some 64% of which were short-term debt securities issued in the EU. Money market instruments from the euro area accounted for a share of only 15% in the first three quarters of 2001; while the first half of 2001 had seen increased purchasing activity, the majority of these acquisitions was sold in the third quarter of 2001. Irish and German securities in particular were resold to foreign investors. Apart from money market instruments from the United Kingdom and from Denmark, Austrian investors showed great interest in issuances from the U.S.A. and from the Cayman Islands.

The Austrian general government was the largest investor in this group of securities; it expanded its portfolio in the first half of 2001 and reduced it slightly in the third quarter, which indicates that some interim investment had become necessary to smooth liquidity fluctuations.

Securities Transactions by Financial Instruments[1])



Source: OeNB.
[1]) 1999 final data, 2000 revised data, 2001 provisional data.

3.2.2 Portfolio Investment in Domestic Securities

In the reporting period, foreign investors acquired Austrian securities worth EUR 17,220 million, i.e. just like external assets, external liabilities had declined significantly on the year.

Foreign investors purchased *Austrian equity securities* worth EUR 1,200 million, with shares and mutual fund shares having been equally popular in all three quarters of 2001. Domestic shares to the tune of EUR 660 million were sold abroad, up 47% from the analogous 2000 period. Within the sector of domestic issuers, around 80% of capital investments came from business enterprises, while banks accounted for the remaining 14%.

Investors abroad purchased *Austrian mutual fund shares* worth EUR 550 million, 39% less than in the first three quarters of 2000; equity funds were the most attractive issues.

Like in the previous years, *domestic bonds and notes* proved to be most popular with foreign investors in the first three quarters of 2001

(EUR 17,870 million). Aside from euro-denominated issues, foreign investors mainly opted for U.S. dollar-denominated securities. A sectoral analysis of debt securities shows that 57% of investments made by foreigners were targeted at government issues and 33% at bank issues. Foreigners invested EUR 11,040 million (94%) in new issues or reopened issues of the Republic of Austria, which totaled EUR 11,760 million in the first three quarters of 2001.

Government Bond Syndication and Tender Offers

in the First Three Quarters of 2001 [1])

	ISIN	External transactions
		EUR million
5.875% Federal government bond 1996–2006/7	AT0000383518	1,393
5.25% Federal government bond 2001–2011/1	AT0000385067	6,457
3.4% Federal government bond 1999–2004/3	AT0000384862	1,409
6.25% Federal government bond 1997–2027/6	AT0000383864	665
5.0% Federal government bond 1998–2008/1	AT0000384227	1,119
Total		11,043

Source: OeNB.

[1]) Transaction values: + = sale abroad.

Liabilities arising from the issuance of *domestic money market instruments* diminished (–EUR 1,860 million). Short-term debt securities, above all commercial paper and certificates of deposit, issued by the Republic of Austria, were sold to foreign investors in all three quarters of 2001. At the same time, the central government purchased or redeemed Austrian banks' issues of this type of security.

3.3 Other Investment

The other investment subaccount posted net capital exports of EUR 2,360 million in the first three quarters of 2001 (table 6). Capital exports thus shrank by a third on the year (EUR 3,835 million). Cross-border transactions expanded only modestly also in this category – all sectors and financing instruments taken together – both on the asset and on the liability side. On the asset side, net capital exports augmented by a mere EUR 4,100 million, against EUR 16,160 million and EUR 15,120 million in the first three quarters of 2000 and 1999, respectively. On the liability side, capital imports of EUR 1,740 million were recorded in the period under review, against EUR 12,320 million in 2000 and EUR 20,680 million in 1999.

This development can be mainly ascribed to Austrian banks: they raised their assets from loans by no more than EUR 3,990 million (first to third quarter of 2000: +EUR 7,814 million) and reduced their deposits by EUR 3,390 million (first to third quarter of 2000: +EUR 7,630 million). After expanding their credit liabilities by EUR 1,370 million in the first three quarters of 2000, banks reduced them by EUR 1,850 million in the analogous 2001 period. Austrian banks' deposit liabilities included capital imports of EUR 6,430 million (against EUR 10,500 million in 2000).

The OeNB's liabilities resulting from TARGET transactions shrank by EUR 3,730 million (from EUR 5,020 million in January to EUR 1,290 million by the end of September) in the first three quarters of 2001.

Owing to the increase in short-term time deposits by EUR 1,920 million, the general government posted relatively high capital exports in the first three quarters of 2001; in the analogous 2000 period, capital imports of only EUR 10 million had been recorded. The redistribution of liquidity plays a role in this context, as it does with money market instruments.

3.4 Financial Derivatives

The financial derivatives position basically includes options, futures contracts and swaps, which are either based on capital products (e.g. foreign exchange assets, securities) or on interest rate products. On the one hand, transaction values refer to the buying and selling of securities-based financial derivatives and, on the other, to transactions resulting from option payments (including premiums) in the course of OTC deals and/or from variation margin payments for futures contracts and swap payments.

The financial derivatives position closed at net capital inflows of EUR 490 million in the first three quarters of 2001; while interest derivatives produced capital imports of EUR 710 million, noninterest derivatives produced capital exports of EUR 220 million.

3.5 Reserve Assets

In the first three quarters of 2001, official reserves contracted by EUR 2,030 million through transactions (table 6).

This decline was mainly attributable to the reduction of securities under reserve assets by EUR 2,230 million and gold sales worth EUR 270 million. The largest part of these transactions took place already in the first quarter of 2001. Deposits under reserve assets and special drawing rights went up by EUR 400 million in the reporting period. Austria's reserve position in the IMF increased by EUR 70 million.

The proceeds from the sale of gold and securities were largely used to reduce the intra-ESCB liability position (TARGET).

Annex

Table 1

Balance of Payments Summary

	1st to 3rd quarter 2000[1])	1st to 3rd quarter 2001[2])	Annual change
	EUR million		
Current account	−4,248	−3,366	+ 882
Goods, services and income	−2,971	−2,270	+ 701
Goods and services	−1,078	+ 76	+1,154
Goods	−1,966	−1,376	+ 590
Services	+ 889	+1,452	+ 563
Travel	+1,542	+1,525	− 17
Other services items	− 654	− 73	+ 581
Transportation	+1,141	+1,324	+ 183
thereof international passenger transport	*+ 607*	*+ 814*	*+ 207*
Construction services	+ 160	+ 154	− 6
Financial services	+ 76	− 19	− 95
Royalties and license fees	− 283	− 360	− 77
Other business services	+ 983	+1,580	+ 597
thereof merchanting	*+ 893*	*+1,000*	*+ 107*
Other services	− 65	+ 330	+ 395
Unclassified transactions	−2,666	−3,082	− 416
Income	−1,894	−2,346	− 452
Compensation of employees	+ 412	+ 397	− 15
Investment Income	−2,306	−2,743	− 437
Current transfers	−1,277	−1,096	+ 181
General government	−1,149	− 949	+ 200
Private sector	− 128	− 146	− 18
Capital and financial account	+3,631	+ 976	−2,655
Capital account	− 288	− 286	+ 2
General government	+ 114	− 34	− 148
Private sector	− 374	− 213	+ 161
Acquisition/disposal of nonproduced, nonfinancial assets	− 27	− 39	− 12
Financial account	+3,918	+1,262	−2,656
Direct investment	+ 659	+ 792	+ 133
Portfolio investment	+5,982	+ 303	−5,679
Other investment	−3,835	−2,359	+1,476
Financial derivatives	+ 625	+ 495	− 130
Reserve assets[3])	+ 487	+2,031	+1,544
Errors and omissions	+ 617	+2,386	+1,769

Source: OeNB.

[1]) Revised data.

[2]) Provisional data.

[3]) Oesterreichische Nationalbank: Gold and foreign exchange, reserve position in the Fund, SDRs, etc.; increase: − / decrease: +.

Table 2

Merchandise Exports and Imports

as Recorded in the Foreign Trade Statistics

Goods by geographic area[1])

	1st to 3rd quarter 2001					
	Exports		Imports		Balance	
	Annual change	Share of total exports	Annual change	Share of total imports		Annual change
	%				*EUR million*	
EU	+ 8.1	62.2	+4.0	65.2	−3,905	+1,074
Euro area[2])	+ 7.2	55.0	+4.5	60.6	−5,180	+ 503
thereof:						
Germany	*+ 5.8*	*33.3*	*+3.9*	*40.2*	*−5,173*	*+ 118*
Italy	*+ 5.4*	*8.7*	*+6.0*	*7.2*	*+ 551*	*+ 5*
France	*+13.1*	*4.6*	*+0.2*	*4.2*	*+ 94*	*+ 286*
Non-euro area countries	+ 5.6	45.0	+8.3	39.4	+1,659	− 439
thereof:						
Switzerland and Liechtenstein	*−16.4*	*5.6*	*+2.2*	*3.0*	*+1,281*	*− 633*
Eastern Europe[3])	*+ 7.8*	*16.7*	*+9.9*	*13.6*	*+1,225*	*− 46*
U.S.A.	*+10.2*	*5.2*	*+0.1*	*5.2*	*− 169*	*+ 259*
Japan	*+ 0.9*	*1.2*	*−9.8*	*2.4*	*− 709*	*+ 154*
Total	+ 6.5	100.0	+6.0	100.0	−3,521	+ 64

Source: Statistics Austria.

[1]) Geographic areas as defined by WIFO.

[2]) Including Greece. On January 1, 2001, Greece joined Stage Three of EMU as the twelfth EU Member State and has since been included in the euro area aggregate.

[3]) Albania, Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovak Republic, Ukraine, countries of the former Yugoslavia.

Table 3

Travel and International Passenger Transport

	1st to 3rd quarter 2000[1])	1st to 3rd quarter 2001[2])	Annual change	
	EUR million			%
Travel				
Receipts	8,537	9,259	+722	+ 8.5
Expenses	6,995	7,734	+739	+10.6
Balance	1,542	1,525	− 17	− 1.1
International passenger transport				
Receipts	1,252	1,451	+199	+15.9
Expenses	645	637	− 8	− 1.2
Balance	607	814	+207	+34.1
	1,000			%
Foreign tourist bednights	71,328	71,937	+609	+ 0.9

Source: OeNB, Statistics Austria.

[1]) Revised data.

[2]) Provisional data.

Table 4

Foreign Tourist Bednights by Country of Origin

	1st to 3rd quarter 2001			
	Overnight stays	Annual change		Share
	1,000		%	
Germany	45,065	+ 28	+ 0.1	62.6
Netherlands	6,938	+265	+ 4.0	9.6
United Kingdom	2,669	− 62	− 2.3	3.7
Belgium, Luxembourg	2,040	+ 35	+ 1.7	2.8
Switzerland, Liechtenstein	2,556	+135	+ 5.6	3.6
Denmark	892	+ 71	+ 8.7	1.2
Italy	2,237	+115	+ 5.4	3.1
France	1,306	− 30	− 2.3	1.8
Sweden	582	− 29	− 4.8	0.8
Spain	404	+ 26	+ 6.8	0.6
Poland	705	+ 30	+ 4.4	1.0
Hungary	653	+ 35	+ 5.6	0.9
Czech Republic	648	+ 51	+ 8.5	0.9
Croatia	212	− 1	− 0.2	0.3
Commonwealth of Independent States	374	+ 72	+23.9	0.5
Slovenia	160	− 11	− 6.6	0.2
Slovak Republic	129	+ 6	+ 4.5	0.2
U.S.A.	1,362	−208	−13.2	1.9
Japan	448	− 4	− 0.9	0.6
Other countries	2,559	+ 86	+ 3.5	3.6
Total	71,937	+609	+ 0.9	100.0
Memorandum item: Austrian tourists	*26,475*	*− 58*	*− 0.2*	*x*

Source: Statistics Austria.

Table 5

Investment Income

	1st to 3rd quarter 2000[1])	1st to 3rd quarter 2001[2])	Annual change
	EUR million		
Net investment income[3])	– 2,306	– 2,743	– 437
Investment income receipts	8,580	9,621	+1,041
Investment income payments	10,886	12,365	+1,479
Net direct investment income[3])	– 880	– 894	– 14
Income on direct investment abroad	1,028	1,241	+ 213
Income on direct investment in Austria	1,908	2,135	+ 227
Net portfolio investment income[3])	– 1,952	– 2,591	– 639
Income on foreign equity securities	322	144	– 178
Income on domestic equity securities	192	183	– 9
Income on foreign bonds and notes	2,981	3,408	+ 427
Income on domestic bonds and notes	4,923	5,758	+ 835
Income on foreign money market instruments	76	59	– 17
Income on domestic money market instruments	216	262	+ 46
Net other investment income[3])	526	742	+ 216
Income on other investment, assets[4])	4,172	4,769	+ 597
Income on other investment, liabilities	3,647	4,027	+ 380
Investment income on foreign interest-bearing investment[5])	7,258	8,289	+1,031
Investment income on domestic interest-bearing investment[6])	8,788	10,053	+1,265
Investment income on foreign venture capital-oriented investment[7])	1,322	1,332	+ 10
Investment income on domestic venture capital-oriented investment[7])	2,098	2,312	+ 214
Memorandum item:			
Financial derivatives based on interest rate contracts, net[8])	*249*	*714*	*+ 465*

Source: OeNB.

[1]) Revised data.

[2]) Provisional data.

[3]) Income on outward foreign investment less income on inward foreign investment.

[4]) Income on deposits, loans and reserve assets.

[5]) Income on debt securities, deposits, loans and reserve assets.

[6]) Income on debt securities, deposits and loans.

[7]) Income on direct investment and equity securities.

[8]) Included in the financial account, financial derivatives.

Table 6

Financial Account

	1999[1])	2000[2])	1st to 3rd quarter 2000[2])	1st to 3rd quarter 2001[3])
	EUR million, net			
Financial account	6,614	5,584	3,918	1,262
Assets	−39,421	−47,343	−40,713	−20,769
Liabilities	46,034	52,926	44,631	22,031
Direct investment	− 306	6,537	659	792
Direct investment abroad	− 3,098	− 3,642	− 2,353	− 2,128
Equity capital	− 2,591	− 3,213	− 2,070	− 1,773
Reinvested earnings	− 666	− 140	1	− 385
Other capital	159	− 288	− 284	29
Direct investment in Austria	2,792	10,179	3,012	2,920
Equity capital	1,309	9,463	2,003	2,153
Reinvested earnings	1,431	667	873	946
Other capital	51	49	136	− 178
Portfolio investment	− 2,553	1,085	5,982	303
Portfolio investment in foreign securities	−27,207	−28,276	−23,066	−16,916
Equity securities	− 4,935	−16,684	− 8,473	− 4,962
Bonds and notes	−22,114	−10,775	−10,713	− 9,903
Money market instruments	− 158	− 816	− 3,881	− 2,051
Portfolio investment in domestic securities	24,654	29,360	29,048	17,219
Equity securities	2,002	2,039	1,359	1,205
Bonds and notes	19,120	25,529	23,511	17,872
Money market instruments	3,532	1,792	4,178	− 1,857
Other investment	7,925	− 2,884	− 3,835	− 2,359
Assets	−10,571	−16,012	−16,156	− 4,096
Trade credits	− 639	− 959	− 683	− 76
Loans	−11,452	− 9,963	− 8,055	− 5,029
Currency and deposits	1,589	− 5,175	− 7,655	1,529
Other assets	− 69	84	236	− 520
Liabilities	18,496	13,129	12,322	1,737
Trade credits	1,181	156	91	− 527
Loans	1,863	3,514	1,507	− 466
Currency and deposits	14,924	9,329	10,874	2,699
Other liabilities	527	129	− 151	31
Financial derivatives	− 415	6	625	495
Reserve assets[4])	1,963	839	487	2,031
Memorandum item:				
Interest-bearing investment	*10,675*	*13,353*	*10,106*	*4,230*
Assets	*−31,597*	*−27,404*	*−30,290*	*−13,498*
Liabilities	*42,272*	*40,757*	*40,396*	*17,728*
Breakdown by sectors				
OeNB and banks	7,204	18,275	10,486	− 234
Assets	−17,014	−16,779	−16,961	− 4,031
Liabilities	24,219	35,054	27,447	3,797
General government	15,087	8,941	9,733	7,177
Assets	440	− 2,487	− 3,555	− 4,626
Liabilities	14,646	11,427	13,289	11,802
Other sectors	−15,676	−21,632	−16,300	− 5,681
Assets	−22,846	−28,077	−20,197	−12,112
Liabilities	7,170	6,445	3,896	6,431

Source: OeNB.

[1]) Final data.

[2]) Revised data.

[3]) Provisional data.

[4]) Oesterreichische Nationalbank: Gold and foreign exchange, reserve position in the Fund, SDRs, etc.; increase: − / decrease: +.

Table 7

Financial Account by Region[1])

	Investment in/ from the euro area[2])			Investment in/ from non-euro area countries		
	2000[3])	1st to 3rd quarter 2000[3])	1st to 3rd quarter 2001[4])	2000[3])	1st to 3rd quarter 2000[3])	1st to 3rd quarter 2001[4])
	EUR million, net					
Financial account	14,133	12,542	7,754	– 8,549	– 8,624	–6,492
Assets	–31,493	–22,830	–11,910	–15,850	–17,883	–8,859
Liabilities	45,626	35,371	19,664	7,300	9,260	2,367
Direct investment	8,471	2,044	2,114	– 1,934	– 1,385	–1,322
Direct investment abroad	– 214	47	731	– 3,428	– 2,400	–2,859
Direct investment in Austria	8,685	1,997	1,382	1,494	1,015	1,538
Portfolio investment	7,920	11,940	7,294	– 6,835	– 5,958	–6,991
Portfolio investment in foreign securities	–20,142	–13,587	– 8,976	– 8,134	– 9,479	–7,940
Portfolio investment in domestic securities	28,062	25,527	16,270	1,298	3,521	949
Other investment	– 3,342	– 2,603	– 2,587	458	– 1,232	228
Assets	–10,176	– 8,879	– 4,705	– 5,836	– 7,277	609
Liabilities	6,835	6,276	2,118	6,294	6,046	– 381
Financial derivatives	1,083	1,160	672	– 1,077	– 535	– 177
Reserve assets[5])	×	×	×	839	487	2,031

Source: OeNB.

[1]) While for foreign direct investment in Austria and other inward investment it is possible to establish the identity of the foreign investors, in the case of portfolio investment one can only determine the country via which the transaction has been effected. This means that it is not possible to provide a current and/or completely reliable classification of creditors. Ongoing studies, however, show that the largest volume of Austrian securities sold to the euro area are government bonds sold to foreign banks in the course of tender or syndication offers. Since, in this case, the secondary market generated only a relatively small volume of cross-border transactions, the regional structure of the basic data derived from the reporting system on foreign exchange statistics can be regarded as sufficiently conclusive.

[2]) Including Greece. On January 1, 2001, Greece joined Stage Three of EMU as the twelfth EU Member State and has since been included in the euro area aggregate.

[3]) Revised data.

[4]) Provisional data.

[5]) Oesterreichische Nationalbank: Gold and foreign exchange, reserve position in the Fund, SDRs, etc.; increase: – / decrease: +.

STUDIES

Central Banks and the Challenges of the Information Economy – Are We on the Road to e-CBs?

Peter Achleitner

1. The Changing Face of Central Banking

Towards the end of the 20th century, with both globalization and regionalization picking up speed and, in particular, information and communications technologies (ICTs) registering heady advances, central banks were once again in the midst of fundamental economic and societal change (Mundell, 2000). A great many observers have thus already evoked the end of the Industrial Age and hailed the dawn of the information economy. At the same time, the post-WWII order of a world divided by the Cold War has come to a close. Regional economic integration, as seen in Europe or in North America (NAFTA), has largely gone hand in hand with global integration (Padoa-Schioppa, 1999). Integration in the central bank realm is reflected e.g. by the harmonization of banking supervisory standards. Of course, global and regional integration do not always mesh. Occasionally, regional deepening of integration serves as a strategy to withstand global innovation.

In retrospect, a number of indicators have clearly presaged this epochal shift from around the mid-1980s. For one thing, international and European merchandise trade and service provision have recorded significant expansions well above the national rates of economic growth. Furthermore, over the past two decades, the production process has gone more and more international, its organization has been streamlined throughout the world, and global capital transactions have increased perceptibly. What lies at the root of this stepped-up integration? Credit is due to liberalization and deregulation measures, the global trend towards establishing market economies, distinct improvements in traffic and transportation infrastructures, new forms of venture capital and, specifically, a leap in ICT progress. As a consequence, the world's division of labor has advanced over the past 20 years, as has specialization in production, which has all boiled down to a more efficient world economy.[1])

Large-scale societal and economic change is not a modern-day phenomenon, though. Global economic and monetary integration was already underway at the turn of the 19th to the 20th century, the common denominator being innovation in the field of information and communications technologies. While today's global integration process is driven by computers and the Internet, the invention of the telegraph and telephone mainly powered the second industrial revolution underway at the time.

We might actually be about to witness the transition from the Industrial Age to the information or digital age. These changes, naturally, pose a great challenge to the information-oriented monetary and financial system.

The transition to the information economy is thus likely to also transform central banks' strategies and structures.

After all, central banks have always been a sensitive gauge of the times, with their institutional makeup and monetary policy framework reflecting the prevailing economic policy view (Graydon, 2000). Since their foundation over 300 years ago, central banks have thus evolved from special-status commercial banks governed by profit maximizing and com-

1 See also UNCTAD (2000), Dresdner Bank (2000), Mrak (2000), Shirakawa (1997).

petitive principles via state-run banks into independent, and in part even supranational economic policy institutions (Goodhart, 1988, p. 8). The original purpose of central banks remained, however, largely untouched. Throughout the years, central banks have always focused on preserving the domestic purchasing power and the relationship of the national currency with foreign currencies. The choice of instruments has likewise been constant. To this day, the monetary policy framework basically builds on variations of the discount rate (Capie, Goodhart and Schnadt, 1994).

Payment systems technology is the key to a central bank's ability to uphold stability and to build trust, as demonstrated by Giannini (1994, p. 18f.). Any implementations of new payment systems regularly entailed institutional adjustments of the central banking system.

Technical progress, especially in the realm of information and communications technologies, has been an important co-determinator of central banks' functions. Eichengreen (1999, p. 35) points out that the gold standard was made possible only by the steam-driven coining press, an achievement of the first industrial revolution. The significance of the telephone and telegraph for the development of banking and payment systems is common knowledge.

