Oesterreichische Nationalbank

FINANCIAL STABILITY REPORT

4

Contents

This study presents a credit risk model for stress testing the aggregate credit portfolio of Austrian banks on the basis of individual loan data. The model captures credit risk in dependence on macroeconomic variables and accounts for the correlations between them. We select multivariate credit risk models based on univariate regressions to explain the credit risk by means of macroeconomic indicators, such as industrial production, inflation and the Austrian Traded Index (ATX). By introducing a dynamic component, we can use these models to assess the future losses on Austrian banks' credit portfolio on the basis of simulations considering the evolution of these macroeconomic variables. The model is used in particular to perform stress tests drawing on historically observed maximum changes in these macroeconomic indicators. Moreover, we conduct a stress test assuming a severe three-year recession. The outcomes for all crisis scenarios under examination attest to a sound risk-bearing capacity of the Austrian banking system.

Since the mid-1990s foreign currency borrowing by businesses and households – first mainly in Swiss francs, later also in Japanese yen – has increased markedly in Austria. This study aims to analyze this development and examines its implications for the risks to the Austrian economy. A discussion of the key features of foreign currency borrowing in Austria will be followed by an attempt to find appropriate theoretical approaches to explain this phenomenon. Efficiency considerations fail to explain the pronounced increase in foreign currency borrowing, but taking into account a range of Austrian particularities, the theory of rational herd behavior may offer some plausible insights into the causes. The study also takes a closer look at the specific risks involved in foreign currency funding and the exposure of lenders and borrowers. The findings show that the economic risks caused by the high share of foreign currency loans in total lending are substantial. Therefore, the trends in foreign currency borrowing deserve to be closely monitored.

This paper analyzes some reasons for the apparent success of financial liberalization in Austria. Remarkably, Austria's ambitious program of deregulation between 1977 and 2000 did not result in a financial crisis, but yielded large and tangible benefits. While the Austrian experience has so far not attracted much attention in the literature, it may contain important lessons on international best practices. Three clear policy implications emerge from this study: First, gradualism worked well. The slicing of reforms into manageable pieces helped avoid a cumulation of risk factors and the emergence of financial bubbles. Second, financial reform was timed in a countercyclical manner, which added stability to the economy. Finally, the predominance of credit cooperatives and savings banks in Austria had stabilizing effects and gave rise to a slightly countercyclical lending behavior, i.e. a financial decelerator.

This paper reviews trends in and determinants of private capital flows to the transition and emerging economies of Latin America, Asia, and Central and Eastern Europe in the 1990s. It portrays the divergent impact of financial crisis periods on direct, portfolio and other investment flows to the emerging markets. A special focus is put on the development of capital flows to the financial and capital markets of Central and Eastern Europe in general and of the accession countries in particular, highlighting the share of Austrian investment in this region. The analysis of the determinants of foreign investment is complemented by an assessment of the impact of cross-border financial investment and of the ensuing challenges for financial markets.

Editoral close: October 29, 2002

Executive Summary

Economic indicators signal that business activity is set to remain moderate in the U.S.A. and in the euro area, international stock prices are still on the decline and oil price rises loom on the horizon in the wake of possible military action in Irak, all of which has increased uncertainty on financial markets. The debt problems some Latin American countries are laboring under further compound global economic fragility and involve the risk of potential contagion for neighboring countries in the region. We may note with satisfaction that the difficulties of Latin American countries have not spread to other regions, such as Central and Eastern European Countries (CEECs). The CEECs have done comparatively well: Except in Poland, the slowdown is likely to be less pronounced than in the EU. Progress with privatization and the reorganization of banks in the CEECs has translated into improved profitability. These stability gains also provide Austrian bank subsidiaries, which continue to maintain a dynamic presence in the financial services industry of the region, with a favorable framework for their activities.

Austrian GDP edged up by only 0.4% in the first half of 2002 and is forecast to expand by less than 1% in 2002 as a whole; the record floods during the summer will probably dampen growth further. Although the economy has not gotten off the ground, consumer spending remains high, which translates into a lower propensity to save and higher credit debt. Substantial valuation losses of EUR 3.2 billion for stocks and mutual fund shares, however, will probably not dent consumer demand in Austria much, as private investors' equity wealth is much smaller than in many other countries. The data do show, however, that households' debt-carrying capacity has deteriorated slightly.

The weakening economy and declining investment activity have reduced Austrian enterprises' borrowing requirements and have noticeably depressed credit growth in 2002 (annual growth rate in July 2002: 0.5%). As a result of the slide in corporate creditworthiness, banks in many European countries are currently faced with an erosion of credit quality and a rising number of defaults. In Germany, the failure of numerous heavyweight companies has burdened banks and has forced them to bolster loan loss provisions, which has further hurt their earnings prospects. Banks are responding with an improvement of cost structures and with structural adjustments. In Austria, the Kreditschutzverband von 1870 (KSV) has not registered a perceptible increase in new insolvency proceedings; however, the proceedings closed as "no assets" cases augmented noticeably in the first three quarters of 2002. All in all, the number of Austrian companies which have folded has gone up by about 4%. What is more, in recent years the number of insolvencies has generally accelerated toward the end of the year.

Reflecting the difficult market Austrian banks are operating in, their profitability has also shown a clear downtrend, as is evidenced by higher loan loss and securities loss provisions. The outlook for Austrian banks' profits at the end of 2002 suggests sharply contracting annual profits in both consolidated and unconsolidated financial statements. Although Austrian banks' spread-based revenues have been performing quite well so far, net interest income rises of 4.4% did not suffice to offset lower fee-based income and marginally increased operating expenses. Unconsolidated operating profit as cited in quarterly

reports was declining marginally – by 2.1% – at mid-year. This also affected the cost/income ratio, which edged down to 70.1%.

With the ATX having slipped by about 6% since the beginning of the year 2002, price losses on the Vienna stock exchange have been much smaller than on other bourses, but the trade volume has contracted further. 2002 has not seen any new listings so far. Purchases of mutual fund shares have mounted by only 3.2% since the beginning of the year 2002, and many equity funds have posted a negative performance. Flagging customer business and diminishing own trade has eroded banks' fee-based income and income from financial transactions. Insurance companies have also suffered from the less than stellar stock market performance and to a smaller extent from claims filed in the wake of the flood in August 2002. While insurance companies have adapted their investment structures to reflect current economic conditions, life insurance companies have nevertheless announced that they would cut profit share payments to some 5.5%.

At this juncture, banks are doing business under adverse economic conditions, and the financial services industry is especially hard hit by the persistent slide in stock markets. Austrian banks' stability is not at risk, though. The structural adjustment measures taken in the past years and the increased use of synergies, such as the organization of savings banks in a sectoral grouping, have emerged as important stabilizing factors. Equity ratios have remained stable. Spread-based revenues have been performing quite well so far, and the contribution of the large Austrian banks' subsidiaries in the CEECs to group operating profit is likely to be quite substantial again this year. Total assets of CEEC subsidiaries exceeded EUR 60 billion at mid-2002, with further acquisitions in the pipeline. Thus, while external developments currently pose no threat to the stability of the Austrian banking sector, banks, and above all profit developments, nevertheless merit close monitoring.

Reports

International Economic Developments

Data indicate that the world economic recovery which had spread from the U.S.A. at the end of 2001 stayed its course from the first throughout the third quarter of 2002 with low to moderate growth rates. Against the background of growing uncertainty and a letup in the pace of the economic upswing, the most recent forecasts for economic growth for the second half of 2002 and for 2003 were revised downward.

Chart 1

Economic Growth in the U.S.A., the EU–12 and Japan

real GDP year on year in %

Legend:
- U.S.A.
- Euro area
- Japan

Source: Eurostat, IMF.
¹) Prognosis.
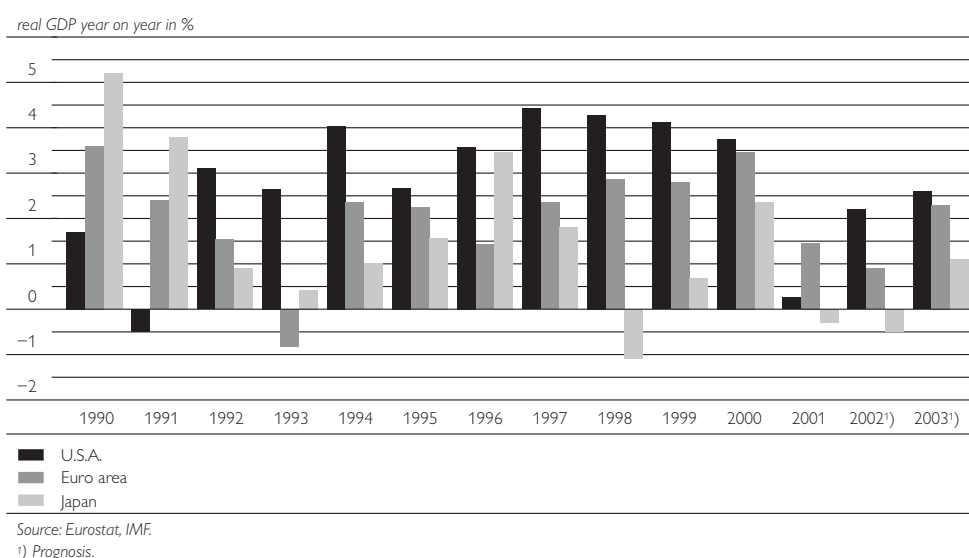
A continued tailspin of stock prices on leading U.S. and European exchanges, extending the trend that had begun in April 2002, figures as one of the main risks for the world economy. Such a plunge in equity values would dampen household spending in the advanced economies, which has now emerged as a main pillar of the fragile recovery. An ongoing slide in equity prices would ultimately affect the emerging economies as well, because they would face worse financing conditions in capital markets as investors become more risk-averse. A pronounced, long-term rise in oil prices as an outcome of a military conflict with Iraq represents a further potential threat to growth. Most of the forecasts are based on an average oil price of USD 24 to USD 25 per barrel in 2003.