The establishment of the information economy is thus likely to spell substantial change for the central banking system as we know it today. Since information and knowledge are vital to the monetary sector, the changes in store could take on much larger proportions compared to previous times of transition.

This paper therefore addresses the following questions: to what extent has the information economy already manifested itself, what rules and principles does it follow, and are central banks already evolving into e-CBs?

The second section highlights the macroeconomic evidence for the information economy. Special attention is paid to the controversial debate about the New Economy and the productivity paradox. The third section is dedicated to microeconomic aspects; it describes the mechanisms driving the rapid spread of new information and communications technologies and discusses how electronic commerce may help businesses to become more efficient. The fourth section presents the many facets of the impact e-commerce has had on monetary, banking and payment systems in just a brief period of time. The fifth section examines in what way the information economy affects the efficiency and effectiveness of monetary and financial market policy. The future of money, another topic giving rise to controversy, is also discussed. Furthermore, this section summarizes how central banks and banking supervisory authorities have responded to the challenges of the information economy and what additional measures might in the future be feasible to maintain price and financial market stability. Finally, the sixth section sheds light on the immediate operational consequences for central banks.

2 Macroeconomic Aspects of the Information Economy

March 1991 ushered in the longest upswing of the U.S. economy (Baily, 2001), with real GDP expanding by an average 3.2% a year in the past

decade and by an even stronger 4.1% from 1995 to 2000. Yet, the splendid thing was that not only economic growth recorded historic highs, but inflation and unemployment remained moderate at the same time. Stock exchanges, with technology-heavy bourses leading the charge, embarked on an unprecedented ascent.

What was at the root of such an extraordinary economic performance?

Many observers put it down to structural changes on the supply side of the economy and saw, for instance, no cyclical causality. In fact, the dawn of a new era, a "New Economy," appeared to loom large.[1])

In quite simple terms, one of the common theories on the New Economy may be subsumed as follows: The spectacular advances in ICTs primarily lead to a marked increase in the performance of ICT products while, at the same time, setting ICT product and service prices onto a downward spiral. This mechanism propels demand for ICTs, which in turn opens up ample opportunities for application and use of such technologies in all economic sectors, with e-commerce a case in point.

Widespread use of ICTs results in a more efficient economy by – and that is the key point – unleashing fundamental structural change. The New Economy is assumed to transform the structure and operations of individual businesses and economic sectors alike. The widespread use of ICTs triggers productivity gains. Reduced transaction and search costs, stiffer competition and streamlined business organizations boost economic efficiency. The new technologies not only help transcend the boundaries within a business organization, but also overcome geographical bounds. In addition, electronic forms and means of payment introduce change to economic structures, and the importance of conventional money is fading. Also, greater microeconomic efficiency goes hand in hand with noninflationary and thus sustainable economic growth.

The notion of a New Economy attracted a lot of attention in the 1990s, but following the economic slowdown in 2000 most of its glamour has been lost (OECD, 2001a). The debate among experts speaks volumes about the complexity of this topic, which to this day remains a contentious issue.

Put simply, there are two camps – techno-optimists and technosceptics. The advocates of the New Economy thesis, or techno-optimists, may be broken down into a moderate and a radical wing. The "cautiously optimistic" wing subscribes to the impact ICTs are having on the economy, as outlined above, with but a few reservations. This group certainly has the most affiliates, including the majority of governments and central banks (Meier, 2001). On the other hand, the radical wing associates ICTs with the end of the traditional economic system and foresees the beginning of a new era. The New Economy renders traditional economic patterns, such as the business cycle, obsolete. Adherents also predict that the New Economy will function with a novel set of rules (Kelly, 1998). In the same vein, a number of observers see electronic money as the harbinger of the cashless society we

1 *The New Economy has been defined in many different ways, and terms like information economy, e-conomics and knowledge-driven economy – to name but a few – have been used synonymously, especially since technology stock took a beating.*

will soon have. Technological progress is thus argued to pose a threat not only to brick-and-mortar banks and the conventional financial system, but also to central banks.

This radical stance reflects to a certain degree the zeitgeist of the 1990s, which, given the undoubtedly tremendous economic and societal changes of that period and perhaps also the year 2000 problem, engendered a run on apocalyptic and utopian visions. Suffice it to mention Fukuyama's thesis on the end of history. Turning to economic history, we find that such speculation on an imminent economic paradigm shift has several precedents in history (Hämäläinen, 2001; Orlikowski and Iacono, 2000).

The other camp, the also rather heterogeneous group of technosceptics, whose followers include several renowned economists, does not attribute so much weight to the effects of ICTs. Pointing out the complex structures of the economy, they argue that technological innovations are rarely capable of triggering such dynamic change within so short a timespan (NZZ, 2000).

Economists have tended to take a sceptical view on the effects of ICTs for quite some time. Even though computers have evolved into an indispensable part of our economy in the past decades, economists have long refused to acknowledge that ICTs have a measurable impact on productivity and, by extension, on economic development. This is significant because productivity gains are basically the single most important determinant of sustainable economic growth, provided labor is a limited resource.

Nobel laureate Robert Solow's widely repeated remark a few years ago that "you can see the computer age everywhere these days except in productivity statistics" neatly sums up the problem and spells out the essence of Solow's productivity paradox. Yet, when productivity started to accelerate in the United States of America – something which had been projected since the mid-1990s – economists had to take note. In fact, proof of an empirical link between ICTs and productivity growth might not only help solve the puzzle about the economic success of the United States, but also provide evidence that ICTs already constitute what is called a general purpose technology. This would translate into a more efficient overall economy and, in turn, higher growth rates for potential output. In other words, the computer would have to be classified as a "great invention," which, together with the latest biotechnology and nanotechnology breakthroughs, might be capable of ushering in a third industrial revolution.

The thesis of a New Economy also reflects the dispute between two strands of economic growth theories. On the one hand, the traditional neoclassical model attributes sustained growth to exogenous technical progress, as rates of return on capital are declining. On the other hand, the new growth theory attempts to pinpoint long-term economic growth to endogenous factors. Irrespective of the differences in approach, both models have been instrumental in shedding light on the productivity puzzle, as Stiroh pointed out (Stiroh, 2001a).

Ironically, especially the booming information economy is plagued by substantial data and measurement problems.[1]) Our traditional analytical

1 *Visco (2000), Federal Reserve Bank of Cleveland (2000). For a brief overview, see European Central Bank (2000b, p. 49f.).*

tools are largely useless in the specific areas that generate information and knowledge. Goldfinger (2001, p. 7) denotes this phenomenon as Griliches' paradox. According to Griliches, the share of the economy measured with a degree of accuracy by official statistics has declined sharply in the post-WWII period.

To illustrate this problem, let us turn briefly to the measurement of computer prices. When determining ICT prices, statisticians are frequently faced with a scarcity or unavailability of adequate, namely comparable, products. Given huge differences in quality and very short life cycles for some products, price changes cannot be measured in the traditional way, i.e. by comparing products. To preclude distortions, it is therefore desirable to compare quality features of ICTs. Statisticians in the United States of America and in isolated cases also in Europe increasingly rely on hedonic techniques for price measurements. According to these highly complex and sophisticated techniques, ICT products are unbundled by product characteristics (computing power, memory, etc.), and the value of each of these product characteristics is estimated via regression analyses. Such calculations thus reveal a far greater depreciation of many ICTs than traditional methods. This also explains in part why results mostly differ from country to country.

The competent institutions have already declared the search for suitable indicators a high priority. Eurostat, for instance, set up working groups on information economy statistics. Moreover, the OECD is developing a three-step indicator system, which in future is meant to improve the measurement of the state of the art of the infrastructure, the degree of diffusion and the consequences on efficiency and wealth (OECD, 2000a).

The majority of studies dealing with the New Economy debate are based on a neoclassical growth accounting approach. Such traditional productivity analyses focus on labor productivity, which is measured in terms of output growth per employee or per hour. Labor productivity growth is decomposed into three categories: capital deepening, labor quality and total factor productivity. The latter, also known as the Solow residual, is key to assessing the New Economy, as it subsumes technological progress. However, this parameter cannot be measured directly. Furthermore, it comprises factors which are difficult to quantify, such as knowledge, and measurement error. Also, this indicator is typically procyclical (European Commission, 2001).

Breaking down ICTs into ICT-producing and ICT-using industries helps provide a clearer picture of the effects ICTs have on productivity.

In the post-WWII period, labor productivity in the United States of America advanced by some 3% annually. In the 1970s, growth slid to an average 1.4%, and only since 1995 has labor productivity accelerated again markedly. Recent calculations show that productivity mounted only by 2.5% a year during this period, and not by an average 2.8%, as had originally been assumed (The Economist, 2001).

Empirical evidence indicates that investment in ICT capital is among the key determinants of productivity growth. Put differently, capital deepening

has significantly boosted capital stock and thus fueled potential output. Up to 50% of the productivity gains may be explained this way.

By contrast, changes in labor quality may not be credited with having contributed to productivity growth during this period according to these findings.

Total factor productivity was identified as the second main driver of productivity growth in this context. Decomposing total factor productivity into ICT-producing and ICT-using sectors shows that labor productivity was influenced significantly by technical advances in the former category. This is particularly noteworthy, since the share of this sector in U.S. production amounts to a mere 8%.

Total factor productivity in the ICT-using sectors (excluding farming) registered a sharp increase, but this outcome is interpreted in different ways, which reflects the dispute over the New Economy. Jorgenson and Stiroh (2000) as well as Oliner and Sichel (2000) and Stiroh (2001b, c) arrive at the conclusion that the application of ICTs contributed essentially to boosting productivity. On the other hand, Gordon (2000) confirms the lack of clear proof of spillover effects of ICT capital use on the productivity growth of other sectors in the economy. In his opinion, the gains are attributable primarily to demand-side factors. In other words, ICTs drove up the productivity of the ICT sector and durable goods sectors only.

There is, of course, a strong link between the as yet unsolved measurement, definition and data collection problems mentioned above and these interpretative differences. For one thing, it is not very plausible that the sectors ranking among the largest ICT investors are not identical to those which show high sectoral growth of total factor productivity. For another thing, it is very difficult analytically to distinguish between cyclical and trend growth from only very short time series.

Evidence of a link between productivity growth and ICTs in addition to the case of the United States would, no doubt, corroborate the manifestation of a New Economy. A host of recent studies (Schreyer, 2000; European Commission, 2001; and European Central Bank, 2001) found such evidence for Japan, Canada and Europe, but, as pointed out earlier, a caveat applies to these findings as far as comparability is concerned. A study drawn up by the European Commission forecasts a similar acceleration of productivity growth for Europe, albeit with a time lag of five years (European Commission, 2001; Issing, 2000). A recent analysis by the European Central Bank (ECB) underlines this outcome. According to observations, ICT use in the euro area yields only very limited positive impulses. In the European context, we have to bear in mind that productivity develops differently than in the United States and that the European ICT sector is smaller. While it is true that in the past two decades labor productivity on average recorded faster growth rates in Europe than in the United States, productivity as such slowed down in Europe, whereas it picked up across the Atlantic.

Several authors, including David (1990), point out that all great inventions of the first and second industrial revolutions passed through to productivity with a substantial time lag. Electricity, for instance, led to a

pronounced increase in productivity as much as some 40 years after it was first put to commercial use, i.e. once it powered more than half of manufacturing enterprises. Reaching critical mass seems to be more important to productivity effects than high growth rates, which may typically be observed at an earlier point in the technology cycle.

Finally, some observers state that technological achievements exceed people's physiological and psychological capacity of taking in and processing information. As a consequence, many advantages, such as the wealth of information available and its ready accessibility, cannot be exploited fully (Streissler, 2001; Gordon, 2000).

Macroeconomic evidence for a positive correlation between the new ICTs and productivity is scarce, at best, and riddled with contradiction. The microeconomic sphere is a different story, though. Here, indicators abound which suggest improved economic efficiency stems from the use of information and communications technologies.

3 Microeconomic Aspects of the Information Society

3.1 Development of the Information Infrastructure

Global expenditure on hardware production, communications and software measured in terms of GDP expanded to 7.3% in 2000, which compares with 5.6% in 1992 (Credit Suisse First Boston, 2000). The biggest spenders in this area are the Anglo-American countries, Japan, and, above all, Scandinavia. Europe as a whole managed to catch up to the United States of America and Japan over the past decade, although expenditures by individual countries diverge greatly across Europe. At 6.5%, Austria's outlays correspond to the European average (European Commission, 2000, p. 118).

The expansion and upgrade of the information infrastructure have accelerated markedly in recent years owing to huge ICT-related expenditure and investment, which at the end of the 1990s were fueled in particular by the year 2000 compliance problem. While computers had already been around since the 1940s, they did not really start to have a bearing on everyday life before the 1970s. The development of the personal computer (PC) in the 1980s triggered a boom in electronic data processing (EDP). In the 1990s, the Internet – which had evolved unbeknown to the public since the end-1960s – powered another quantum leap in the information infrastructure. Ten years from now, every U.S. and European household will have Internet access. Chances are that the Internet will by then have absorbed all traditional information and communications technologies, such as TV, radio, fax, computer, and wireless technologies. The Internet might even evolve into what is termed a grid.[1])

Ten years ago, just a few million people worldwide had access to the Internet, while today close to 400 million households are hooked up to the world wide web. The Internet is composed of a steadily growing number of computers, comprising at present more than 100 million connected hosts, or network computers with a coordinating function. These hosts are spread

1 *A grid allows users to access the computing power of the entire system; a forerunner encountered today is peer-to-peer computer pooling (The Economist, 2001).*

relatively unevenly across the world. Again, the United States of America and the Scandinavian countries show the highest computing density.

At the same time, Internet users may browse millions of pages for private and commercial purposes. In Europe, no less than 28% of households have access to the Internet; if Internet access offered via schools and universities as well as at the workplace is factored in, this percentage likely mounted to 40% by the end of 2000. Europe has thus managed to catch up with the leading United States. Divergence, granted, still prevails within Europe, but a catching-up process is evident in the laggard countries as well, not least owing to government initiatives.

Although the introduction of faster-access technologies is still in its infancy, here, too, prices are being cut relentlessly. Surveys clearly show that the public still considers security problems, such as online payments or computer viruses, a considerable obstacle to intensifying their use of the new technologies (European Commission, 2001). This is why all countries are striving to improve security standards, e.g. by introducing the electronic signature, and consumer protection.

The boom in connectivity, i.e. of Internet hookups, has been instrumental to the Internet's success (Evans and Wurster, 1997). Rapid advances in the ICT sector – the steady pursuit of greater power, speed and availability – and the fact that communications is based on universal standards have primarily been driving these developments.

Moore's Law put this in a nutshell, predicting that the number of transistors per integrated circuit would double every 18 months. In other words, storage and processing capacities would grow tenfold every 5 years, hundredfold every 10 years and thousandfold every 15 years.[1]) While this trend is bound to continue in the years to come, experts caution that physical limits may put an end to miniaturizing.

The breakneck speed at which hardware and software prices tend to tumble is basically the most important consequence of Moore's Law. Since the 1960s the quality-adjusted investment cost for computers had declined by some 17% annually. As from 1995, it has been falling by more than 32% p. a. Relative software costs, by contrast, had remained unchanged for a long period and started to decline in the 1980s only. Communications equipment has displayed a similar development (Jorgenson, 2001).

These dynamic forces are likely to be effective for some years, promoting the development of the information infrastructure all over the world. A few years ago this infrastructure achieved critical mass, for the first time allowing global commercial use.

3.2 Electronic Commerce

Even though the share of electronic commerce via the Internet is still rather insignificant compared to traditional transactions, its share in international trade is likely to expand considerably in the near future. Scores of estimates suggest such a rise, even though the projected values are fairly divergent.

1 See also U.S. Department of Commerce (2000) and Evans and Wurster (1997).

Most projections date from a time before the slowdown of the New Economy, though. New forecasts are thus likely to be revised downwards.

In 2000, Forrester Research (2000) estimated that the turnover of e-commerce transactions would double every year. E-commerce would thus be worth around USD 6.8 trillion or account for 8.6% of global trade and services by 2004. According to this research, North America will control half of the global market. This also means that in 2004, no less than 12.8% of all business deals would be struck over the Internet. Both Asia and Europe are projected to undergo a frenzied catching-up process.[1]) A German economic research institute analyzed more than 40 forecasts corporate consultants had compiled on electronic commerce (RWI Rheinisch-Westfälisches Institut für Wirtschaftsforschung, 2000). According to businesses, e-commerce offers opportunities above all in the field of business-to-business (B2B) activities, i.e. to streamline business correspondence and to make the coordination of procurement processes more efficient. By contrast, the business-to-customer (B2C) segment, i.e. electronic retail and catalogue trade, is expected to expand only modestly.

At first glance, these results are surprising, since public debate has centered largely on the B2C segment. This may be due primarily to the successful distribution of multimedia products via the Internet, e.g. by firms like Amazon, or to online banking services. In the next few years, B2B transactions will claim more than three fourths of the e-commerce market, clearly dwarfing the B2C segment (Goldman Sachs, 2000). For the time being, the transaction volumes of business-to-business deals are expected to remain significantly higher than the turnover on electronic consumer markets. Nevertheless, these figures undoubtedly understate the importance of B2C. Its success will to a great extent hinge on how fast it will be possible to dispel consumers' reservations about legal and security issues, but also to break down psychological barriers. In the long run, this e-commerce segment holds out enormous potential, not least owing to the unrelenting rise in Internet hookups and the growing ease of use of e-commerce solutions.

Basically, three groups of agents interact with one another on the Internet – individuals, firms and governments, with all three capable of assuming roles both on the supply and the demand side. The literature thus distinguishes between nine interactive patterns in the e-economy (Merz, 1999; Coppel, 2000). When considering the role of central banks in the e-economy, it is of interest to examine the B2B, B2C and G2C (government-to-customer or e-government) segments.

Following up on the new public management initiatives of the past decades, which became known by the catchphrase "reinventing government," public authorities at various levels are attempting to lend substance to the notions of efficient public administration and accessibility by exploiting the tools of the 21st century. The U.K. government, a pioneer in this sphere, for instance set its sights on offering every citizen the

1 An UNCTAD (2000) study provides an overview of e-commerce developments in the developing countries.

opportunity to carry out any public administration procedure online by the year 2005.[1])

3.3 Economic Effects

The future success of electronic commerce is associated with the assumption that the use of innovative technologies will make markets and institutions more efficient by lowering transaction costs as well as market entry barriers. This is particularly relevant for the monetary sphere of the economy, as it is laden with information and communications, which will be discussed in greater detail in the following sections. Since information costs make up a great portion of transactions costs, the potential for cost savings is rather large, even more so if we bear in mind that transaction costs, i.e. the costs incurred for operating an economic system, are pegged at more than 50% of the net national product (Richter and Furubotn, 1999). An advanced information economy would thus correspond more closely with the neoclassical idea of a "friction-free" economy (OECD, 1999).

When e-commerce is examined from an economic viewpoint, a distinction is frequently made between information goods and traditional goods and services. The marginal cost curve of traditional goods has a U shape. The cost of an additional unit falls owing to learning effects as well as improved capacity utilization. After a while, above-optimal capacity utilization, however, again drives up costs.

By contrast, information goods involve a very high proportion of fixed costs associated e.g. with software programming. Given very low reproduction costs, their variable or marginal costs are close to zero. This cost trend results in positive returns to scale (Deutsche Bank Research, 2000).

Such a cost structure favors price discrimination. The price of a product may not be derived from its production costs, but rather from the value attached to it by individual consumers. In the light of different consumer preferences, the provider of information products has the opportunity to extract the consumer's surplus. Based on Pigou's taxonomy,[2]) Shapiro and Varian (Shapiro and Varian; 1999a; Varian, 2001) distinguish between three kinds of price differentiation.

First degree price discrimination involves personalized pricing, mass customization or personalization. Here, every consumer buys the product at a different price. Second degree price discrimination refers to product price lining, market segmentation or product versioning. In this case, the consumer may choose from a range of product versions. Frequently, goods are sold in product lines, i.e. with a delay. Publishing houses, for instance, first put a hardcover book on the market, and it takes some time until a cheaper paperback version becomes available. Third degree price discrimination means selling at different prices to different groups. Student discounts are a common form of this type of price discrimination.

1 *See also The Economist (2000b) or Deloitte Consulting and Deloitte & Touche (2000a).*

2 *Arthur C. Pigou's classical model describes first, second and third degree price discrimination.*

In addition, information goods display network externalities and network effects, which may give rise to substantial returns to scale. Such effects are triggered once a provider succeeds in establishing an industry standard (e.g. for software products) or a trade standard (electronic markets). In this context, mention is frequently made of Metcalfe's Law, according to which the cost of a network exhibits linear growth proportional to its size, while its worth increases exponentially (Papows, 2000, p. 57). The rapid diffusion of the fax machine is clear testimony of this phenomenon.

The desire to reap returns to scale motivates a great many entrepreneurs to scramble to be first on a given market in order to benefit from the first mover advantage. Investing heavily on the marketing front, businesses expect to attain high sales figures very rapidly and build up a sizeable customer base. However, as many Internet projects flounder, it seems that reaching critical mass is also contingent on some additional factors. Michael Porter (2001) identified the fact that many dotcoms lack strategic management as the main culprit.

System dependency is another characteristic of information and communications technologies. More than other economic sectors, ICTs are marked by complementary enterprises, i.e. an individual company's competition policy is affected not only by its competitors, but also very much by its business partners. Microsoft and Intel best illustrate this point. The emergence of product systems entails considerable consequences first and foremost for the users, as it may be quite expensive to switch systems. Consumers attempt to avoid such a lock-in effect, but the simple example of sound media (LPs, MCs, mini disks, CDs) demonstrates how difficult this may be.

In the B2B segment, the use of e-commerce technologies, i.e. primarily electronic information exchange among enterprises, optimizes production, inventory keeping and distribution (Wenninger, 1999) and thus yields considerable productivity gains (Lucking-Reiley and Spulber, 2001).

First, automating transactions may markedly reduce the procurement cost before, during and after a transaction, especially search and communications costs. There is anecdotal evidence that the savings could amount to a factor of five, ten or more. The fee for online brokerage, more on online brokerage below, for instance, is about one tenth of the service charge of brick-and-mortar brokerages.

Second, B2B transforms conventional intermediation structures. Intermediation[1]) usually benefits from lower transaction costs compared to direct dealings between buyers and sellers. The Internet impacts all categories of intermediation, i.e. brokerage, auctions, dealing and exchanges. While the elimination of intermediaries features prominently in the public debate about e-commerce, the shape of things to come is utterly different; in other words, given less costly intermediation processes and lower transaction costs in the future, the number of intermediaries is even bound to rise.

1 For an overview on intermediation in the information age, see Rose (1999).

Third, electronic supply chain management may be instrumental in optimizing the material flow, above all, of production-oriented companies by closely coordinating planning and materials usage. Downstream the value chain, storage costs may be curbed, the flexibility of product development lifted and throughput time cut sharply (Shaw, 2000). These are the fruits of enterprise resource planning (ERP) and material resource planning (MRP) systems.

Meanwhile, it has even become feasible to use e-commerce in the B2B segment to procure indirect products. Here, reference is made to MRO (maintenance, repair, operating) products (Dolmetsch, 2000), which are not direct components of the finished product and, in the past, were hardly sought out for automation. Consequently, the associated transaction costs were relatively high. This is where electronic procurement, or e-procurement, comes into play. Applications which serve to buy MRO goods are known as desktop purchasing systems. The potential savings such tools hold out are deemed to be very high (Nenninger, 1999).

The ICTs, especially the Internet, thus have the potential to deconstruct many traditional economic structures. Such a change would not only translate into the reduction or restructuring of value chains and supply chains, but also allow for changes in conventional organizational structures. As a consequence, numerous production and business cycles would accelerate. Moreover, this could yield a great number of new products, markets and business models (Evans and Wurster, 2000; OECD, 1999). The wind of change introduced by ICTs is therefore often cited together with "creative destruction," a phrase coined by Schumpeter (Greenspan, 2000b).

Technological change obviously speeds up the concentration process of recent years. It is also at the root of many large mergers and strategic partnerships (Greenspan, 2000a). The U.N. World Investment Report (2000) shows a marked rise in international mergers and linkups, with the share of horizontal mergers having run at no less than 70% for some years, while conglomeration has slipped below 30%. Vertical mergers have been playing but a minor role for years.

Small wonder then that ICTs increasingly feed through to management and organizational teaching.[1]) While in the early 20th century vertical integration had predominated teaching precepts, diversification became the name of the game in the second half of the 20th century. Virtual network structures are projected to replace hierarchical structures in response to the "information revolution." Disintegration and migration processes are blurring traditional industry lines, thus opening up new forms of labor division. Individual companies are tending to become more specialized. Reducing the complexity within the organization is meant to empower companies to focus on their core competences. At the company level, sourcing decisions thus are of great strategic importance. In the context of competition and value layers, however, greater specialization makes companies more susceptible to market fluctuations.

1 *For an overview on this topic, see Picot and Reichwald (2001).*

Evans and Wurster (2000) pointed out that the Internet is beginning to diminish the tradeoff between information richness and reach. In the past, companies had to give preference to one over the other. In marketing, for instance, there is a great difference between personal selling and the use of TV commercials. The Internet offers a vast expanse of information and knowledge. This allows for the elimination of several traditional information asymmetries, but also for the reduction of uncertainties that used to hamper the decision-making process at the company level (Greenspan, 2000b).

Empirical research on individual companies has established a very high correlation between productivity and ICTs (OECD, 2000). The more technology use is coupled with organizational change, the greater the positive consequences of ICTs. Stepped-up training and continuous education as well as decentralized decision-making structures seem to have similar effects (Brynjolfsson and Hitt, 2000).

Given considerable economies of scale and network effects, the death of distance, i.e. the lessening significance of the location, and stiffening competition as the barriers to market entry sink, many observers expect a lasting transformation of market and economic structures. Furthermore, direct access is seen as fueling a general shift from sellers' to buyers' markets.

3.4 Economic Policy Response

Many governments have in recent years assigned top priority to the Internet. Scores of industrial nations,[1]) spearheaded by the United States of America (Council of Economic Advisers, 2001) and Europe, as well as a range of international organizations (Dryden, 2000) have therefore incorporated the promotion of the Internet into their action programs. The eEurope project of the European Commission (2001), for instance, is intended to ensure fast, cheap and secure Internet access as well as adequate training and educational opportunities. Besides, incentives are to target intensified Internet use.

Governments have stepped in more vigorously to prevent a global and societal digital divide from opening up. As mentioned earlier, widespread use of the Internet is still confined mainly to the industrial nations, above all North America and the Scandinavian countries in Europe. In these countries, most Internet users are young and stem from high-income and well-educated social strata.

The effort to prevent a digital divide has given rise to specific initiatives and education programs. On the one hand, such measures are designed to help mitigate the tightening IT labor pool; on the other hand, the ICTs in particular could contribute significantly to the catching-up process underway in less developed countries, e.g. by means of distance learning.

It should not go unmentioned that e-commerce has increasingly been attracting the attention of competition authorities. In the light of the economic effects described above, such as the establishment of systems, standardization and price discrimination, the rise of monopolistic practices,

1 See, for instance, the G8 Okinawa Charter on the Global Information Society.

unfair competition, collusion and the formation of cartels cannot be ruled out. The highest profile case so far was certainly the antitrust trial against Microsoft, in which the U.S. government pitted itself against the software company.[1])

4 Impact of E-Commerce on Banks and Financial Markets

From the very outset, the financial services industry ranked among the most intensive users of computers. As early as in the 1950s, banks started to employ automated booking tools. The 1960s and 1970s subsequently saw the first wave of widespread EDP use. While at that time the focus was on automating internal information management and electronic payment systems, the second wave – up to this day – has been centering largely on automating customer relations management. The IT budgets of financial service providers have expanded especially in the past few years and are now markedly higher than those of the manufacturing industry (European Central Bank, 1999; Ferguson, 2000a). According to Gartner Research, banks' IT expenditure already accounted for over 7% of their total budget, as opposed to some 4% for the industrial sector.[2]) An analysis of the U.S. financial market shows that IT expenditure may vary substantially within the financial services industry as well as among large and small financial institutions. Commercial banks and larger financial institutions tend to spend more on IT (Cooke, 1997).

The importance of ICTs for the financial services industry is beyond debate, since economic theory explains banks primarily through transaction costs. Generally speaking, all financial products belong to the information goods category. Given the prominent role information processing, interpretation and dissemination plays with information goods, the entire value chain from creation to distribution may be ICT-based. What is more, it is relatively easy to market financial products on the Internet owing to high standardization and global product recognition (Imo, 2000). The reduction of information and communications cost brought about by electronic commerce will thus likely transform the financial services industry more strongly than other industrial and services sectors.[3]) According to some observers, this evokes the specter of a virtual threat (The Economist, 2000a). On the other hand, the new technologies present financial institutions with improved risk and information management tools and enable them both to penetrate new markets and to design novel financial products. The success of derivatives trading and the securitization boom would have been unthinkable without the use of state-of-the-art ICTs.

The concentration process ubiquitously observed in the financial services industry is picking up additional speed due to the expanded use of ICTs (Group of Ten, 2001). The same goes for disintermediation; in other words, the process of other economic sectors taking over services and bank tasks, which has been underway for some time now, is set to continue. It

1 *For an overview of the economic aspects of this case, see Klein (2001).*

2 *Gartner Research, as cited in Imo (2000).*

3 *See also Foresight (2000), Vartanian, Ledig and Bruneau (1998).*

remains to be seen, however, whether ICT use will amplify either one of the trends towards specialization and universalization.

The dynamic development of ICTs, their manifold applications combined with lock-in and network effects tremendously alter the risk position (European Central Bank, 1999) of financial service providers. The high degree of innovation in the financial service industry drives up the strategic risks of all players. Financial service providers are faced not only with the risk of misreading market developments and technological cycles, but also with legal risks, which, for instance, have to do with privacy and data protection, reputational risks and, last but not least, operational risks. The security and stability problems of the highly complex information and communications structures are immense, and Murphy's Law[1]) doubtlessly applies. On the bright side, the use of new technologies helps contain risk, as both internal and external information asymmetries may be reduced. This is exactly where modern management information systems and a number of new methods of credit and market risk assessment come in.

4.1 Electronic Finance

Over the past few years, the use of ICTs has been impacting the financial service industry in manifold ways. The drive to automate customer relationship management has led to new banking models, or self-service account management, such as kiosk banking, telebanking and online banking. To date, online banking is certainly one of the most successful e-commerce in general and B2C applications in particular. This is ascribable to several factors. In the United States of America, around one third of banks already offered Internet services in 2000. More than half of U.S. banks are expected to be online by end-2001. The investment bank J.P. Morgan (2000) predicts that in 2004, no less than 15% of all financial products will be traded over the Internet. In particular, major banks representing the bulk of deposits and assets are at the forefront of the Internet marketplace. Most smaller credit institutions apparently continue to avoid this new medium. The term Internet banks in this context denotes not just virtual banks, but also conventional banks that have adopted a clicks-and-mortar strategy, i.e also make use of this new distribution channel for part of their business activities. One of the few analyses of this topic[2]) shows that Internet banks display greater profitability and pursue a more aggressive business strategy.

The biggest asset of Internet banking is definitely its cost-cutting potential. Estimates for the United States of America peg the cost of an Internet transaction at merely around 1/100 of the price of a traditional transaction, at 1/50 of that of a transaction struck over the phone and at about 1/30 of the cost of an ATM transaction (OECD, 2000a, p. 110). Even though search and transaction costs have fallen dramatically, it is still quite expensive to switch from one service provider to another. Customer loyality will therefore not erode as quickly as some would have it.

1 *"If anything can go wrong, it will."*

2 *See also Carlson, Furst, Lang and Nolle (2001).*

Another aspect of the Internet is its greater ease of use compared to traditional distribution channels (Hauser, Crameri and Hoffmann, 2001), which is also why online banking is sometimes referred to as martini banking (access any time, any place, anywhere – via any access device). Moreover, the Internet lets banks tap into new customer segments that now have Internet access, which in the past used to be a privilege of professional users only. With market power shifting towards the customer and information asymmetries diminishing, some observers (D'Avolio, Gildor and Shleifer, 2001) already speak of a democratization of the financial markets.

Banks have reacted to the challenges of e-commerce and, above all, growing competition from nonbanks with a variety of strategies (Morgan Stanley Dean Witter Research, 1999; Claessens et al. 2001).[1]) For one thing, many banks started to develop a web presence by setting up their own websites. In a multichannel approach, the Internet is first and foremost regarded as an alternative distribution channel for many of the traditional banking services, including account management, provision of information and securities trading. Consulting-intensive segments, such as mortgage loans, asset management or insurance services, usually still involve face-to-face meetings. A number of banks founded Internet subsidiaries to take care of their web presence, while others operate as hybrid enterprises, using the same brand name for their traditional and Internet business.

Direct banking has proven to be one of the most successful e-commerce strategies, particularly in the form of e-brokerages. Especially in North America, Internet securities trading got a tremendous boost from the booming stock markets (OECD, 2001b). In Europe, direct brokerage did well, too, gaining additional momentum from the privatization drive and pension system reforms. The main key to success was that, in contrast to many other e-commerce applications, e-brokerage actually saw its transaction costs drop significantly. The stock market shakeout and the increased market volatility that followed have taken the glamour off the boom for the time being. With investors taking a more conservative approach and trade turnover shrinking, online financial service providers have been forced to rethink their strategies and to offer higher-quality services to investors with longer-term interests (Deloitte & Touche, 2001).

E-brokerage, by the way, has also advanced the automation of exchange and trading platforms (Fan, Stallaert and Whinston, 2000).

In another move, as products of other providers were considered as well, financial portals came into being. Finance portals allow customers to inform themselves about the offerings of not only one particular institution, but also other service providers.

These forms of organization promote cooperation between financial service providers and IT companies, e.g. major hardware and software producers, telecommunications service providers and pure Internet providers. A distinction is made between vertical portals, or vortals,

1 *See also Deloitte Consulting and Deloitte & Touche (2000b), The Economist (2000a), Wenninger (2000), Deutsche Bundesbank (2000).*

which specialize in one particular subject, and horizontal portals, which cover a broader spectrum of services.

Yet another approach is the aggregator model. Like in the classified ads section of a paper, this model is about bundling supply and demand, and the aggregator company charges an intermediation fee for its services.

All in all, this market is still in an embryonic stage, and experiments abound. Which of the business models will carry the day in the long run is hard to tell at the present juncture. Perhaps these models are simply showing the way to a universal Internet banking model.

Seeking ever new frontiers, the financial service industry is even expanding into other areas of electronic commerce. The establishment of certification points, consulting services for small and medium-sized enterprises wishing to formulate e-commerce strategies, the provision of B2B infrastructures, or even the linking up of ATMs to the Internet and the implementation of electronic bill presentment and payment (EBPP). In the e-economy, the financial services industry benefits, above all, from its comparative advantage when it comes to security and trust.

4.2 Electronic Money (E-Money)

The forces of change unleashed by ICTs are of particular importance to payment systems. In this key sphere, ICTs have spawned so many innovations that Solomon (1997) even dubbed this phenomenon a Cambrian revolution in finance. When banking automation made rapid strides last century, many experts considered the cashless society to be within close reach as early as in the 1960s. But just as the PC has not led to a paperless office, the countless payment system innovations have not made cash redundant so far.

In addition, it has become clear that developing secure and less expensive electronic payment systems is central to the future of e-commerce.

All these innovations revolve around electronic money, or e-money. Given the prominent role of money in the entire economic system, the enormous potential of e-money has caught the attention not only of the business world, but also of central banks, financial market supervisory authorities and economists.

In the 1990s, many experts deemed e-money capable of replacing coins and banknotes, which had been around for some two and a half thousand years and three hundred years, respectively. With numerous e-money models having sprung up, we also find numerous definitions,[1]) which has caused no shortage of confusion in discussions. The definition drawn up by the ECB in 1998 helped to redress this problem. In crafting a single legal framework, the European Union largely adhered to this definition.[2])

1 *For an overview, see Hartmann (2000).*

2 *In the Directive 2000/46/EC, the EU laid down that "electronic money shall mean monetary value as represented by a claim on the issuer which is: (i) stored on an electronic device; (ii) issued on receipt of funds of an amount not less in value than the monetary value issued; (iii) accepted as means of payment by undertakings other than the issuer."*

According to the ECB, electronic money is an electronic store of monetary value which may be widely used to make payments to undertakings other than the issuer without necessarily involving banking accounts in the transaction, but acting as a bearer instrument (European Central Bank, 1998). Hence, e-money differs from access products, such as debit cards. The ECB definition does not comprise single-purpose electronic payments, such as prepaid telephone cards.

From a technical viewpoint, e-money models may be divided into hardware- and software-based models. With hardware systems, the data carrier, as a rule, consists of a computer chip embedded in a plastic card; it may be accessed securely via dedicated hardware. By contrast, in software-based systems, electronic money is transmitted via data networks with the help of a specific software program. For this reason, e-money is also called network money in such schemes.[1]) If a distinction is made according to when, from the payer's point of view, the effect on liquidity occurs, then network money belongs to the "pay before" category. By contrast, with the electronic check method, payments are made at the very moment a commodity changes hands, which is why such systems fall into the "pay now" category. As traditional credit cards are based on deferred payment terms, they are assigned to the "pay later" category (Deutsche Bundesbank, 1999).

Furthermore, one may distinguish between closed and open e-money cycles. Here, the determining factor is whether the beneficiary can use the electronically stored monetary value for further transactions and thus pass it on or may only cash it in with the issuer.

At this point, we must not forget that the development of electronic payment forms is very closely tied to advances in cryptography. At any rate, data encoding may result merely in relative, and never in absolute security. The final objective can only be economically viable security. Put differently, the decoding cost must exceed the value of the encoded information (Schuster, Färber and Eberl, 1997, p. 10ff.).

E-money has failed to live up to the overall expectations in the past few years. According to an ECB survey, e-money circulation in 2000 amounted to some EUR 140 million, which is but a fraction of total cash holdings and equals just 0.04% of currency in circulation and 0.003% of M3. This may certainly be traced to the still unsatisfactory technical solutions and unresolved security issues. In addition, the typically high fixed costs of information goods play a great role with e-money.

So far, none of the e-money schemes has either reached critical mass or reaped the associated network effects. Besides, with old habits dying hard, the public seems very hesitant to embrace new forms of payment (Kamihachi, 1999).

The lack of anonymity appears to be another obstacle to more widespread use of e-money. While it is theoretically feasible to construct anonymous e-money systems, it will nevertheless take some more time until such systems are on a par with the well-established system in place.

1 This also includes hardware-based e-money schemes if payments are executed via telecommunications networks.

Finally, all the presently known models are not interoperable, i.e. a given type of e-money is limited to one domestic system and cannot be used abroad.

The expectations of the early 1990s notwithstanding, e-money systems will most likely not prove a genuine alternative to cash or debit and credit card systems in the foreseeable future. The fate of e-money will thus hinge on the relative costs and advantages associated with its use. Singapore currently pursues a very ambitious goal. The competent authorities (Board of Commissioners of Currency, 2001) are intent on completely substituting coins and banknotes by electronic money by 2008.

5 Impact of the Information Economy on the Monetary and Financial Market Policy Role of Central Banks

As shown above, an advanced e-economy is marked by ever increasing microeconomic efficiency; simultaneously, financial intermediation and traditional means of payment lose importance. Against this background, a number of observers are concerned about the future role of central banks, as they caution that new developments would hamper the mandates of central banks, which might, in turn, impair the effectiveness of monetary policy. In the longer run, they even question the entire traditional monetary and financial system. Arguments like these have rekindled the debate about the future of money. This perennial discussion is as old as money itself; it last heated up towards the end of the 1980s, when financial markets worldwide were deluged with financial innovations (Mayer and Kneeshaw, 1989). Like in the discussion of the productivity paradox, techno-optimists and techno-pessimists of every shade are pitted against one another.

5.1 Impact on the Efficiency and Effectiveness of Monetary Policy

Some fear that ICTs in general and e-money in particular could have a strong impact on the informative value and thus the quality of economic indicators. This, in turn, might raise the likelihood of central banks misreading indicators and, thus, detract from the effectiveness of monetary policy measures (Hoenig, 2000).

In other words, given the uncertainty about the future path of productivity following the information revolution, it may be a tall order for central banks to make meaningful assessments. The supply effects of increased productivity dampen inflation. On the other hand, the demand effects stemming from increased returns and positive welfare effects stoke inflation. Long-run productivity gains would push up real GDP and thus boost the marginal yield on capital. The real equilibrium interest rate would mount in turn. To preserve price stability, central banks would have to adjust their key policy rates to the higher interest rate level (Ferguson, 2000b; Hämäläinen, 2001). It is especially difficult to distinguish between a permanent and temporary increase in the "speed limit" of the growth potential of the economy. Observers therefore suggest that central banks communicate clearly their assessment of the developmental stage of the New Economy to prevent misinterpretations and any ensuing inefficiencies (Centre for European Policy Studies, 2001).

Furthermore, the diffusion of e-money could entail statistical distortions,[1]) since e-money might affect the definition of financial assets serving as close substitutes for central bank money in transactions. Monetary policy would thus have to take account of the consequences of these technologies and redefine the monetary aggregates. Moreover, e-money in its current stage may destabilize the money multiplier. In the late 1980s, a number of financial innovations, such as short-term marketable instruments like deposit certificates already gave rise to similar concerns. Experience with these innovations has shown that it is possible to contain the risks inherent in such instruments and that they did not affect financial market stability.

While the information economy makes it more difficult to obtain a clear statistical picture of the economy, it also allows for greater transparency, providing new insights into the interplay of economic forces. Observers thus warn that central bank policy might lose most of its surprise effect and, by extension, its effectiveness. On the bright side, as Woodford (2001, p. 18f.) points out, there is also good reason to believe that increased transparency might make monetary policy even more effective, as it decreases the forecasting errors of economic agents.

Widespread private issuance of electronic money and the subsequent substitution of central bank money could curb the monetary policy leeway further. It is feared that central banks might eventually lose control of money market rates. Shrinking demand for central bank money would reduce central banks' total assets. As a consequence, central banks would metamorphose into "an army with only a signal corps" (Friedman, 1999 and 2000).

Mervyn King sees even greater danger ahead for central banks, for once technical progress permits all electronic transactions to be performed in real time, the economy would theoretically no longer need the settlement and clearing services offered by central banks, and when push comes to shove, could even run without money. A likely scenario according to King (1999, p. 48f.) plays out like this: *"The need to limit excessive money creation would be replaced by a concern to ensure the integrity of the computer systems used for settlement purposes"* and, as he goes on, *"the successors to Bill Gates would have put the successors to Alan Greenspan out of business."*

The camp of ardent techno-optimists also comprises exponents of the new monetary theory and the free banking school (Goodhart and Krueger, 2001). This comes as no big surprise, as the notion of an advancing information economy accompanied by falling transaction costs and decreasing government regulation is largely in line with the tenets of the new monetary theory (Krueger, 1999 and 2000). Contrary to Keynesian or monetarist views, the new monetary theory no longer allows for a distinction between money and other unregulated assets. Money as we know it would have become obsolete. Likewise, the followers of the free banking theory attribute stability and efficiency advantages to an unregulated

1 *See Forum on the Development of Electronic Payment Technologies and Its Impact on Monetary Policy (2000) and European Central Bank (1998).*

monetary system. This school, however, assumes that traditional money will continue to play a role in an unregulated world.

Finally, the debate about the future of money also touched on some of Hayek's ideas. Internet-related payment system innovations were postulated to undermine the state's monetary monopoly and to pave the way for competitive money production.[1])

A number of economists, including, above all, Goodhart (2000) and Woodford (2001), attempted to dispel these fears and were rather sceptical of the extreme consequences of the information society.

First of all, the history of money demonstrates very clearly that it takes fairly long for a new payment system to take hold; besides, no existing system has so far been crowded out completely. One reason why cash would not go out of existence is, as Goodhart and Krueger (2001) point out, that the users of money strongly prefer anonymous transactions. This might be attributable e.g. to privacy concerns and even to the role money has in the underground economy.

Second, Woodford, for instance, shows that in a world devoid of central bank money demand central banks would still be capable of controlling short-term interest rates (Henckel, Ize and Kovanen, 1999). Indeed, many countries have already been shifting from reserve management to interest rate management in recent years, abolishing or easing minimum reserve requirements, a move which has not been detrimental to the efficiency of monetary policy (Sellon and Weiner, 1996). In theory, a central bank could in any case influence the term structure of interest rates by buying or selling financial assets. This would, however, mean that any loss the central bank suffers would have to be compensated for by the government, which could, of course, place a constraint on central bank independence. Yet, the growing substitution of e-money for central bank money may also reduce central bank independence by diminishing seigniorage income and, by extension, central bank profit.

Third, there is always the option of securing the monetary policy framework by putting in place regulatory mechanisms. For one thing, e-money holdings could be made subject to minimum reserve requirements. According to another proposal, all tax payments were to be made via central bank accounts. Simplest of all, central banks could start issuing e-money themselves.

Fourth, it is pointed out in the literature[2]) that money is a socioeconomic construct, and thus politics play an important role, too. It follows that technological advances alone could not call the universal character of money into question. Even less so if we equate the history of money with the effort of the economy and society to create secure and calculable institutions first and foremost to instill trust in the medium money.

1 *For a brief overview, see Duwendag, Ketterer, Kösters, Pohl and Simmert (1999).*

2 *See also Aglietta, Goodhart, (2000, p. 30), and Henckel, Ize and Kovanen (1999, p. 35).*

Interestingly, one of the two debates on principles in the sphere of monetary policy[1]) has received new impetus in this context. Is a central bank actually necessary or desirable for a functioning monetary system? This debate harks as far back as the argument between metallists, who defined money's worth in terms of its precious metal content or backing, and chartalists, who argued that money's value is independent of the medium used to represent it and regarded money as a token.

5.2 Measures Promoting Monetary Policy Efficiency and Financial Stability

Central banks and supervisory authorities responded to the challenges of ICTs in a very timely fashion.

As from 1996, upon the initiative of the G10 central banks, the consequences of e-money on monetary policy, payment systems oversight and central bank income have been monitored closely.[2])

The European Commission and the European Central Bank were at the forefront of regulating the issuance of e-money in a timely and adequate fashion. By providing clear regulations at an early stage, they hope to keep uncertainty in check (Duisenberg, 2001). Apart from monetary policy considerations, their interest in smooth and efficient payment systems played a decisive role. Furthermore, it was key to ensure that systems be secure and interoperable. Many market participants embraced this proactive strategy as supportive of a sound regulatory framework, as shown by a study of the Bank of Finland.[3])

To eliminate negative fallout on

– price stability and the role of money as a unit of account,
– the smooth functioning of payment systems and trust in payment instruments,
– the protection of customers and dealers,
– the stability of the financial market and
– the protection from criminal abuse and fraud,

the European Central Bank (2000a) proposed seven rules for the issuance of e-money:

1. E-money issuers must be subject to supervision.
2. The rules and obligations on the part of the respective participants in an electronic money scheme must be clearly defined and disclosed.
3. Electronic money schemes must maintain adequate technical, organizational and procedural safeguards.
4. Protection against criminal abuse must be taken into account when designing and implementing electronic money schemes.
5. Electronic money schemes must supply the central bank with whatever information may be required for the purposes of monetary policy.

1 *The second debate on principles, i.e. rule-based vs. discretionary monetary policy, is of lesser significance in this context.*

2 *Bank for International Settlements (2000 and 1996).*

3 *See also Gormez and Capie (2000, p. 20).*

6. Issuers of electronic money must be legally obliged to redeem electronic money against central bank money at par at the request of the holder of e-money.
7. The possibility must exist for central banks to impose reserve requirements on all issuers of electronic money.

From the viewpoint of European national central banks, these rules will ensure that the monetary policy and supervisory policy objectives are not threatened even if e-money is used widely.

The ECB's recommendations were largely incorporated into the pertinent European Union Directives. The Directives 2000/46/EC and 2000/28/EC spell out the supervisory framework of electronic money institutions, ensuring their integrity and diligence. Issuance of electronic money is limited to traditional credit institutions and specific e-money institutions.

In the United States and Japan, the competent authorities have taken a wait-and-see approach. They argued that premature regulatory efforts could possibly nip valuable experiments – key to innovations – in the bud (Greenspan, 1997).

As has been shown, e-commerce and e-money stand to exert considerable influence also on financial intermediation. The traditional banking and financial system has thus come under immense pressure to change. An ever changing banking and financial system has been known to pose a great challenge for financial market supervision. Technical and financial innovations inevitably alter the risk profiles of banks and financial markets. The question if, and – if so – to what extent the e-economy has changed the overall risk level proves much harder to resolve. Increasing product and process standardization and the stepped-up specialization of financial institutions might drive up systemic risk. As we are faced with a system that operates increasingly like a network, the risk of contagion is expected to mount as well. On the other hand, this very organization as a network is very crisis resistant. If part of the system fails, other components will take over, which averts crippling of the entire system. In the same vein, increasing transparency, which ensues from reduced information asysmmetries, is likely to have a stabilizing effect.

In tackling these issues, the Basel Committee on Banking Supervision (BCBS) has started to design a harmonized supervisory framework. According to its first conclusions,[1]) the supervisory mechanisms currently in place are generally deemed to be adequate. Furthermore, it is still too early in the innovative cycle to impose concrete regulations and technical standards. It is, however, desirable to adapt the supervisory framework to the changes of the risk profile caused by electronic banking. The BCBS' working group on electronic banking thus recommended that the supervisory authorities cooperate with the financial service industry in devising sound risk management schemes. Technical security and IT outsourcing issues deserve special attention. As e-banking is a cross-border activity, supervisory authorities also have to step up their cooperation on a global

1 See also Basel Committee on Banking Supervision (2000) and Deutsche Bundesbank (2000).

scale and need to pay closer attention to IT issues, (Schilder, 2001) which further strengthens the drive for enhanced quality of banking supervision.

Like with monetary policy, the new technologies are expected to entail significant statistical distortions of indicators. Financial market supervision will thus have to close in on valuation issues – suffice it to mention intangible assets or productivity measurement – in the future.

6 Impact on the Central Banking Structure

With the information economy making strides, not only will the objectives and strategies of central banks be impacted considerably, but also their organizational setup. Chandler's proposition that structure follows strategy applies here as well, of course. Also, central banks primarily deal in the generation, processing and dissemination of information. It is therefore safe to assume that the effects of the Internet will fundamentally alter the organizational and workflow structures of central banks.

Since both the Federal Reserve System (Fed) and the European System of Central Banks (ESCB) are set up like a network,[1]) the potential applications of the Internet hold out particularly great promise. Even today, the Internet already facilitates collaboration among the individual central banks scattered throughout the United States and Europe, respectively. ICTs may be of particular importance to the ESCB, which is, after all, still a young institution. In today's fast-paced world, steadfast use of ICTs could help reduce information, planning, decision-making and implementation lags.

Last but not least, steadfast use of ICTs could contribute to optimizing resource allocation and thus help cut costs significantly. In this context, the Internet is optimally suited to making central banks more accessible to customers and, above all, the general public.

The importance of the Internet has been undisputed in the world of research and science for a long time. Economic research and analysis units of central banks will therefore continue to profit from the advances of the Internet, as information and search costs are set to tumble further despite the growing supply of information (Taylor, 1998). This probably also applies to the collection and compilation of statistical information; here, inexpensive ways of interaction between reporting agents and data compilers seem to be within reach. In general, greater attention will have to be paid to timely data measurement and analysis. Designing new methods for evaluating information and knowledge goods or drawing up knowledge balance sheets – a practice already employed by some companies – might be just the way to go.

The use of new ICTs will flatten organizational structures. Moreover, demand for flexible and highly skilled staff will rise further. This calls for extended use of modern management techniques, especially in human resource and knowledge management (KPMG Consulting, 1999); at the

1 *Organizational forms may be considered to be strategic networks if they are legally independent, but economically interdependent units that specialize in a particular link of a given value chain and pursue common strategies. Sydow (1993).*

same time, companies focus more closely on technological issues. It is vital to pay more attention to future challenges, especially technological progress and its consequences (Kováts, 2000). In addition, scenario management, strategic information systems and technology assessment necessitate closer cooperation among economic agents, researchers and international organizations (Stewart, 2000).

Central banks are not just economic policy administrations, but also large logistics enterprises. This is clearly evident from the logistical efforts required to launch the euro banknotes and coins. Even though central banks' direct involvement differs from country to country, all of them are basically in charge of producing and distributing money. The Internet, especially B2B applications, could help scale back costs in this area in the years to come. B2B applications, most of all e-procurement, are generally suitable for all central bank activities. Last but not least, this also offers central banks the opportunity to explore new fields of cooperation with one another.

7 Conclusion

At this point in time, it is probably still too early for a definitive assessment of the impact the information economy will have on central banks. It is, however, possible to draw a number of conclusions:

1. In parallel to the advances of the information society, central banks will increasingly evolve into electronic central banks, e-CBs for short. We should bear in mind that central banks are already among the most intensive users of modern computing and communications technologies. And yet, technology will acquire even greater strategic importance. In the information economy, the need for an integrated communications policy will increase markedly.
2. So far, central banks have basically been proven right in their assessment of e-economic developments. Macroeconomic and microeconomic evidence has convinced not only central banks, but also the majority of experts in this field that productivity is gaining momentum thanks to both the great strides in the ICT sector and intensified use of these technologies in the rest of the economy. The productivity paradox has, to a certain degree, been refuted. The macroeconomic effects are likely to be smaller than originally expected, though (DeLong and Summers, 2001). Perhaps only the next generation of economic historians will succeed in unraveling the productivity puzzle (Blinder, 2000).

   Nevertheless, chances are that the New Economy was not just a temporary phenomenon of the 1990s associated with irrational exuberance on the stock markets. Future developments are, however, likely to lack much of the dynamics and uniformity predicted a few years ago. Central banks thus have to focus more closely on technological issues. To be able to assess the highly complex and interconnected problems of the future, the traditional forecasting toolbox should be complemented increasingly by alternative instruments, such as technology assessment.

3. The debate about the information economy lays bare the limits conventional economic and statistical analyses are still up against. As the Federal Reserve Bank of Cleveland succinctly put it, "we are what we measure" (Federal Reserve Bank of Cleveland, 2000). Central banks are therefore called upon to develop adequate measurement and analytical tools to maintain and improve the efficiency of monetary policy instruments in the future.
4. The New Economy has triggered a number of theoretical discussions among economists. To prevent ambiguity, central banks should engage more actively in this discourse.
5. Even though according to some scenarios, the end of the traditional monetary and banking system is at hand, this will not happen for a long time yet, if at all. Instead, during the transition from the industrial society to the information society there will be an even greater need for institutions which have traditionally stood for stability, security and trust.

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The Payment Habits of Austrian Households

Results of a Study on the Use of Payment Cards and the Structure of Payment Transactions in 2000

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Helmut Stix,
Karin Wagner

1 Introduction

"Cash or card? How would you like to pay?" This is a choice Austrians are now offered more and more often when they are about to pay for something. "Should I go get cash from an ATM or should I use my card?" Once people have decided to pay with plastic, they have to choose again: Maestro card, Quick electronic purse, credit card or loyalty card? In keeping with the international trend, Austrian consumers may now select from among a growing range of cashless payment options. What has not been available until now is a comprehensive overview of contemporary payment habits. This study represents an effort to fill that gap by providing a broad, up-to-date portrait of payment habits in Austria using a variety of original data sources.

For reasons of monetary policy, supervision and cash logistics, it is indispensable from a monetary policy perspective to analyze public payment behavior regularly on the basis of a sufficiently disaggregated data set. To establish trends and to assess future developments, this study also provides a comparison with earlier survey results (Mooslechner and Wehinger, 1997). Several types of payment systems have gained considerable ground, above all point-of-sale (POS) terminals, since the last study was concluded in 1996. This has raised the question of the effect of the growing popularity of cashless payments on banknotes and coins in circulation as well as on other forms of payment.

The data used are available up to the fourth quarter of 2001, providing the perfect opportunity to draw up a last broad review of Austrian schilling payment transactions before the introduction of euro cash. Also, the choice of this cutoff date will allow the effects of the introduction of euro notes and coins on payment behavior and payment transactions to be analyzed at a later date.

The results of this study are derived largely from two surveys commissioned by the Oesterreichische Nationalbank (OeNB) and conducted by the Austrian empirical social research institute IFES (Institut für Empirische Sozialforschung). The target sample was chosen from among a representative random sample of Austrian residents above 15 years of age.

The first survey, referred to below as the *payment behavior survey,* compiled information about actual payment habits. For the first part of this survey, the respondents kept records of all purchases and payments for one week, documenting the amount, payment method and the sector in which the payment was made. Credit transfers were explicitly excluded from these payment categories. For the second part of the survey, respondents were asked to indicate only large-value payments (over ATS 5,000)[1]) that they had made in the four weeks preceding the survey date. Again, payments had to be classified by amount, method and sector. This survey was conducted in September and October 2000 and is the basis of the analysis in chapter 2.

1 *Even though published after the introduction of euro cash, this study states all values in Austrian schillings. This procedure serves to signal that the figures refer to payments made before January 1, 2002; also, the surveys were based on schilling amounts.*

The second survey, referred to below as the *payment card survey,* has been conducted at quarterly intervals since 1996. The most recent survey data are from the fourth quarter of 2001. This survey collects data on cardholding and both actual use and planned card use. The latest surveys also contain data about the use of payment options offered by banks, such as transfers or payment slips. These data are used in chapter 3.

As these survey data reflect the subjective estimates of the respondents, they provide unique insights into Austrians' payment behavior. To round out the picture, it seems useful to compare the payment card survey data with the objective statistical developments. Hence chapter 3 includes an analysis of Europay Austria's data about the spread of payment cards, ATMs and POS terminals.[1])

The study is structured as follows: Chapter 2 begins with a review of the types of payment transactions made by households. This outline is followed by a more detailed breakdown of transactions by type and size as well as commercial sector and weekdays. The use and diffusion of various payment cards, in particular the development of debit card (previously known by the brand name Bankomat in Austria, now referred to as Maestro card) transactions and Quick electronic purse transactions at the point of sale, are treated in chapter 3. Apart from providing descriptive information, the survey data can be evaluated to draw up statistically sound discriminant analyses of the choice of payment card. These discriminant analyses are considered in chapter 3 as well. Chapter 4 concludes with a summary of the main points.

2 Structure of Austrian Households' Payment Transactions in 2000

Like the 1996 survey, the survey conducted in 2000 sought to document not just the growing use of modern forms of payment in Austria, but also to provide information about the structure of Austrian households' payment transactions. No original data sources specifically concentrate on the extent and the structure of cash transactions by private nonbanks, above all households, within overall payment transactions.

The format of the 2000 survey was altered marginally from that of the 1996 survey. 14,805 direct payment transactions between nonbanks (households to companies) totaling ATS 4.7 million are covered. These values derive from an analyzable sample of transactions made by 1,204 persons within a one-week period; the same poll also covered payments in excess of ATS 5,000 in the four weeks preceding the survey. Hence the survey covers just over 12 payment transactions per respondent per week, or just under 2 transactions a day. It may be inferred from this result that not all transactions were in fact captured. Each payment averaged approximately ATS 316, and the weekly total ran to just under ATS 3,900.

Given the lack of macrostatistical data on the total amount and volume of payment transactions between nonbanks, the survey coverage cannot be established precisely. While the average weekly expenditure total of

1 *The authors thank Europay Austria for providing the data.*

ATS 3,900 seems to indicate fairly exact coverage, the average of two transactions a day appears to be quite small. The results may be skewed insofar as small and very small payments are probably represented to a very low degree. Nevertheless, we may expect the representation of the structure of payment transactions to be conclusive and faithful.

The switch to written responses appears to have caused some problems with the coverage of large-value payments in the 2000 survey. Moreover, the shift from given categories of amounts in the 1996 survey to the reporting of exact amounts may have led to distortions. Therefore the comparability with the survey conducted in 1996 is limited.

2.1 Cash Transactions Continue to Predominate although They Diminished Slightly

Prior to the changeover to the euro, cash continued to be the method of choice in all direct payment transactions between nonbanks in Austria. 13,750 or around 93% of the 14,805 payment transactions covered were cash payments. By payment amounts, the cash share is perceptibly lower at 81.5% (chart 1).

By frequency, debit card terminal transactions[1]) rank second with a share of 5%, followed by credit card payments (1%) and loyalty card payments (0.6%). Check payments accounted for just 0.5% of transactions, and Quick electronic purse payments were at the bottom of the list at 0.1%. By payment amounts, cashless payments accounted for a noticeably larger share of payments than measured by the number of payments. Debit card terminal payments account for a more than twice as large share at 11.1%, and the volume shares for checks (2.9%), credit cards (2.6%) and loyalty cards (1.9%) are a multiple of their transaction shares. Only in the case of cards with the Quick electronic purse application, which are used for small and very small payments, is the payment volume share smaller than the transaction share.

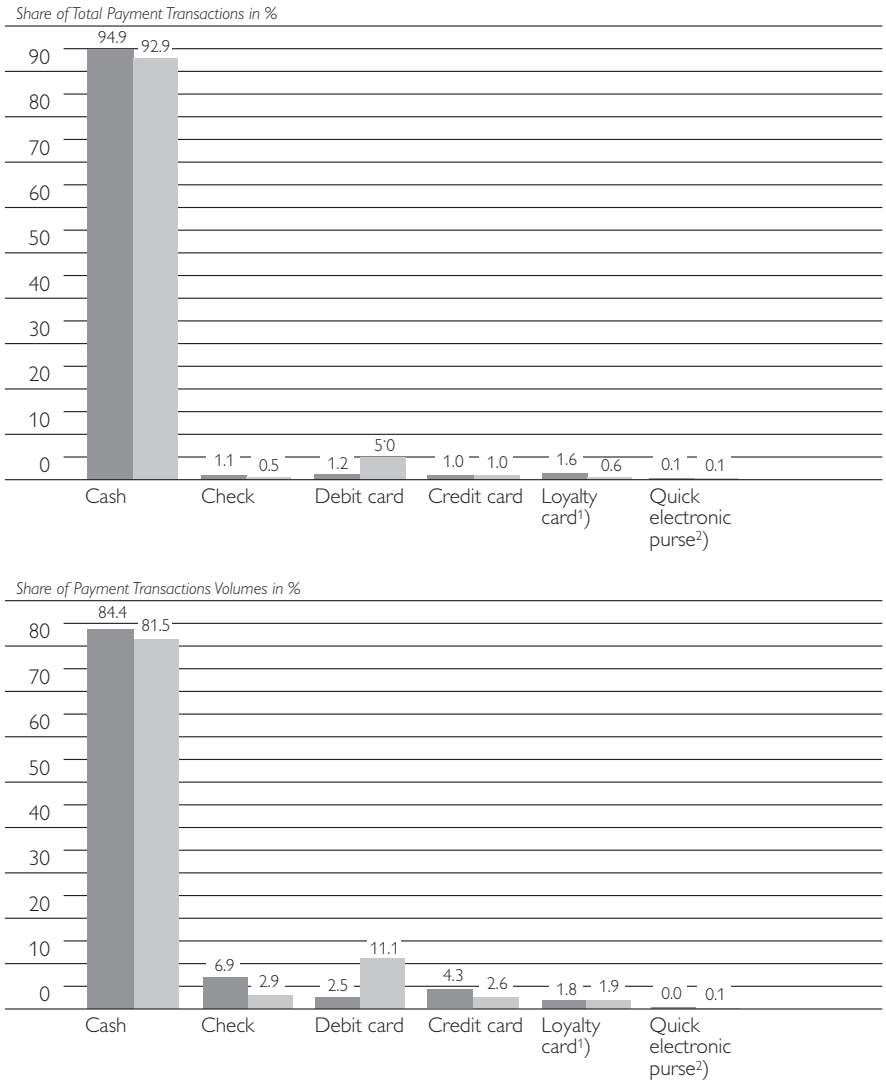
The share of cash payments declined by 2 percentage points from 1996. As expected, checks were used less frequently according to the 2000 survey (–0.6 percentage point), most likely as a result of the rise in card payments, the higher cost of check transactions and the announcement that the international check guarantee would be dropped. The share of loyalty cards contracted even more (–1 percentage point), whereas that of credit cards and Quick electronic purses remained virtually unchanged. Debit card payments, which expanded by 3.8 percentage points to account for a 5% share of all payments, posted the biggest popularity gains.

The increase in the share of debit card payments was even larger measured in terms of amounts. By this yardstick, the rise came to 8.6 percentage points, from 2.5% to 11.1%, reflecting the stepped-up development of EFTPOS (electronic funds transfer at the point of sale) infra-

1 *The terms debit card terminals and POS terminals (these terminals are referred to as Bankomatkassen in Austria) are used interchangeably. For the purpose of this study, a POS transaction or payment is an EFTPOS payment (electronic fund transfer at the point of sale) by means of a debit (ATM) card, now referred to as a Maestro card in Austria.*

Chart 1

Payment Behavior by Payment Type



Source: OeNB (payment behavior survey), IFES.
1) Corresponds to the category "not classified" in the 1996 survey.
2) Corresponds to the category "chip card" in the 1996 survey.
Note: Chart 1 shows the share of the different types of payment in terms of the total number of transactions and in terms of the total payment amount of transactions. Please note that the categories "loyalty card" and "Quick electronic purse" were classified under a different category in 1996.

structure. Loyalty cards (+0.1 percentage point) and Quick payments also registered marginal gains, albeit starting from a low level; all other payment methods suffered relative losses in terms of volume. The share of debit card payments widened mostly at the expense of check transactions, whose share declined by 4.1 percentage points from 1996. The volume of cash payments (–3 percentage points) and surprisingly enough the volume of credit card payments (–1.6 percentage points) both declined sharply.

While the survey results show the anticipated replacement of cash payments by cashless methods, a distinct shift between the different categories of cashless payments also occurred. The key factor is the obvious rise in popularity of debit card payments. Debit card payments expanded not just at the expense of cash and check payments, as might be concluded at first glance, but also at that of credit card payments, even though credit card use has become more widespread.[1])

2.2 Cashless Methods Become More Popular for Amounts Exceeding ATS 500

The 2000 survey reconfirms a link between the payment size and the payment method (table A1). A breakdown of cash transactions reveals this link. More than 99% of all payments involving amounts up to ATS 99 are cash payments. For amounts of ATS 500 and over, the share of cash payments falls to under 80%, and reaches a low of 71.8% for amounts in excess of ATS 10,000. By contrast, cashless payment options exhibited a rising trend for payments involving higher amounts. Check payments accounted for over 1% of payments higher than ATS 500 and peaked at 11.2% in the category of payments over ATS 10,000. Most EFTPOS payments with debit cards involved amounts of ATS 500 to ATS 5,000, whereas credit card payments made up between 1.6% and nearly 8% of all payments between ATS 500 and ATS 10,000.

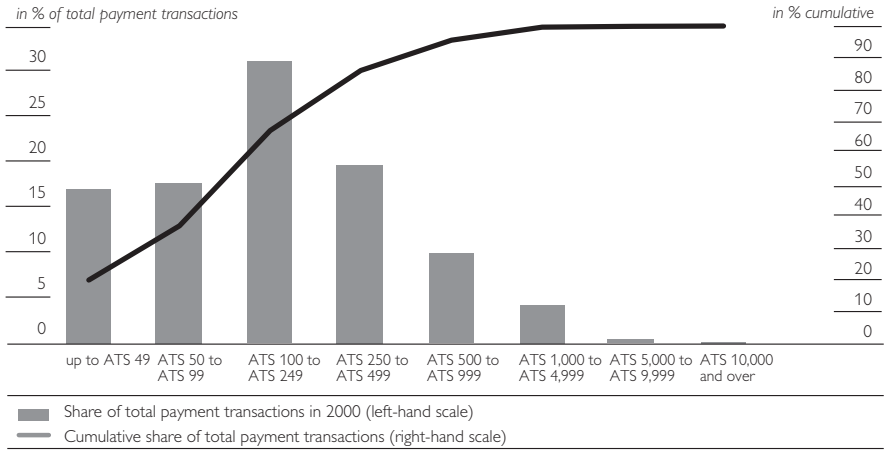
By and large, the results are the same when payments are analyzed by amounts (table A2). The share of cash payments shrinks as the size of payment grows also if measured in terms of volumes. Cash accounts for nearly all (99.1%) very small payments and is used for an above-average number of payments up to totals of ATS 500. Starting at ATS 500, the share of cash payments falls rapidly, reaching a low of only 61.4% in the category of payments over ATS 10,000. While the share of cash payments in terms of transaction numbers is identical with that measured in terms of the volume share in the category up to ATS 10,000, it is more than 10 percentage points lower in terms of volume in the category of payments larger than ATS 10,000. This difference can be traced to the fact that people tend to opt more readily for cashless procedures when large amounts are involved.

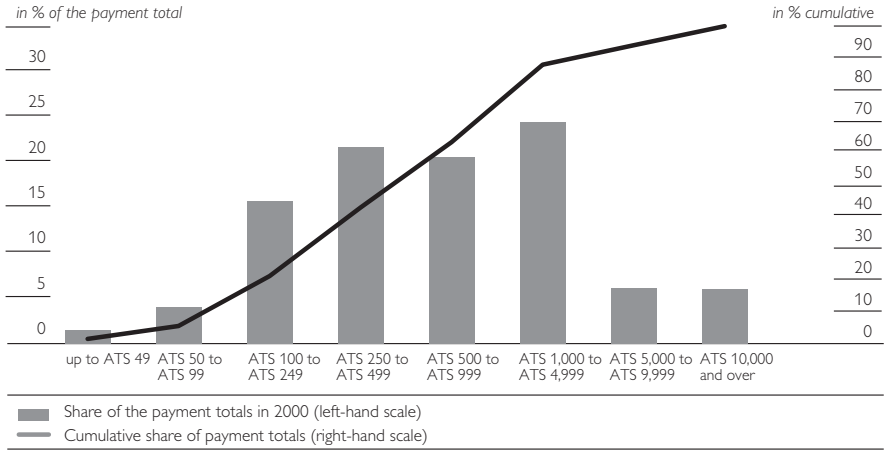
Despite the explicit effort to cover adequately large-value payments of over ATS 5,000 (during the four weeks preceding the survey week), the sample showed a concentration on small-value payments. 12,649 or 85.5% of the total of 14,805 payments covered were of amounts under ATS 5,000 (chart 2). Payments lower than ATS 250 made up more than 65% of all transactions. Conversely, a mere 0.4% of all payments surpassed ATS 5,000. Payments between ATS 100 and ATS 250 accounted for the largest share, namely 31.1%.

1 See information on credit card use in chapter 3.1.

Chart 2

Distribution of Payments by Payment Size





Source: OeNB (payment behavior survey), IFES.

The distribution of cash and Quick electronic purse payments by the size of payment also largely dovetails with the general pattern for transactions. The other types of payment were mostly used for amounts between ATS 250 and ATS 5,000. Check payments, for example, concentrated on totals between ATS 1,000 and ATS 5,000 (40.8%), and the largest share of credit card payments (42.3%) was in the category between ATS 500 and ATS 1,000. EFTPOS debit payments (33%), payments with the Quick electronic purse (28.1%) and loyalty card payments (25.4%) were most often between ATS 250 and ATS 500.

Unlike in the case of the distribution of transaction numbers, the highest volume turnovers are for medium-sized payments of between ATS 100 and ATS 5,000. While 34.7% of all transactions involve amounts up to ATS 100, these small-volume payments constitute only 5.5% of the total volume of payments (chart 2). Payments over ATS 5,000 represent only 0.5% of all transactions, but 12.1% of the total volume. Payments between ATS 100 and ATS 5,000 account for 82.3% of the payment volume and for 64.9% of all transactions. The gap between volumes and transactions is even more

pronounced in the category between ATS 500 and ATS 5,000, into which 14.2% of all payments and some 45% of the payment volume fall.

2.3 Choice of Payment Method Differs Strongly from Sector to Sector

Nearly half (over 49%) of all payment transactions were classified under the two sectors food stores (32.1%) and restaurants/cafés (17.2%). Newspaper and tobacco shops (9.8%) as well as pharmacies/drugstores/cosmetics stores (6.9%) and gas stations/fuel shops (5.2%) also accounted for significant shares of transactions. All other sectors had shares of under 4%. By volumes, food stores and restaurants still predominated, though with far smaller shares (24.3% and 9.6%, respectively). Hence the payment volume is more evenly distributed than the number of transactions, which has to do with the predominance and frequency of small-value payments in specific sectors. Payment volumes were high in the clothing/fabric store sector (8.4%) and in the sector gas stations/fuel shops (7.6%).

Not only do the frequency and volumes of payment differ markedly depending on the sector, so do payment methods. Cash, for example, was used most often in the three sectors newspaper and tobacco shops and florists (99% in both cases) and in restaurants/cafés (98.8%). The respondents used cash least in gas stations/fuel shops (73.4%), clothing/fabric stores (77.3%) and toys/sporting goods (77.9%), where shares were below the 80% mark. Respondents elected to use checks often to pay for vacation/travel agency expenditures (8.8%), and debit card terminals were favored for payments at gas stations (15.4%), electrical equipment retailing (15.1%), at toy/sporting goods stores (14.3%) and at clothing/fabric stores (14.2%). Payments by credit card reach noticeable percentages at gas stations and furniture stores (7.2%), at textile retailers (6.8%), for vacation/travel agency expenditures (6.7%) and at toy/sporting goods stores (6.1%) (table A3).

The classification of payment volumes by sectors exhibited a very similar pattern with an even greater dispersion (table A4). Cash is used for only 58% of all payments by volume for toys and sporting goods, followed by textiles (63.6%) and gas stations (68.5%). By contrast, cash payments account for a hefty 98% of the volume of payments at florists, 97.2% at restaurants/cafés and 96.7% at newspaper and tobacco stores. Payments by check peaked in terms of volume in the sectors watches/jewelry (13.6%) and vacations/travel agencies (12.8%). Debit card payments topped 20% in volume terms for toys/sporting goods (25.9%), clothing/fabric stores (23.8%) and in department stores (22.1%). Credit card sales were strongest in the sectors toys/sporting goods (9.7%), clothing/fabric stores (9%) and at gas stations (8.5%).[1])

Although comparability with the 1996 survey is limited, it is noteworthy that the share of cash payments declined in no less than 16 of 21 individual sectors (chart 3). The most pronounced shift to cashless payment methods occurred in the vacations/travel agency sector (–16.2 per-

1 *The annex contains two tables indicating the development of payments in the course of the survey week (tables A5 and A6).*

centage points), here mainly to check and credit card payments.[1]) Among cashless payment methods, debit card payments rose most distinctly. In the sector clothing/fabric stores (+12.2 percentage points), toys/sporting goods (+11.2 percentage points) and furniture (+10.4 percentage points) the rise in debit card payments soared into the double-digit range.

3 Growing Use of Payment Cards

As shown above, cashless payment methods enjoyed sharp popularity gains, mainly because of the more widespread use of debit cards at cash registers. The growing use of payment cards will be described in greater detail in this chapter. The first part of the chapter will discuss the results of the regular surveys examining the use of payment cards. The analysis centers on the personal assessments of the respondents; subsequently, these results are compared with the data on actual payment card use.

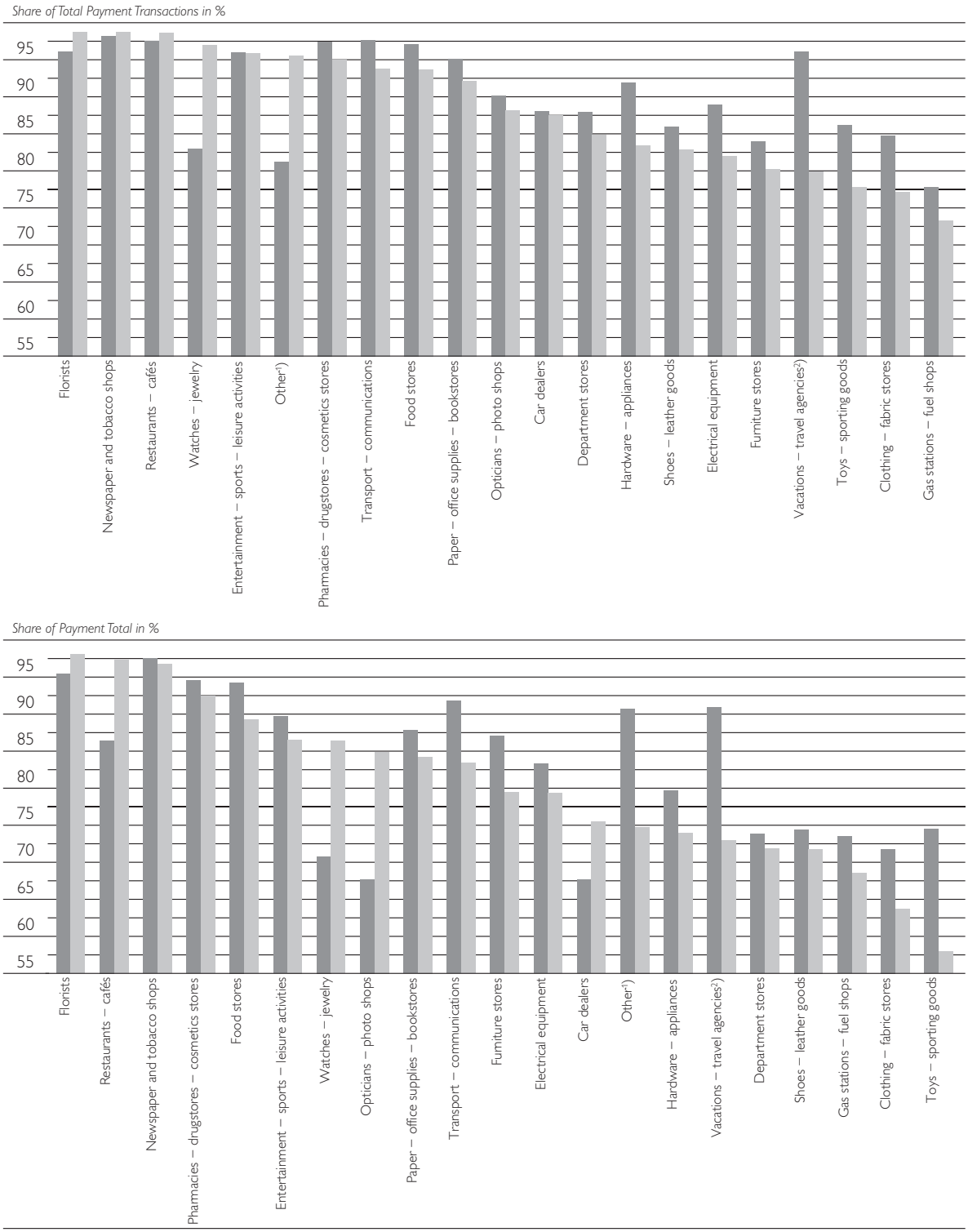
3.1 Cardholding and Card Use

Some 70% of the respondents of the payment card survey conducted in the fourth quarter of 2001 stated that they owned at least one payment card. By card type, 66% of the respondents held debit cards, 30% credit cards, 22% cards with the Quick electronic purse application and 15% retailer loyalty cards with a built-in payment application. As payment card surveys have been conducted every quarter since 1997, it is possible to show developments over time (chart 4). The data signal that debit card ownership augmented strongly and constantly from an initial 41% in the first quarter of 1997 to 66% in the fourth quarter of 2001. Credit card ownership also displayed a long-term positive trend (rising from 19% to 30%). Cards with the Quick electronic purse application exhibited a different development: The percentage of respondents with Quick-enabled cards rose to 25% until the first quarter of 2000, but sank to below 20% thereafter. Not until the fourth quarter of 2001 did the percentage rise again. This increase may be linked to the issue of new cards and the fact that the respondents were better informed about the uses of the new cards. An additional reason may be that the Quick electronic purse application was promoted more heavily prior to the introduction of euro cash. The share of payment-enabled loyalty cards (covered quarterly in the last six surveys, covered semiannually previously) was on the decline in the latest survey.

1 *Strangely enough, the share of cash payments in the watches and jewelry sector went up by 14 percentage points.*

Chart 3

Share of Cash Payments by Sectors



Source: OeNB (payment behavior survey), IFES.

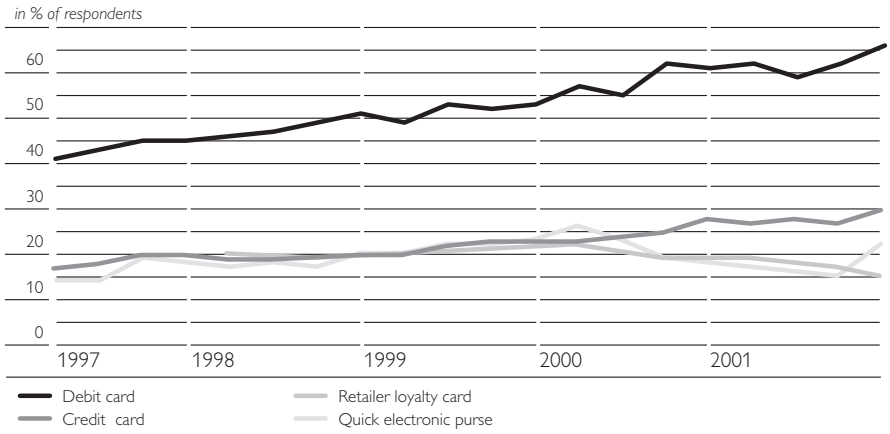
[1]) Corresponds to the category "not available" in the 1996 survey.

[2]) Corresponds to the category "other" in the 1996 survey.

Note: Chart 3 shows the disaggregated share of cash by sectors – by number of transactions and by payment totals. The shares are shown in decreasing order. The 1996 values are shown for the sake of comparison.

Chart 4

Payment Card Ownership



Source: OeNB (payment card survey), IFES.
Note: Chart 4 shows the development of the responses to the question "Which of these cards do you own yourself?"

Only 22% of the respondents in the fourth quarter of 2001 stated that they possessed a card with the Quick electronic purse application, though the actual figure is probably nearly three times as high, as will be shown below. Moreover, the number of Quick-enabled cards was expanding robustly recently. The surveys only partly reflect this rise:[1]) Thus while the group of Quick electronic purseholders is growing, the survey results signal that people were becoming less informed relative to the number of cards issued.

Table 1

Ownership and Use of Payment Cards

		Debit card	Credit card	Quick electronic purse	Retailer loyalty card
Ownership	4th quarter 2001	66	30	22	15
Use	several times a week	28	9	9	13
	about once a week	31	18	11	23
	at least once a month	18	37	12	32
	less	12	31	12	27
	never	11	4	54	5

Source: OeNB (payment card survey), IFES.
Note: Table 1 shows both the answers (in percent of respondents) on card ownership and the answers on frequency of use. Results may not add up to 100% due to rounding.

In addition to providing information about card ownership, the interviewees also answered questions about the frequency of use. Different categories of responses range from "several times a week" to "never." Table 1 summarizes the results for the fourth quarter of 2001. According to the data, the debit card is used most frequently. 89% of all cardowners actually use their debit cards, 96% of owners their credit cards and 95% of owners use their loyalty cards. Use of the Quick card trails these results by a wide

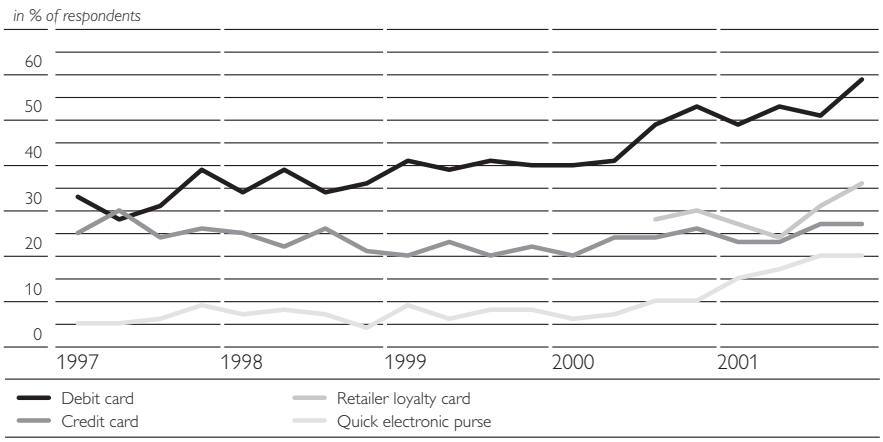
1 *See the actual card issuance figures in chapter 3.4.*

margin, with only 46% of the respondents using this payment method at all.[1]) The share of respondents who use their debit card at least once a week mounted steadily from somewhat more than 20% to almost 60% (chart 5). The percentage of Quick and loyalty card use (at least once a week) also widened in the recent surveys:[2]) Quick electronic purse use doubled from 10% in the fourth quarter of 2000 to 20% in the fourth quarter of 2001. Conversely, the use of credit cards remained more or less constant over time. Interestingly, the card use data thus confirm the result touched on in chapter 2, namely that the more widespread use of debit cards at cash registers led to a substitution among cashless payment options.

Chart 5

Payment Card Use:

Respondents Use the Card at Least Once a Week



Source: OeNB (payment card survey), IFES.
Note: Chart 5 shows the development of the responses to the question "How often do you use this card?" No data on use of retailer loyalty cards are available before the third quarter of 2000.

Since debit cards play a preponderant role among payment methods, the next two subchapters will cover in more detail the development in the number of ATMs and debit card transactions overall as well as debit card transactions at EFTPOS terminals, that is the use of Maestro debit cards for actual payments. The data used were provided by Europay Austria.[3])

3.2 Increase in ATM Numbers and Steady Growth in Debit Card Use

The number of ATMs and the number of debit cards issued skyrocketed from the first year whose data are used in this study, 1989, to 2001 (table 2). The quantity of debit cards more than quadrupled from 1.1 million in 1989 to 4.6 million in 2001. In terms of the general population, this means that 14.6% of all Austrians held a debit card in 1989, 26% had one in 1995 and 57% of all Austrians owned a debit card in 2001.[4]) The share of

1 *"Quick card" is used for all cards with the Quick electronic purse application.*

2 *Unlike other cards, credit cards elicited a majority of responses in the category "at least once a month." Card use in this category developed fairly constantly over time in the recent surveys.*

3 *Europay Austria issues the Austrian Maestro cards.*

4 *Assuming, of course, that every Austrian has only one debit card.*

Austrians over 15 years of age with a debit card came to 61% in 2001.[1]) The number of cash-dispensing ATMs grew at approximately the same pace (1989: 820 ATMs, 2001: 2,630 ATMs). This means that there were about 1,400 debit cards per ATM on average in 1989, and about 1,700 cards in 2001.

Table 2

The ATM System: Some Key Figures

	of ATMs in operation	Number of debit cards	Number of ATM withdrawals	Annual change	Total withdrawals	Annual change	Average size of ATM withdrawals
year-end-level		*thousands*	*millions*	*%*	*ATS billion*	*%*	*ATS*
	1	2	3	4	5	6	7
1989	820	1,143	34.1	×	55.7	×	1,633
1990	988	1,246	41.7	+22.3	69.0	+23.9	1,655
1991	1,130	1,377	48.5	+16.3	82.2	+19.1	1,695
1992	1,260	1,448	53.3	+ 9.9	95.0	+15.6	1,782
1993	1,564	1,590	57.7	+ 8.3	105.6	+11.2	1,830
1994	1,821	1,639	63.5	+10.1	118.3	+12.0	1,863
1995	1,993	2,089	68.2	+ 7.4	129.1	+ 9.1	1,892
1996	2,164	2,422	74.3	+ 8.9	141.1	+ 9.3	1,900
1997	2,337	2,655	78.7	+ 5.9	146.8	+ 4.0	1,866
1998	2,424	2,913	81.3	+ 3.3	154.6	+ 5.3	1,903
1999	2,570	3,245	84.1	+ 3.5	158.3	+ 2.4	1,882
2000	2,600	3,633	87.7	+ 4.3	163.7	+ 3.4	1,866
2001	2,630	4,616	90.1	+ 2.7	174.6	+ 6.6	1,938

Source: Europay Austria, OeNB.

The number of withdrawals from ATMs also climbed steeply from 34 million (1989) to 90 million (2001)[2]). However, the growth rates have eased considerably in the past few years (table 2, column 4). The sum total of withdrawals per year (table 2, column 5) has reached substantial proportions: in 1989, withdrawals came to ATS 55 billion, rose to ATS 129 billion in 1995 and jumped to ATS 174 billion in 2001. In percent of cash in circulation, this is tantamount to a rise from 51% (1989) to around 85% in 2000. Withdrawals ran to somewhat more than 100% of the average amount of currency in circulation in 2001.[3]) At an estimated velocity of 5 (3) of cash in circulation, these figures would suggest that roughly 20% (33%) of all cash transactions in 2001 used cash that was withdrawn from ATMs immediately prior to the transaction. These figures are patent evidence of how important ATMs are for cash logistics. As in the case of transactions, the volume growth rates lost momentum, though more sharply than transaction growth rates since the beginning of the 1990s. Average withdrawals from ATMs are also informative; they remained fairly constant between about ATS 1,800 and ATS 1,900.

1 *These calculations are based on population estimates for the entire year 2001.*

2 *Hence the number of daily withdrawals came to 94 per ATM in 2001.*

3 *This corresponds to about 6% of nominal GDP. It should be noted that the expansion from 85% to 100% is so strong because, among other things, the amount of cash in circulation shrank in 2001 in the runup to the euro changeover.*

3.3 Rapid Development of POS Terminals

Apart from withdrawing cash from ATMs, debit cards also serve to make electronic funds transfers (EFTs) at suitably equipped cash registers (POS terminals) using customers' PIN codes. EFTPOS developments progressed even faster than ATM developments (table 3).

Table 3

POS Transactions and Sales

	Number of POS terminals	Debit card sales	Annual change	Sales at POS terminals	Sales at food terminals
year-end level		*ATS billion*	*%*	*ATS billiion*	*ATS billion*
1989	229	0.4	×	×	×
1990	678	0.9	+99.5	×	×
1991	1,109	1.5	+72.1	×	×
1992	1,496	2.4	+58.4	×	×
1993	1,831	3.5	+47.4	×	×
1994	2,410	5.1	+45.0	×	×
1995	3,382	7.2	+40.0	×	×
1996	5,847	11.2	+56.1	×	×
1997	15,860	17.8	+58.8	15.1	2.6
1998	21,347	27.5	+55.0	22.5	5.1
1999	28,763	43.4	+57.9	36.4	7.0
2000	40,170	62.2	+43.1	47.4	14.8
2001	58,073	80.6	+29.6	61.2	19.4

Source: Europay Austria.

In 1989, only 229 POS terminals were equipped to handle electronic funds transfers using debit cards. By the end of 2001, this number had burgeoned to more than 58,000. This corresponds to a 235 fold rise! Volume developments were just as impressive, registering growth from ATS 0.4 billion in 1989 to ATS 80.6 billion in 2001. In percent of cash in circulation or GDP this is equivalent to a rise from 0.37% or 0.02% (1989) to 47% or 2.7% (2001).

From 1997 the data distinguish between sales at POS terminals and sales at food terminals (the latter refer mainly to terminals at supermarkets). As is apparent, the rates of expansion are considerable in both categories: Sales at food terminals more than doubled from 1999 to 2000 and augmented markedly again in 2001. Overall, unlike withdrawals from ATMs, EFTPOS transactions are still growing animatedly. In the S-shaped growth curve that innovations frequently exhibit, the POS technology is still at an earlier stage than ATM technology. For this reason, growth rates are expected to remain high.

3.4 Changes in Quick Electronic Purse Use

In addition to EFTPOS payments using debit cards, which provide fast and easy access to customers' accounts, information about the use of electronic money is particularly relevant for monetary policymakers. Although several e-money systems are currently in operation in Austria, only the Quick electronic purse has attained any quantitative significance so far (table 4).

Table 4

The Quick System: Some Key Figures

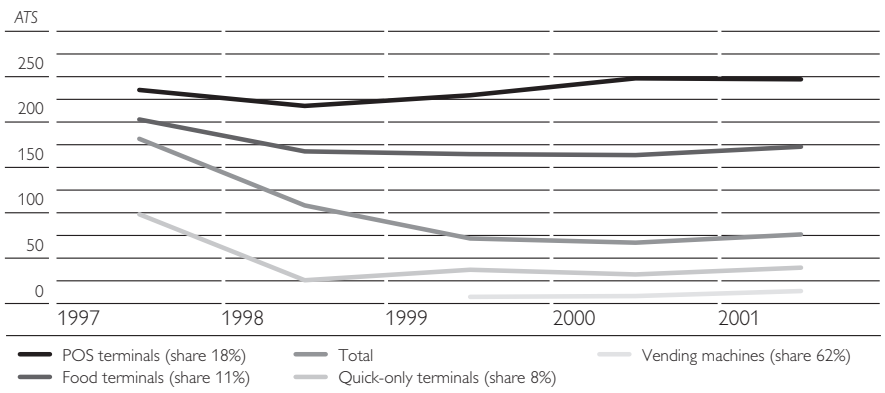
	Number of Quick payment terminals	Number of Quick loading terminals	Load			Payments		
			Amount	Annual change	Average amount	Amount	Annual change	Average amount
year-end level			*ATS million*	*%*	*ATS*	*ATS million*	*%*	*ATS*
1997	12,756	3,495	110	×	688	78	×	183
1998	19,118	4,954	154	+40.1	677	127	+62.7	109
1999	29,564	5,225	187	+21.7	716	161	+26.9	73
2000	41,585	5,162	239	+27.7	745	209	+30.0	68
2001	60,848	5,419	473	+97.5	750	392	+87.3	77

Source: Europay Austria, OeNB calculations.

Cards with the Quick electronic purse application have become quite widespread, as is evidenced by the number of payment and value load terminals. Although the system went into full operation only in 1996, more than 60,000 POS terminals and more than 5,400 value load terminals were available at the end of 2001. This diffusion may be explained above all by the fact that it was possible to piggyback Quick onto the ATM infrastructure (value loading) and the infrastructure of POS terminals (which often accept Quick payments as well). Some 6.4 million Quick electronic purses have been issued; this even exceeds the number of debit cards. The payments total expanded enormously, though from an initially low level, from ATS 78 million in 1997 to ATS 392 million in 2001.

Chart 6

Size of Average Quick Payments



Source: Europay Austria, OeNB calculations.
Note: Chart 6 shows the development of average payment amount for Quick payments both as a total and split into categories. "Share" denotes the share of the category in all Quick payment transactions in the fourth quarter of 2001.

The average amounts loaded and paid are also very informative (table 4). Whereas the average load enlarged from ATS 688 in 1997 to ATS 750 in 2001, the average size of a transaction sank from ATS 183 to ATS 77. This decline in transaction size is indicative of a shift in the shares of various Quick electronic purse transactions.[1]) In particular, the share of very small vending machine payments in total quick payments burgeoned from 0% in 1997 to roughly 60% in 2001. Chart 6 depicts the average amounts and shares. The chart demonstrates that the average amounts differ greatly depending on where the payment is made: Average transactions sizes were ATS 250 at debit card POS terminals, about ATS 150 at food terminals, just under ATS 50 at Quick-only terminals and around ATS 10 at vending machines.

Although the study does not focus directly on the impact of electronic money on monetary policy, the anticipated effects on monetary policy will nevertheless be outlined briefly below. The Quick system currently represents the most widespread e-money system in Austria; its hardware has a high market penetration rate. Nonetheless, the figures are evidence that Quick has only low economic significance, at least for the time being. As indicated above (see table 1), only 22% of all respondents stated that they owned a Quick electronic purse. 54% of these owners asserted that they never used the electronic purse function of their payment cards. Extrapolating the Quick sales figures for 2001, if nonusers would start using the Quick electronic purse in the same way as users, the amount of annual payments would surge to roughly ATS 850 million a year. However, if the percentage of users would expand to 66% of the population (tripling the current user ratio), annual payments would, under ceteris paribus assumptions, jump to ATS 2.55 billion. Admittedly, this extrapolation is an oversimplification, but it does demonstrate that a change in the user ratio of the Quick system would not suffice to have a major monetary policy impact. For such an impact to occur, the payment behavior of the entire population would have to change quite substantially.

3.5 Outlook for Austrian Payment Behavior

Any long-term predictions about Austrians' payment behavior are of course guesswork. However, respondents' statements about their intended use of payment cards may be analyzed to provide at least some indication of future payment behavior. To this end, current cardholders in the surveys were asked how they planned to use their various payment cards in the 12 months following the survey.

The gist of the answers in the fourth quarter of 2000 was that the respondents envisaged using their cards roughly equally (debit cards: 70%, credit cards: 70%, retailer loyalty cards: 72%). The Quick electronic purse was an exception in that only 36% of the holders meant to continue using it at the same rate whereas 33% stated that they expected to discontinue its use. Comparing the end-2000 results with those of the fourth quarter of

1 *The Quick card may be used to pay at POS terminals, food terminals, Quick-only terminals and Quick-enabled vending machines.*

2001, the percentages sank perceptibly for all categories of payment cards. At the same time, the percentage of people who wished to use their cards more frequently also increased sharply: from 17% to 36% for debit cards, from 19% to 30% for credit cards, from 11% to 21% for loyalty cards and from 14% to 38% for Quick cards. Thus a general shift from "just as often" to "more often" occurred. Moreover, the share of respondents who stated that they would not use the Quick electronic purse (any longer) declined from 33% to 21%. These data signal that there will be a marked increase in payment card use.

3.6 Which Features Determine Payment Card Use?

The surveys allow for both a descriptive and empirical analysis and a statistical review of the motives of payment method use as well as the principal differences between users. As in comparable studies (see e.g. Mantel, 2000), the aim is to find the factors prompting users to choose a specific payment method. The results of discriminant analyses made to determine these factors will be presented in this subsection. The results are rendered in detailed tables annexed to the study.

3.6.1 Payment Card Ownership

The analysis results indicate that *debit cardholders* typically tend to be relatively young, have a job, be highly educated and have a fairly high income (table A7). Moreover, debit cardholders also own credit cards. There are few differences between male and female cardholders. Though the number of male cardholders tends to be a bit larger, the difference is not statistically significant. Payment by preauthorized debit and credit transfers is positively correlated with the possession of debit cards.

For the central bank, it is interesting that people who own a debit card carry more cash than those who do not. However, the attributes cash holding and personal income do not contribute significantly to the discrimination between card owners and others.[1])

The contribution of the individual variables to the discrimination between groups is measured in terms of the decline in values of Wilks' lambda. While Wilks' lambda falls by 0.056 after inclusion of the variable "credit card ownership," it falls by 0.04 after inclusion of the Quick electronic purse and by only 0.005 – roughly a tenth – after the fifth step. A comparable examination of the Wilks' lambda values may be made for each of the stated payment card categories. Canonical coefficients may be used for a similar method to analyze the discriminant significance of the individual variables. The percentage weights of the standardized (canonical) discriminant coefficients clearly show that four factors are decisive in the decision to use or not to use a debit card: possession of a credit card, possession of a Quick electronic purse, use of credit transfers and age (these

1 *This means that once other explanatory variables are taken into account, cashholding is no longer a significant discriminatory factor. A statistical significance level of 5% was chosen for the use of variables in the stepwise discriminant function analysis.*

four factors account for some 64% of the discriminant influence of all independent variables).[1])

The results for *credit card ownership* are similar (table A8). Here, debit card possession, a high level of education, age, having a job, living in an urban environment but also the size of a person's disposable income[2]) contribute significantly to credit card possession. The debit card possession data do not reflect the same high significance of income. Only in the case of credit cards is there a significant gender difference between holders and nonholders: Men use credit cards more frequently than women.

The factors important for the *Quick electronic purse ownership* are debit and credit cardholding, a markedly lower age and, notably, Internet banking. The possession of a debit card, age and the use of Internet banking accounted for a hefty 68% of the discrimination between users and nonusers of Quick electronic purses (table A9).

From the perspective of payment systems policy, it is interesting to determine which target group uses *Internet banking* and which factors are decisive for the use of this payment medium. Quick electronic purse users tend to be young and highly educated – education alone accounted for 23% of the discrimination between the groups (table A10). Considering the widespread access to the Internet (27% of all respondents have Internet access at work, 36% at home), disposable income, where respondents live or whether they have a job do not contribute significantly to the decision to conduct their banking transactions via the Internet. Moreover, ownership of a debit card is not significant.

3.6.2 Intention to Acquire Payment Cards

The analysis of nonholders' intention to acquire payment cards was subjected to a multiple discriminant analysis (MDA), where the cases analyzed are classified into more than two groups. Basically, the same method is applied as for the discriminant function analysis (DFA or DA), except that more than one discriminant function is used. The MDA is used to calculate *eigenvalue ratios.* These ratios indicate the relative discriminating power of the discriminant functions; in other words, how much of the discriminant information in the independent variables each function covers. The eigenvalue ratios thus provide information about how significant the relative discriminant power of each discriminant function is for all groups. In a next step, standardized canonical coefficients may be calculated for each of the discriminant functions. The eigenvalue ratios calculated for the first discriminant function in each case come to between 79% and 91% in this study. Hence, only the standardized canonical coefficients of the first function are employed.

Above all young respondents with high incomes stated that they intended to obtain a *debit card.* Unsurprisingly, persons contemplating the

1 *Please note that the variable Quick electronic purse does not refer to actual possession, but the statements of respondents about whether they own a Quick electronic purse or not.*

2 *It must be pointed out that the option of having a credit card hinges, among other things, on the customer's creditworthiness, which is linked directly to the amount of disposable income.*

acquisition of a debit card have high cash holdings. Age alone contributes 68%, income 23% to the discrimination between the groups (table A11).

Age (with a canonic coefficient of 34%) and income, but also gender, play a significant role in the deliberations on *credit card* acquisition (table A12). Most respondents pondering the purchase of a credit card were men. In addition, interviewees planning on taking out a credit card tended to live in an urban environment (as measured in terms of the size of a municipality).

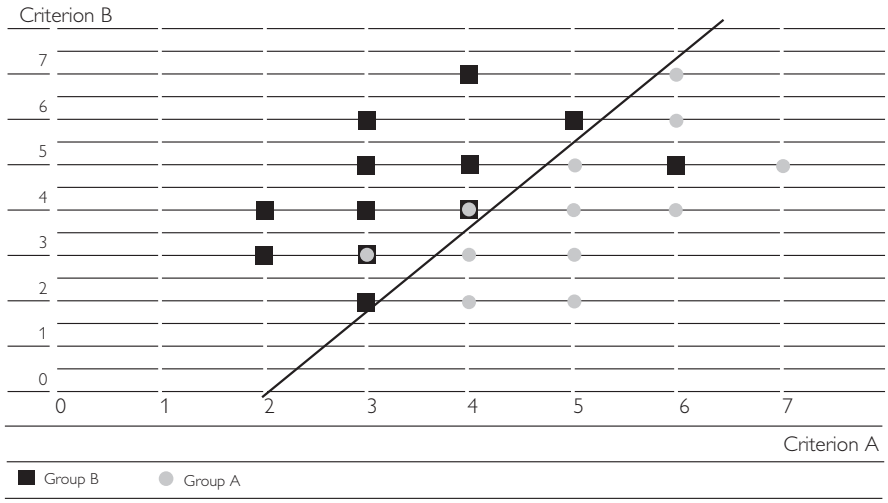
The results for the intention to acquire *Quick electronic purses* are similar (table A13). Having a job is an additional criterion in this case. It is apparent that nonholders with a job basically favor the purchase of a Quick card in the future.

To round out the discussion, a word on *Internet banking:* The intention to select this payment option in the future decreases in tandem with the respondents' age, as was expected. An additional difference stands out (table A14): While people with jobs can envisage using this payment method, apprentices largely reject this option. What is more, a larger number of better educated respondents plan to take advantage of Internet banking than less highly educated respondents.

Some Principles of Discriminant Analysis

In discriminant analysis the object is to determine the best linear combination of independent variables to reproduce, as far as possible, an a priori grouping of the cases, i.e. to maximize group differences. Unlike regression analysis, where the dependent variable has a metric scale, the dependent variable in the discriminant analysis is based on a nominal scale. In discriminant analysis the groups are determined beforehand. This distinguishes discriminant analysis from cluster analysis, where the groups (clusters) are not predetermined and the object is in fact to determine the best way in which cases may be clustered into groups. Discrimination involving just two groups is referred to as discriminant analysis (discriminant function analysis, DA); multiple discriminant analysis (MDA) is an extension used to classify more than two categories.

Starting with an easy example, the chart below shows a case with two variables.



The object of the discriminant analysis is to place a straight line or a discriminant function (in the case of the multiple discriminant analysis, a set of discriminant functions) through the observations in such way that frequency distributions show the lowest possible overlap when projected onto this straight line and that they exhibit the highest possible density. Several criteria are used to assess the discriminatory power of the function. This study uses Wilks' lambda Lambda Λ[1]) as the significance test for the discriminant function. The smaller Wilks' lambda, the more important the interval or dummy independent variables to the discriminant function and the lower the share of total deviation of independent variables that is explained by deviations of the elements within the individual groups. Hence, the smaller Λ, the more homogeneous the individual groups and thus the greater the difference between the groups. The Wilks' lambda value ranged between 0.7 and 0.9 in this study. While this allows the conclusion that the groups are not very homogeneous, it must be emphasized that a very large number (13) of variables was used in the analysis. This certainly impairs the homogeneity of the groups.

In the stepwise method[2]) chosen, the first variable selected is the one that will contribute most to the discrimination between groups. Of the remaining variables, the second independent variable chosen is the one which − among the already selected variables − improves the group discrimination most, and so on,[3]) with already included variables rejected if later choices reduce the discriminatory power of earlier variables. This process is continued until either all variables are included or selection of an additional independent variable does not increase the discriminatory power by a significant amount. This procedure successively lowers the value of Wilks' lambda, rendering increasingly homogeneous groups.

The sign and the absolute amount of the discriminant coefficients determine the influence or discriminatory importance of the independent variables for the discriminant function analysis. A standardization (multiplication by the standard deviation of the respective variables) is performed to prevent measuring units and the variance of the variables from distorting the size of the variables. The classification matrix provides information about the number of accurately categorized features. Leaving sample errors out of account, a comparison of the share of correct categorization with a random categorization allows conclusions about the significance of the classification (of the discriminant function calculated) to be made. In the analyses of cardholding between 70% and 75% of the cases were correctly classified in the first instance, indicating that the categorization was very much on the mark. Only complete information or data sets are used to calculate the discriminant function, while the classification also includes data sets missing individual responses (such as data about disposable income).[4])

---

1 $\Lambda = \frac{Matrix\ of\ unexplained\ dispersion\ of\ independent\ variables}{Matrix\ of\ total\ dispersion\ of\ independent\ variables}$

2 *As an alternative, the simultaneous method, in which all variables are included in the analysis at once, could be chosen. The stepwise discriminant analysis was selected among other things to clearly distinguish the contribution of each variable individually.*

3 *As explained, the object is to maximize group differences.*

4 *However, the varying total means of the data sets on the intended acquisition of payment cards may be explained by the different sizes of the total group of cardholders in each category.*

4 Summary and Conclusions

This study provides an up-to-date overview of how payments between Austrian nonbanks are effected. The analysis of various original data sources – surveys commissioned by the Oesterreichische Nationalbank (OeNB) – provides numerous valuable insights.

Cash remains the most important means of payment by a wide margin: In 2000, 93% of all transactions involved the exchange of banknotes and coins. Cash accounts for 81% of all payments in terms of volume. Compared with the data gathered in 1996 (Mooslechner and Wehinger, 1997), cash lost some ground. The slight deterioration in the share of cash payments may be pinpointed primarily to the expansion of debit card payments, which posted considerably gains both as a percentage of overall transactions and of payment volumes.

Confirming expectations, it was shown that cash payments were in fact substituted to a certain extent by noncash payments (debit card payments). Interestingly enough, significant shifts also occurred among cashless payment methods; debit card payments also replaced credit card and check payments.

The analysis of the popularity and the use of payment cards indicates that POS payments continued to augment sharply at a high level. The Quick electronic purse system registered even higher rates of growth recently, with the total payment figures in this category, however, still remaining insignificant in terms of their impact on the economy. Although Quick electronic purses have become quite widespread, astonishingly enough only 22% of the respondents stated that they owned a Quick-enabled payment card.

The survey results documenting interviewees' intentions regarding the use of payment cards in the future signals that the upcoming months will see a marked increase in payment card use. This applies to more or less all types of payment card, above all debit and Quick cards. Moreover, more of the current nonusers of the Quick application expressed their intention to use the Quick-enabled card in the future.

Apart from a descriptive and empirical analysis, discriminant analyses were performed to establish the main features differentiating users and nonusers. The purpose was to establish which features were key to the decision to select a particular payment method. Factors such as age, education, disposable income and cashholding were chosen as the discriminant variables for the two groups.

In addition, the analyses aimed at portraying the motivation behind the choice of a particular payment method in the future. Analyses of this type may be used to help recognize future trends. The results show that age, education and disposable income are the factors which are significantly correlated with the future acquisition of a payment card or with the use of Internet banking.

Despite the surge in debit card transactions and high Quick electronic purse use growth rates, the results nevertheless document that Austrians still prefer cash payments by a wide margin. As payment habits seem to change only very slowly (perhaps network externalities also play a role in

this development), the results allow the conclusion that in the medium term new, innovative forms of payment will not crowd out cash to any significant extent, that is, to an extent of relevance for monetary policymaking.

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Annex

Table A1

Payment Behavior by Payment Size in 2000

	Cash	Check	Debit card	Credit card	Retailer loyalty card	Quick electronic purse	Total result
	in % of total payments						
up to ATS 49	99.1	0.0	0.2	0.0	0.7	0.0	100.0
ATS 50 to ATS 99	99.0	0.0	0.7	0.0	0.1	0.1	100.0
ATS 100 to ATS 249	95.7	0.2	3.3	0.3	0.4	0.1	100.0
ATS 250 to ATS 499	88.9	0.3	8.4	1.6	0.7	0.1	100.0
ATS 500 to ATS 999	79.7	1.3	13.6	4.2	1.2	0.0	100.0
ATS 1,000 to ATS 4,999	72.3	4.8	18.6	3.4	0.9	0.1	100.0
ATS 5,000 to ATS 9,999	76.2	8.5	7.4	7.9	0.0	0.0	100.0
ATS 10,000 and over	71.8	11.2	12.7	0.0	4.2	0.0	100.0

Source: OeNB (payment behavior survey), IFES.
Note: Table A1 shows the share of the different types of payment in total transactions classified by payment amounts.

Table A2

Payment Behavior by Payment Size in 2000

	Cash	Check	Debit card	Credit card	Retailer loyalty card	Quick electronic purse	Total result
	in % of the payment total						
up to ATS 49	99.1	0.0	0.2	0.0	0.7	0.0	100.0
ATS 50 to ATS 99	98.9	0.1	0.8	0.0	0.1	0.1	100.0
ATS 100 to ATS 249	95.3	0.2	3.6	0.4	0.4	0.1	100.0
ATS 250 to ATS 499	88.3	0.3	8.7	1.7	0.8	0.1	100.0
ATS 500 to ATS 999	79.3	1.2	14.0	4.3	1.1	0.0	100.0
ATS 1,000 to ATS 4,999	70.5	5.6	18.7	3.6	1.5	0.1	100.0
ATS 5,000 to ATS 9,999	76.0	9.1	7.7	7.1	0.0	0.0	100.0
ATS 10,000 and over	61.4	9.9	11.7	0.0	17.0	0.0	100.0

Source: OeNB (payment behavior survey), IFES.
Note: Unlike Table A1, Table A2 shows the share of payment amounts.

Table A3

Payment Behavior by Sectors in 2000

Sector	Cash	Check	Debit card	Credit card	Retailer loyalty card	Quick electronic purse	Total result
	in % of total payments						
Restaurants – cafés	98.8	0.2	0.2	0.4	0.4	0.0	100.0
Food stores	93.8	0.1	5.8	0.0	0.2	0.1	100.0
Department stores	85.0	2.1	12.1	0.3	0.4	0.2	100.0
Hardware – appliances	83.5	1.8	10.6	3.8	0.0	0.3	100.0
Newspaper and tobacco shops	98.9	0.0	0.7	0.1	0.2	0.0	100.0
Clothing – fabric stores	77.2	1.4	14.2	6.8	0.3	0.0	100.0
Shoes – leather goods	83.0	2.4	10.8	3.8	0.0	0.0	100.0
Pharmacies – drugstores – cosmetics stores	95.1	0.1	3.5	0.2	1.0	0.0	100.0
Furniture stores	80.4	0.0	12.4	7.2	0.0	0.0	100.0
Car dealers	87.7	0.0	9.0	1.1	2.2	0.0	100.0
Gas stations – fuel shops	73.4	0.7	15.4	7.2	2.9	0.5	100.0
Transport – communications	94.0	0.8	3.4	0.2	1.7	0.0	100.0
Electrical equipment	82.1	1.7	15.1	1.1	0.0	0.0	100.0
Opticians – photo shops	88.3	2.8	4.2	0.0	4.6	0.0	100.0
Watches – jewelry	97.1	2.9	0.0	0.0	0.0	0.0	100.0
Paper – office supplies – bookstores	92.3	0.6	5.6	1.0	0.4	0.0	100.0
Toys – sporting goods	77.9	0.4	14.3	6.1	1.4	0.0	100.0
Florists	99.0	0.6	0.5	0.0	0.0	0.0	100.0
Entertainment – sports – leisure activities	96.0	0.7	2.1	0.5	0.4	0.2	100.0
Vacations – travel agencies[1])	80.1	8.8	4.4	6.7	0.0	0.0	100.0
Other[2])	95.7	1.5	1.1	0.6	0.9	0.2	100.0

Source: OeNB (payment behavior survey), IFES.

[1]) Corresponds to the category "other" in the 1996 survey.

[2]) Corresponds to the category "not available" in the 1996 survey.

Note: Table A3 shows the disaggregated shares of the different types of payment in percent of total transactions.

Table A4

Payment Behavior by Sectors in 2000

Sector	Cash	Check	Debit card	Credit card	Retailer loyalty card	Quick electronic purse	Total result
	in % of total payment amounts						
Restaurants – cafés	97.2	1.2	0.4	0.9	0.2	0.0	100.0
Food stores	89.2	0.2	10.2	0.1	0.2	0.1	100.0
Department stores	71.8	5.2	22.1	0.4	0.3	0.1	100.0
Hardware – appliances	73.9	3.6	16.1	5.0	0.0	1.4	100.0
Newspaper and tobacco shops	96.7	0.0	2.9	0.4	0.0	0.0	100.0
Clothing – fabric stores	63.6	3.5	23.8	9.0	0.1	0.0	100.0
Shoes – leather goods	71.8	7.2	14.5	6.5	0.0	0.0	100.0
Pharmacies – drugstores – cosmetics stores	92.4	0.3	6.3	0.4	0.6	0.0	100.0
Furniture stores	79.4	0.0	12.8	7.8	0.0	0.0	100.0
Car dealers	75.4	0.0	14.5	5.8	4.3	0.0	100.0
Gas stations – fuel shops	68.5	3.3	16.5	8.5	2.9	0.3	100.0
Transport – communications	83.4	5.0	11.1	0.3	0.2	0.0	100.0
Electrical equipment	79.3	6.1	13.9	0.7	0.0	0.0	100.0
Opticians – photo shops	84.9	5.3	6.0	0.0	3.9	0.0	100.0
Watches – jewelry	86.4	13.6	0.0	0.0	0.0	0.0	100.0
Paper – office supplies – bookstores	84.2	0.7	12.0	2.6	0.5	0.0	100.0
Toys – sporting goods	57.9	0.5	25.8	9.7	6.1	0.0	100.0
Florists	98.0	1.2	0.8	0.0	0.0	0.0	100.0
Entertainment – sports – leisure activities	86.5	3.5	9.0	0.6	0.2	0.1	100.0
Vacations – travel agencies[1])	72.9	12.8	10.8	3.6	0.0	0.0	100.0
Other[2])	74.7	6.4	1.9	0.4	16.6	0.0	100.0

Source: OeNB (payment behavior survey), IFES.
[1]) Corresponds to the category "other" in the 1996 survey.
[2]) Corresponds to the category "not available" in the 1996 survey.
Note: Unlike table A3, table A4 classifies payments by percent of the payment size. The sectors Vacations-travel agencies and Other were classified differently in the 1996 survey.

Table A5

Payment Behavior in the Course of the Week

	Cash	Check	Debit card	Credit card	Retailer loyalty card	Quick electronic purse	Total result
	in % of total payments						
Monday	92.7	0.5	5.2	0.9	0.5	0.0	100.0
Tuesday	92.8	0.6	5.0	0.5	0.9	0.1	100.0
Wednesday	93.4	0.5	4.7	0.8	0.4	0.1	100.0
Thursday	92.6	0.6	4.6	1.5	0.7	0.0	100.0
Friday	91.7	0.5	6.3	1.0	0.5	0.1	100.0
Saturday	92.4	0.5	5.4	1.1	0.5	0.0	100.0
Sunday	96.5	0.2	1.8	1.0	0.3	0.1	100.0

Source: OeNB (payment behavior survey), IFES.
Note: Table A5 shows the share of the different types of payment in percent of total payments in the course of the survey week.

Table A6

Payment Behavior in the Course of the Week

	Cash	Check	Debit card	Credit card	Retailer loyalty card	Quick electronic purse	Total result
	in % of the payment total						
Monday	80.5	3.9	12.6	2.0	0.8	0.0	100.0
Tuesday	74.1	4.1	10.7	2.1	8.9	0.1	100.0
Wednesday	84.7	3.4	9.4	2.0	0.3	0.1	100.0
Thursday	80.4	2.2	12.3	4.3	0.7	0.0	100.0
Friday	82.3	2.0	12.3	2.5	0.9	0.0	100.0
Saturday	80.9	2.2	12.3	3.3	1.3	0.0	100.0
Sunday	94.2	1.5	2.3	1.7	0.2	0.2	100.0

Source: OeNB (payment behavior survey), IFES.
Note: Unlike table A5, table A6 shows the different types of payment in percent of the payment total.

Discriminant Analysis:

The following specifications apply to the variables (wherever they are not self-explanatory):

"Owns a debit (ATM) card," "Owns a credit card," "Owns a Quick electronic purse," "Uses credit transfers," "Uses preauthorized debit transfers," "Uses Internet banking," "Uses payment forms":
1 = yes, 2 = no
By analogy: "Future Use of the Respective Payment Method":
1 = definitely, 2 = probably, 3 = probably not, 4 = definitely not, 5 = not available

"Amount of cash carried"
1 = up to ATS 100, 2 = up to ATS 200, 3 = up to ATS 300, 4 = up to ATS 400, 5 = up to ATS 500, 6 = up to ATS 1,000, 7 = up to ATS 1,500, 8 = up to ATS 2,000, 9 = up to ATS 3,000, 10 = over ATS 3,000, 11 = not available.

"Has a job"
1 = full-time job, 2 = part-time job, 3 = contributing family worker, 4 = apprentice, 5 = unemployed, 6 = own pension, 7 = income without a job, 8 = widow without income of her own, 9 = housemaker, 0 = student or trainee

"Gender"
1 = male, 2 = female

"Size of municipality"
2 = up to 2,000 residents, 3 = up to 3,000 residents, 4 = up to 5,000 residents, 5 = up to 10,000 residents, 6 = up to 20,000 residents, 7 = up to 50,000 residents, 8 = up to 1 million residents, 9 = over 1 million residents

"Education"
1 = mandatory schooling, 2 = apprenticeship, 3 = technical or vocational schooling, 4 = high school (not completed), 5 = high school (completed), 6 = university (completed)

To provide better insight into the results of the discriminant analysis, *Table A7* is explained below:

Mean:

Credit card ownership (1 = yes, and 2 = no): This means that the average owner of a debit card tends to own a credit card as well (value 1.57), while those who do not own a debit card also respond to credit card ownership by "no" (mean: 1.95).

Having a job (the lower the value, the higher the degree of jobholding, 1= full time job to 9 = homemaker and 0 = student or trainee): Owners of debit (ATM) cards tend to have a job more (2.62) than those who do not (4.43).

Amount of cash carried (value rises in line with the amount of cash carried): Debit card owners carry more cash (5.39) than nonusers (4.84).

Discriminant Analysis:

To discriminate between the groups of users and nonusers, the analysis uses only those variables which contribute significantly to the discrimination between the groups. The variable with the highest discriminatory power is ranked first. In this case, credit card ownership contributes most to the discrimination between debit card users and nonusers. The factor with the second most discriminatory power is Quick electronic purse ownership.

Table A7

Discriminant Analysis: Debit Card Ownership

		"Yes" mean	"No" mean	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients
first step	Owns a credit card	1.57	1.95	1.70	0.844	0.000	0.535	24.5
second step	Owns a Quick electronic purse	1.68	1.98	1.78	0.788	0.000	0.391	17.9
third step	Has a job	2.62	4.43	3.23	0.748	0.000	0.217	9.9
fourth step	Uses credit transfers	1.16	1.31	1.21	0.727	0.000	0.248	11.4
fifth step	Education	3.07	2.10	2.75	0.720	0.000	−0.210	9.6
sixth step	Age (years)	41.53	50.84	44.67	0.715	0.000	0.219	10.0
seventh step	Uses preauthorized debit transfers	1.33	1.56	1.41	0.709	0.000	0.203	9.3
eighth step	Size of municipality	5.56	5.53	5.57	0.704	0.000	0.158	7.2
not included in the analysis	Disposable income (ATS 1,000)	11.65	11.19	11.50	0.704	0.974	×	×
not included in the analysis	Gender	1.49	1.62	1.53	0.704	0.212	×	×
not included in the analysis	Amount of cash carried	5.39	4.84	5.21	0.703	0.052	×	×
not included in the analysis	Uses payment forms	1.23	1.23	1.23	0.704	0.352	×	×
not included in the analysis	Uses Internet banking	1.82	1.96	1.86	0.704	0.439	×	×

Source: OeNB calculations (payment behavior survey), IFES.
[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.
Note: Table A7 shows which factors contribute significantly to the discrimination between owners and nonowners of a debit card. The stepwise procedure shows patently that a growing number of steps reduces the additional discriminatory power of these variables.

Table A8

Discriminant Analysis: Debit Card Ownership

		"Yes" mean	"No" mean	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients
first step	Owns a debit card	1.05	1.46	1.34	0.844	0.000	0.511	18.9
second step	Education	3.60	2.38	2.75	0.778	0.000	−0.360	13.3
third step	Amount of cash carried	5.85	4.93	5.21	0.760	0.000	−0.239	8.8
fourth step	Uses Internet banking	1.74	1.92	1.86	0.747	0.000	0.232	8.6
fifth step	Size of municipality	6.21	5.30	5.57	0.736	0.000	−0.201	7.4
sixth step	Owns a Quick electronic purse	1.62	1.85	1.78	0.730	0.000	0.188	6.9
seventh step	Gender	1.43	1.58	1.53	0.726	0.000	0.110	4.1
eighth step	Age (years)	43.18	45.32	44.67	0.721	0.000	−0.314	11.6
ninth step	Has a job	2.34	3.61	3.23	0.715	0.000	0.263	9.7
tenth step	Disposable income (ATS 1,000)	12.67	10.99	11.50	0.709	0.000	−0.185	6.8
eleventh step	Uses preauthorized debit transfers	1.24	1.48	1.41	0.707	0.000	0.106	3.9
not included in the analysis	Uses payment forms	1.25	1.22	1.23	0.706	0.466	×	×
not included in the analysis	Uses credit transfers	1.16	1.22	1.21	0.706	0.132	×	×

Source: OeNB calculations (payment behavior survey), IFES.

[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.

Note: Table A8 clearly shows that ownership of a debit card, education and age (the factors with the highest percentage contributions) contribute most to the discrimination between groups.

Table A9

Discriminant Analysis: Quick Electronic Purse Ownership

		"Yes" mean	"No" mean	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients
first step	Owns a debit card	1.02	1.42	1.34	0.878	0.000	0.523	29.6
second step	Uses Internet banking	1.71	1.91	1.86	0.847	0.000	0.300	17.0
third step	Age (years)	36.26	47.01	44.67	0.830	0.000	0.378	21.4
fourth step	Owns a credit card	1.48	1.76	1.70	0.818	0.000	0.231	13.1
fifth step	Uses preauthorized debit transfers	1.25	1.45	1.41	0.811	0.000	0.206	11.7
sixth step	Education	3.4	2.56	2.75	0.809	0.558	−0.127	7.2
not included in the analysis	Gender	1.44	1.56	1.53	0.808	0.185	×	×
not included in the analysis	Disposable income (ATS 1,000)	11.88	11.39	11.50	0.809	0.537	×	×
not included in the analysis	Amount of cash carried	5.33	5.17	5.21	0.809	0.317	×	×
not included in the analysis	Has a job	2.00	3.57	3.23	0.809	0.988	×	×
not included in the analysis	Size of municipality	5.61	5.56	5.57	0.808	0.072	×	×
not included in the analysis	Uses payment forms	1.24	1.23	1.23	0.809	0.788	×	×
not included in the analysis	Uses credit transfers	1.16	1.22	1.21	0.809	0.873	×	×

Source: OeNB calculations (payment behavior survey), IFES.

[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.

Note: This discriminant analysis (two groups) again shows that debit (ATM) card ownership, Internet banking and age are the determinants of the discrimination between people who own Quick electronic purses and people who do not. In addition the mean values reveal the profile of the "average" owner of a Quick electronic purse-enabled card.

Table A10

Discriminant Analysis: Internet Banking

		"Yes" mean	"No" mean	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients
first step	Education	3.82	2.57	2.75	0.924	0.000	−0.468	22.7
second step	Owns a Quick electronic purse	1.53	1.82	1.78	0.890	0.000	0.357	17.3
third step	Owns a credit card	1.42	1.74	1.70	0.876	0.000	0.344	16.7
fourth step	Age (years)	35.55	46.12	44.67	0.861	0.000	0.344	16.7
fifth step	Uses payment forms	1.33	1.21	1.23	0.853	0.000	−0.223	10.8
sixth step	Uses preauthorized debit transfers	1.26	1.43	1.41	0.851	0.000	0.173	8.4
seventh step	Uses credit transfers	1.23	1.20	1.21	0.849	0.000	−0.156	7.6
not included in the analysis	Size of municipality	5.88	5.52	5.57	0.848	0.178	×	×
not included in the analysis	Has a job	1.79	3.46	3.23	0.848	0.513	×	×
not included in the analysis	Gender	1.48	1.54	1.53	0.849	0.591	×	×
not included in the analysis	Disposable income (ATS 1,000)	12.36	11.36	11.50	0.849	0.724	×	×
not included in the analysis	Amount of cash carried	5.31	5.19	5.21	0.848	0.474	×	×
not included in the analysis	Owns a debit card	1.10	1.37	1.34	0.848	0.389	×	×

Source: OeNB calculations (payment behavior survey), IFES.
[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.
Note: Table A10 is headed by (higher) education, which, along with Internet banking, contributes substantially to the discrimination between the groups "Yes" and "No."

Tabelle A11

Discriminant Analysis: Future Debit Card Ownership

		"Definitely" mean	"Probably" mean	"Probably not" mean	"Definitely not" mean	Not available	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients[2])
first step	Age (years)	31.09	35.94	50.75	58.83	62.38	50.84	0.744	0.000	0.898	68.4
second step	Disposable income (ATS 1,000)	15.57	13.30	11.96	9.33	12.78	11.19	0.751	0.000	−0.304	23.2
third step	Amount of cash carried	4.17	4.40	5.26	4.90	5.50	4.84	0.740	0.000	0.081	6.2
fourth step	Uses payment forms	1.39	1.20	1.19	1.22	1.36	1.23	0.729	0.000	−0.030	2.3
not included in the analysis	Gender	1.57	1.54	1.57	1.67	1.48	1.62	0.722	0.130	×	×
not included in the analysis	Has a job	2.52	2.72	4.55	5.24	4.90	4.43	0.722	0.166	×	×
not included in the analysis	Owns a credit card	1.96	1.97	1.93	1.96	1.90	1.95	0.726	0.529	×	×
not included in the analysis	Owns a Quick electronic purse	1.98	1.97	1.99	1.99	2.00	1.98	0.729	0.964	×	×
not included in the analysis	Uses preauthorized debit transfers	1.61	1.57	1.52	1.57	1.55	1.56	0.729	0.984	×	×
not included in the analysis	Size of municipality	6.50	5.58	5.24	5.48	5.55	5.53	0.722	0.155	×	×
not included in the analysis	Education	2.51	2.26	2.16	1.96	1.81	2.10	0.724	0.345	×	×
not included in the analysis	Uses Internet banking	1.91	1.97	1.96	1.97	1.85	1.96	0.721	0.107	×	×
not included in the analysis	Uses credit transfers	1.33	1.38	1.31	1.27	1.36	1.31	0.725	0.383	×	×

Source: OeNB calculations (payment behavior survey), IFES.
[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.
[2]) Refer to the first (of four) discriminant function(s). The eigenvalue share of the first discriminant function is 90.4%.
Note: The following four tables render a multiple discriminant analysis including several groups. Age and disposable income, but also cash carried contribute significantly to the discrimination between groups.

Table A12

Discriminant Analysis: Future Credit Card Ownership

		"Definitely" mean	"Probably" mean	"Probably not" mean	"Definitely not" mean	Not available	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients[2])
first step	Age (years)	26.95	32.85	41.71	50.04	48.79	45.32	0.895	0.000	0.696	34.3
second step	Size of municipality	6.37	6.07	4.88	5.28	5.98	5.30	0.872	0.000	−0.214	10.5
third step	Gender	1.32	1.43	1.53	1.63	1.70	1.58	0.853	0.000	0.397	19.6
fourth step	Education	2.77	2.75	2.51	2.20	3.05	2.38	0.841	0.000	−0.174	8.6
fifth step	Disposable income (ATS 1,000)	12.81	12.86	11.99	10.13	10.48	10.99	0.829	0.000	−0.290	14.3
sixth step	Owns a Quick electronic purse	1.68	1.72	1.86	1.89	1.73	1.85	0.820	0.000	0.141	6.9
seventh step	Owns a debit card	1.40	1.27	1.40	1.53	1.34	1.46	0.813	0.000	0.118	5.8
not included in the analysis	Amount of cash carried	4.81	4.96	5.02	4.87	5.51	4.93	0.810	0.191	×	×
not included in the analysis	Has a job	1.73	1.82	3.25	4.19	3.47	3.61	0.809	0.148	×	×
not included in the analysis	Uses preauthorized debit transfers	1.43	1.43	1.52	1.47	1.36	1.48	0.811	0.517	×	×
not included in the analysis	Usespayment forms	1.36	1.20	1.20	1.22	1.32	1.22	0.809	0.100	×	×
not included in the analysis	Uses Internet banking	1.86	1.87	1.90	1.94	1.87	1.92	0.813	0.945	×	×
not included in the analysis	Uses credit transfers	1.34	1.27	1.24	1.21	1.17	1.22	0.810	0.250	×	×

Source: OeNB calculations (payment behavior survey), IFES.
[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.
[2]) Refer to the first (of four) discriminant function(s). The eigenvalue share of the first discriminant function is 80.3%.
Note: Age, the size of the municipality (as an indicator of the place of residence) and, interestingly, gender are of key importance for the discrimination of groups.

Table A13

Discriminant Analysis: Future Quick Electronic Purse Ownership

		"Definitely" mean	"Probably" mean	"Probably not" mean	"Definitely not" mean	Not available	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients[2])
first step	Age (years)	34.24	37.88	42.55	50.66	54.22	47.01	0.931	0.000	0.542	29.6
second step	Disposable income (ATS 1,000)	14.49	13.99	12.51	10.33	13.49	11.39	0.910	0.000	−0.487	26.6
third step	Owns a credit card	1.79	1.61	1.72	1.80	1.74	1.76	0.897	0.000	0.276	15.1
fourth step	Size of municipality	6.42	5.96	5.18	5.63	5.94	5.56	0.885	0.000	0.136	7.4
fifth step	Education	2.56	2.71	2.82	2.42	2.68	2.56	0.877	0.000	−0.075	4.1
sixth step	Has a job	2.71	2.35	2.92	4.07	3.87	3.57	0.870	0.000	0.317	17.3
not included in the analysis	Owns a debit card	1.51	1.36	1.33	1.48	1.35	1.42	0.865	0.076	×	×
not included in the analysis	Amount of cash carried	4.64	4.95	5.30	5.15	5.89	5.17	0.867	0.291	×	×
not included in the analysis	Uses Internet banking	1.93	1.86	1.90	1.91	1.94	1.91	0.868	0.537	×	×
not included in the analysis	Gender	1.54	1.45	1.50	1.59	1.68	1.56	0.865	0.070	×	×
not included in the analysis	Uses payment forms	1.31	1.29	1.18	1.23	1.24	1.23	0.865	0.089	×	×
not included in the analysis	Uses preauthorized debit transfers	1.50	1.42	1.49	1.44	1.30	1.45	0.867	0.345	×	×
not included in the analysis	Uses credit transfers	1.37	1.19	1.22	1.21	1.30	1.22	0.866	0.203	×	×

Source: OeNB calculations (payment behavior survey), IFES.
[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.
[2]) Refer to the first (of four) discriminant function(s). The eigenvalue share of the first discriminant function is 78.7%.
Note: Age is also the most important factor in the decision to purchase a Quick electronic purse, followed by disposable income and credit card ownership.

Table A14

Discriminant Analysis: Future Internet Banking

		"Definitely" mean	"Probably" mean	"Probably not" mean	"Definitely not" mean	Not available	Total mean	Wilks' lambda	Significance of the F-statistic[1])	Standardized canonical coefficients	Percentage weights of the coefficients[2])
first step	Age (years)	30.23	34.05	40.22	52.18	51.72	46.12	0.842	0.000	0.608	32.4
second step	Education	3.48	3.14	2.76	2.32	2.22	2.57	0.807	0.000	−0.305	16.2
third step	Owns a credit card	1.60	1.57	1.71	1.80	1.82	1.74	0.790	0.000	0.240	12.8
fourth step	Size of municipality	6.04	5.61	4.98	5.65	6.28	5.52	0.774	0.000	0.200	10.6
fifth step	Has a job	1.63	1.71	2.58	4.31	4.46	3.46	0.766	0.000	0.273	14.5
sixth step	Disposable income (ATS 1,000)	10.33	12.65	12.19	10.72	12.86	11.36	0.759	0.000	−0.113	6.0
seventh step	Owns a debit card	1.22	1.20	1.27	1.47	1.40	1.37	0.754	0.000	0.140	7.5
not included in the analysis	Owns a Quick electronic purse	1.65	1.70	1.81	1.86	1.90	1.82	0.750	0.083	×	×
not included in the analysis	Uses payment forms	1.17	1.18	1.20	1.22	1.31	1.21	0.752	0.308	×	×
not included in the analysis	Amount of cash carried	5.44	5.28	5.24	5.13	5.33	5.19	0.752	0.547	×	×
not included in the analysis	Gender	1.46	1.49	1.49	1.58	1.55	1.54	0.753	0.820	×	×
not included in the analysis	Uses preauthorized debit transfers	1.38	1.37	1.46	1.44	1.38	1.43	0.753	0.674	×	×
not included in the analysis	Uses credit transfers	1.14	1.20	1.22	1.20	1.23	1.20	0.753	0.690	×	×

Source: OeNB calculations (payment behavior survey), IFES.

[1]) A significance level of 5% was chosen for the inclusion of variables in the analysis.

[2]) Refer to the first (of four) discriminant function(s). The eigenvalue share of the first discriminant function is 91.2%.

Note: Age, education and credit card ownership are the variables which contribute most to the discrimination between groups.

Abbreviations

AMS	Arbeitsmarktservice Österreich (Austrian Public Employment Office)
ARTIS	Austrian Real Time Interbank Settlement
BWA	Bundes-Wertpapieraufsicht (Federal Securities Supervisory Authority)
BWG	Bankwesengesetz (amendments to the Banking Act)
CAD	Capital Adequacy Directive
CEECs	Central and Eastern European Countries
COICOP	Classification of Individual Consumption by Purpose
CPI	Consumer Price Index
EC	European Community
ECB	European Central Bank
EEA	European Economic Area
EEC	European Economic Community
EGVG	Einführungsgesetz der Verwaltungsverfahrensgesetze (Introductory Act to the Administrative Procedure Acts)
EMU	Economic and Monetary Union
EQOS	Electronic Quote and Order Driven System
ERM	Exchange Rate Mechanism
ERP	European Recovery Program
ESCB	European System of Central Banks
ESNA	European System of National Accounts
EU	European Union
Eurostat	Statistical Office of the European Communities
GDP	Gross Domestic Product
HICP	Harmonized Index of Consumer Prices
IHS	Institut für Höhere Studien (Institute for Advanced Studies)
IIP	International Investment Position
IMF	International Monetary Fund
NACE	Nomenclature générale des Activités économiques dans les Communautés Européennes (Statistical Classification of Economic Activities)
ÖCPA	Austrian Version of the Classification of Products by Activities
OECD	Organisation for Economic Co-operation and Development
OeKB	Oesterreichische Kontrollbank
OeNB	Oesterreichische Nationalbank
ÖNACE	Austrian Version of the Statistical Classification of Economic Activities
RTGS	Real Time Gross Settlement System
SDR	Special Drawing Right
SNA	System of National Accounts
TARGET	Trans-European Automated Real-time Gross settlement Express Transfer
TEU	Treaty on European Union
WIFO	Österreichisches Institut für Wirtschaftsforschung (Austrian Institute of Economic Research)
WWU	Wirtschafts- und Währungsunion

Legend

– = The numerical value is zero
. . = Data not available at the reporting date
× = For technical reasons no data can be indicated
0 = A quantity which is smaller than half of the unit indicated
∅ = Mean value
_ = New series

Note: Apparent arithmetical discrepancies in the tables are due to rounding.

Official Announcements of the Oesterreichische Nationalbank

Official Announcements Regarding the Foreign Exchange Law

		Authentic German text published in the Official Gazette (Amtsblatt zur Wiener Zeitung)	Translation published in "Reports and Summaries" and "Focus on Austria" issue no
DL 1/91	Promulgation of the new Official Announcements regarding the Foreign Exchange Law; general provisions 1. Issuance of new Official Announcements 2. Definitions 3. Fees	Sept. 24, 1991	4/1991
DL 2/91	Granting of general licenses 1. General license 2. Waiver of obligation to declare; release 3. Nonbanks 4. Banks not engaged in foreign business 5. Foreign exchange dealers 6. Exchange bureaus 7. Special banks and financial institutions 8. Provisions applying to both banks and financial institutions	Sept. 24, 1991	4/1991
DL 3/91	Reporting requirements 1. General provisions 2. Exemptions from the reporting obligation 3. General reports 4. Reports by banks 5. Reports by nonbanks and financial institutions 6. Special reports	Sept. 24, 1991	4/1991
DL 4/91	Assets of nonresidents with residence (domicile) in Iraq	Oct. 29, 1991	4/1991
DL 2/93	Modification of the Official Announcement DL 3/91	May 5, 1993	2/1993
DL 1/95	Repeal of the Official Announcement DL 1/93; SC Resolution 1022 (1995) Concerning the suspension of the sanctions of the United Nations against the Federal Republic of Yugoslavia	Dec. 21, 1995	4/1995
DL 1/96	Modification of Official Announcement DL 3/91	Sept. 3, 1996	3/1996
DL 1/99	Modification of Official Announcements DL 2/91 and DL 3/91 to the Foreign Exchange Act	Dec. 21, 1998	4/1998
DL 2/99	Abrogation of Official Announcement DL 3/93 Sanctions of the United Nations against Libya	April 30, 1999	1/1999
DL 3/99	Modification of Official Announcement DL 3/91 with respect to the Foreign Exchange Act	Dec. 16, 1999	3/1999
DL 1/01	Modification of Official Announcement DL 3/91 with respect to the Foreign Exchange Act	June 19, 2001	2/2001
DL 1/02	Modification of Official Announcements DL 1/91 and DL 3/91 with respect to the Foreign Exchange Act	Feb. 25, 2002	1/2002

Please see the German-language publication "Berichte und Studien" for a list of all Official Announcements in German.

Council Regulations of the European Communities

		Published in the Official Journal of the European Communities
Minimum Reserve Regulations		
No 2531/98	Council Regulation (EC) concerning the application of minimum reserves by the European Central Bank	Nov. 23, 1998
No 2532/98	Council Regulation (EC) concerning the powers of the European Central Bank to impose sanctions	Nov. 23, 1998
No 2818/98	Regulation (EC) of the European Central Bank on the application of minimum reserves	Dec. 1, 1998

List of Reports, Summaries and Studies[1])

	Published in "Focus on Austria"
Oesterreichische Nationalbank and Selected Monetary Aggregates	
Official Announcements Regarding the Foreign Exchange Law and Minimum Reserve Requirements – see preceding page	
Calendar of Monetary Highlights	1/1999
Calendar of Monetary Highlights	2/1999
Calendar of Monetary and Economic Highlights	3/1999
The Possibilities and Limitations of Monetary Policy – Results of the OeNB's 27th Economics Conference	3/1999
Calendar of Monetary and Economic Highlights	4/1999
Calendar of Monetary and Economic Highlights	1/2000
Calendar of Monetary and Economic Highlights	2/2000
Calendar of Monetary and Economic Highlights	3/2000
The New Millennium – Time for a New Economic Paradigm? – Results of the OeNB's 28th Economics Conference	3/2000
Calendar of Monetary and Economic Highlights	4/2000
Calendar of Monetary and Economic Highlights	1/2001
Calendar of Monetary and Economic Highlights	2/2001
The Single Financial Market: Two Years into EMU – Results of the OeNB's 29th Economics Conference	2/2001
Calendar of Monetary and Economic Highlights	3–4/2001
Calendar of Monetary and Economic Highlights	1/2002
Austrian Financial Institutions	
Money and Credit in 1998	1/1999
Money and Credit in the First Quarter of 1999	2/1999
Austria's Major Loans Register in 1998	2/1999
Money and Credit in the First Half of 1999	3/1999
Banking Holidays in Austria	4/1999
Money and Credit in the First Three Quarters of 1999	4/1999
Money and Credit in 1999	1/2000
The Austrian Supervisory Risk Assessment System	1/2000
Money and Credit in the First Quarter of 2000	2/2000
Risk Analysis of a Representative Portfolio of International Assets	2/2000
Calculating the Thresholds for the Notification of Mergers of Banks – The New Legal Situation	2/2000
Money and Credit in the First Half of 2000	3/2000
Banking Holidays in Austria	4/2000
Money and Credit in the First Three Quarters of 2000	4/2000
Money and Credit in the Year 2000	1/2001
Money and Credit in the First Quarter of 2001	2/2001
Money and Credit in the First Half of 2001	3–4/2001
Banking Holidays in Austria in the Year 2002	3–4/2001
Money and Credit in the Year 2001	1/2002
Interest Rates	
An International Comparison of Term Structures – Estimations Using the OeNB Model	1/1999

Please see the German-language publication "Berichte und Studien" for a list of all German-language reports, studies and special publications of the OeNB.

1 For a comprehensive list of reports, summaries and studies hitherto published please refer to issue no. 1/2002 of "Focus on Austria."

List of Studies on Focus on Austria Main Topics

Focus on Austria 2/2000:

The Monetary Policy of the Eurosystem
Monetary Policy and Monetary Policy Strategy in EMU:
New Framework – New Challenges
The Credibility of the Eurosystem
Monetary Growth during the Changeover to Economic
and Monetary Union
Indicators for Assessing Price Changes
Estimate and Interpretation of the Taylor Rule for the Euro Area
Modification to the Monetary Policy Framework
and Structural Changes in the Austrian Money Market
in Stage Three of EMU

Focus on Austria 3/2000:

On a New Capital Adequacy Framework as Proposed by Basel and Brussels
Regulatory Capital Requirements for Austrian Banks –
A Supervisory Tool Subject to Change
Supervisory Review
Credit Risk
Critical Evaluation of the Basel Committee's
and the European Commission's Proposals on the
Treatment of Other Risks in the New Capital Adequacy Framework
Interest Rate Risk in the Banking Book

Focus on Austria 2/2001:

The New Framework for Fiscal Policy
Fiscal Policy Design in the EU
Measures and Strategies for Budget Consolidation
in EU Member States
Distributive Aspects of Economic Policy in EMU –
An Analysis from an Employee Perspective
Problems Relating to the Taxation of Cross-Border Capital Income
Austria's Sovereign Debt Management Against the Background
of Euro Area Financial Markets
Cyclically Adjusted Budgetary Balances for Austria

Focus on Austria 3–4/2001:

Aspects of the Transmission of Monetary Policy

The Transmission Mechanism
and the Role of Asset Prices in Monetary Policy
Asymmetric Transmission of Monetary Policy
throught Bank Lending –
Evidence from Austrian Bank Balance Sheet Data
Balance Sheet and Bank Lending Channels:
Some Evidence from Austrian Firms
Financial Innovation and the Monetary Transmission Mechanism
Transmission Mechanism and the Labor Market:
A Cross-Country Analysis
Monetary Transmission and Fiscal Policy
Principles for Building Models of the
Monetary Policy Transmission Mechanism

Publications of the Oesterreichische Nationalbank

Periodical Publications	Published
Statistisches Monatsheft	monthly
Focus on Statistics (English translation of "Statistisches Monatsheft")	http://www.oenb.at
Leistungsbilanz Österreichs, revidierte Jahresdaten gegliedert nach Regionen und Währungen	annually
Berichte und Studien	quarterly
Focus on Austria (selected chapters from „Berichte und Studien")	quarterly
Focus on Transition	semiannually
Finanzmarktstabilitätsbericht	semiannually
Financial Stability Report (English translation of "Finanzmarktstabilitätsbericht")	semiannually
Geschäftsbericht	annually
Annual Report (English translation of "Geschäftsbericht")	annually
Volkswirtschaftliche Tagung (for a list of the topics discussed at the conferences, see below)	annually
The Austrian Financial Markets – A Survey of Austria's Capital Markets – Facts and Figures	annually

Other Publications	
New Developments in Banking and Finance in East and West (Kranichberg 1989)	1990
Erfahrungen Österreichs beim Übergang von administrativer Regulierung zur Marktwirtschaft (Moscow 1990)	1990
Challenges for European Bank Managers in the 1990s (Badgastein 1990)	1991
From Control to Market - Austria's Experiences in the Post-War Period (Warsaw 1990)	1991
The Economic Opening of Eastern Europe (Bergsten Conference Vienna 1991)	1991
Erneuerung durch Integration – 175 Jahre Oesterreichische Nationalbank	1991
Striking a Balance – 175 Years of Austrian National Bank	1991
Transparente Dispositionen – Liberalisierter Devisenverkehr unter Beachtung internationaler Publizitätsverpflichtungen	1991
Ausgeglichene Position – Die neue Präsentation der österreichischen Zahlungsbilanz	1992
Aktive Bilanz – Ein Jahr vollständig liberalisierter Devisenverkehr in Österreich	1992
Economic Consequences of Soviet Disintegration (Bergsten Conference Vienna 1992)	1993
Neuorientierung – Internationale Vermögensposition und Außenwirtschaftliche Investitionsbilanz Österreichs	1993
Bankwesengesetz 1993	1994

Other Publications (cont.)	Published
Internationale Vermögensposition 1992 – Die grenzüberschreitenden Forderungen und Verpflichtungen Österreichs	1994
International Investment Position for 1992 – Austria's Cross-Border Assets and Liabilities	1994
Western Europe in Transition: The Impact of the Opening-up of Eastern Europe and the Former Soviet Union	1995
Die Oesterreichische Nationalbank als Unternehmen	1996
Monetary Policy in Central and Eastern Europe: Challenges of EU Integration	1996
Monetary Policy in Transition in East and West	1997
Die Auswirkungen des Euro auf den Finanzmarkt Österreich	1997
Die Bank der Banken	1997
Die Zukunft des Geldes: Auf dem Weg zum Euro Grundlagen – Strukturen – Termine	1997
Geld & Währung	1997
Kompendium von Texten zur Wirtschafts- und Währungsunion	1997
Nationalbankgesetz 1984 (as of January 1999)	1999
Information literature on banknote security	recurrently
Working Papers	recurrently

Videos	
Wie Mozart entsteht (banknote security)	1990
The Evolution of W. A. Mozart (English version of "Wie Mozart entsteht")	1995
Bank der Banken (tasks and functions of the OeNB)	1991
The Banks' Bank (English version of "Bank der Banken")	1991
Fenster, Tore, Brücken: Eurogeld aus Österreich	1997
Das Geld von Morgen	1997
Der Euro stellt sich vor	2001

List of the Topics Discussed at the Economics Conferences (Volkswirtschaftliche Tagungen)

1975	Die ökonomischen, politischen und sozialen Konsequenzen der Wachstumsverlangsamung
1976	Störungsanfällige Bereiche in unserem ökonomischen und sozialen System
1977	Fiskalismus kontra Monetarismus
1978	Wirtschaftsprognose und Wirtschaftspolitik
1979	Technik-, Wirtschaftswachstums-, Wissenschaftsverdrossenheit: Die neue Romantik – Analyse einer Zeitströmung
1980	Probleme der Leistungsbilanz in den achtziger Jahren
1981	Systemkrisen in Ost und West
1982	Forschung und Wirtschaftswachstum
1983	Ausweg aus der Krise – Wege der Wirtschaftstheorie und Wirtschaftspolitik
1984	Der Weg zur Welthandelsnation
1985	Weltanschauung und Wirtschaft
1986	Vollbeschäftigung, ein erreichbares Ziel?
1987	Vollendung des Binnenmarktes in der Europäischen Gemeinschaft – Folgen und Folgerungen für Österreich
1988	Sand im Getriebe – Ursachen und Auswirkungen der Wachstumsverlangsamung in Österreich
1989	Banken und Finanzmärkte – Herausforderung der neunziger Jahre
1990	Wettbewerb und Kooperation im Finanzbereich
1991	Wirtschaftliche und politische Neugestaltung Europas – Rückblick und Perspektiven
1992	Zukunft regionaler Finanzmärkte in einem integrierten Europa
1993	Europäische Währungspolitik und internationaler Konjunkturverlauf
1994	Neue internationale Arbeitsteilung – Die Rolle der Währungspolitik
1995	Die Zukunft des Geldes – das Geld der Zukunft
1996	Auf dem Weg zur Wirtschafts- und Währungsunion – Bedingungen für Stabilität und Systemsicherheit
1997	Die Bedeutung der Unabhängigkeit der Notenbank für die Glaubwürdigkeit der europäischen Geldpolitik
1998	Wirtschaftspolitik 2000 – Die Rolle der Wirtschaftspolitik und nationaler Notenbanken in der WWU
1999	Möglichkeiten und Grenzen der Geldpolitik
2000	Das neue Millennium – Zeit für ein neues ökonomisches Paradigma?
2001	Der einheitliche Finanzmarkt – Eine Zwischenbilanz nach zwei Jahren WWU

List of the Topics Discussed in the Working Papers[1])

		Published
No. 7	Die Finanzoperationen der öffentlichen Haushalte der Reformländer ČSFR, Polen und Ungarn: Eine erste quantitative Analyse	1991
No. 8	Erfüllung der Konvergenzkriterien durch die EG-Staaten und die EG-Mitgliedswerber Schweden und Österreich[2])	1992
No. 9	Alternative Strategies For Overcoming the Current Output Decline of Economies in Transition	1992
No. 10	Signaling a Hard Currency Strategy: The Case of Austria	1992
No. 11	The Impact of the Opening-up of the East on the Austrian Economy – A First Quantitative Assessment	1993
No. 12	The Scope for Regional Autonomy in Russia	1993
No. 13	EMU and the International Monetary System – A Transatlantic Perspective	1993
No. 14	Austria's Role as a Bridgehead Between East and West	1993
No. 15	Prospects for Growth in Eastern Europe – Some questions raised in the course of a macroeconomic forecasting exercise	1994
No. 16	A Survey of the Austrian Capital Market	1994
No. 17	Trade and Employment: Can We Afford Better Market Access for Eastern Europe?	1994
No. 18	Interdependence of Politics and Economic Development: Financial Stabilization in Russia	1994
No. 19	Austrian Exchange Rate Policy and European Monetary Integration – Selected Issues	1995
No. 20	Monetary Spill-over Effects in the ERM: The Case of Austria, A Former Shadow Member	1995
No. 21	Investing in Insider-dominated Firms – A Study of Voucher Privatization Funds in Russia	1995
No. 22	Pessimism Confounded? Economic Recovery in Eastern Europe	1996
No. 23	Will Asymmetric Shocks Pose a Serious Problem in EMU?	1996
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No. 28	What Do We Really Know About Real Exchange Rates?	1998
No. 29	Goods Arbitrage and Real Exchange Rate Stationarity	1998
No. 30	The Great Appreciation, the Great Depreciation, and the Purchasing Power Parity Hypothesis	1998
No. 31	The Usual Suspects? Productivity and Demand Shocks and Asia-Pacific Real Exchange Rates	1998
No. 32	Price Level Convergence Among United States Cities: Lessons for the European Central Bank	1998
No. 33	Core Inflation in Selected European Union Countries	1998
No. 34	The impact of EMU on European unemployment	1998

1 *For a comprehensive List of the Topics Discussed in the Working Papers please refer to issue no. 12/2001 of "Statistisches Monatsheft."*

2 *Published in a modified form in "Berichte und Studien."*

List of the Topics Discussed in the Working Papers (cont.)

		Published
No. 35	Room for Manoeuvre of Economic Policy in EU Countries – Are there Costs of Joining EMU?	1998
No. 36	Heterogeneities within Industries and Structure-Performance Models	1998
No. 37	Estimation of the Term Structure of Interest Rates – A Parametric Approach	1999
No. 38	On the Real Effects of Monetary Policy: Central Banker's View	1999
No. 39	Democracy and Markets: The Case of Exchange Rates	1999
No. 40	Central Banks in European Emerging Market Economies in the 1990s	2000
No. 41	Is There a Credit Channel in Austria? The Impact of Monetary Policy on Firms' Investment Decisions	2000
No. 42	Integration, Disintegration and Trade in Europe: Evolution of Trade Relations During the 1990s	2000
No. 43	The Bank, the States, and the Market: An Austro-Hungarian Tale for Euroland, 1867–1914	2001
No. 44	The Euro Area and the Single Monetary Policy	2001
No. 45	Is There an Asymmetric Effect of Monetary Policy over Time? A Bayesian Analysis Using Austrian Data	2001
No. 46	Exchange Rates, Prices and Money. A Long Run Perspective	2001
No. 47	The ECB Monetary Policy Strategy and the Money Market	2001
No. 48	A Regulatory Regime for Financial Stability	2001
No. 49	Arbitrage and Optimal Portfolio Choice with Financial Constraints	2001
No. 50	Macroeconomic Fundamentals and the DM/$ Exchange Rate: Temporal Instability and the Monetary Model	2001
No. 51	Assessing Inflation Targeting after a Decade of World Experience	2001
No. 52	Beyond Bipolar: A Three-Dimensional Assessment of Monetary Frameworks	2001
No. 53	Why Is the Business-Cycle Behavior of Fundamentals Alike Across Exchange-Rate Regimes?	2001
No. 54	New International Monetary Arrangements and the Exchange Rate	2001
No. 55	The Effectiveness of Central Bank Intervention in the EMS: The Post 1993 Experience	2001
No. 56	Asymmetries in Bank Lending Behaviour. Austria During the 1990s	2002
No. 57	Banking Regulation and Systemic Risk	2002
No. 58	Credit Channel and Investment Behavior in Austria: A Micro-Econometric Approach	2002
No. 59	Evaluating Density Forecasts with an Application to Stock Market Returns	2002
No. 60	The Empirical Performance of Option Based Densities of Foreign Exchange	2002
No. 61	Price Dynamics in Central and Eastern European EU Accession Countries	2002

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