The persistence of global imbalances, such as the high U.S. current account deficit, also adds to the risk to the growth outlook. Some emerging markets were especially hard hit when the U.S.A. stopped functioning as the locomotive for global growth. However, Latin American countries' difficulties may to some extent be attributed to other factors, such as political uncertainty and economic instability (indebtedness problems). By contrast, the recovery in the Asian emerging markets has proved sturdy so far, partly because their regional integration is more advanced than that of Latin American countries.

Chart 2

Price Development on the Spot Markets (Brent)

USD/barrel

Source: Datastream.

Legend: 2001, 2002
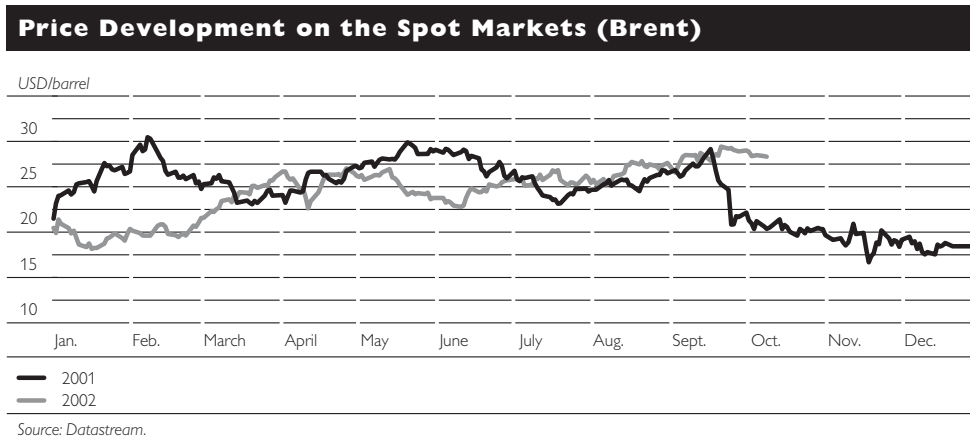
U.S. Indicators Signal Continued Moderate Business Activity

The robust pace of growth in the fourth quarter of 2001 (+2.7%) and in the first quarter of 2002 (+5%) could not be upheld in the second quarter of 2002, when the expansion cooled to only 1.3%. The recovery could turn out to lack the vigor of earlier upswings. Until recently, household spending sustained the U.S. economy, but now investors' heavy losses on the stock market and their shaken confidence, stagnating employment growth, burgeoning private sector debt and higher oil prices could all converge to induce consumers to spend less freely. Private investment has not shown any sign of a lasting recovery. Indicators which signal a slowdown in economic growth include the Composite Leading Indicators, manufacturing output and the consumer confidence indicators.

With the data signaling dampened economic prospects, a double-dip scenario can no longer be ruled out. Most international institutions and private forecasters, however, are less pessimistic and do not envisage a renewed slide into recession. The International Monetary Fund (IMF) scaled back its growth projections to 2.2% for the current year and to 2.6% for 2003.

The most recent anemic economic data and the rising probability of a slump in the most powerful factor underpinning growth, namely consumer spending, have fueled financial markets' expectations that key interest rates would be cut before the year is over. Because the U.S. recovery will precede that in the trading partner countries, the IMF sees the U.S. current account deficit augmenting further (2001: almost 4% of GDP; forecast for 2002: 4.6%; forecast for 2003: 4.7% of GDP). Import prices have started to reflect the higher cost of oil, but inflation has remained well below the 2% mark.

Sluggish Business Activity in the Euro Area

The pace of real GDP expansion in the euro area in the first half of 2002 confirms that the economy has begun to recuperate after bottoming out in the fourth quarter of 2001. However, GDP growth has remained slow; the data have not signaled any acceleration of business activity. In the second quarter of 2002 GDP edged up by 0.3% on the first three months of 2002 and by 0.6% against the same period of 2001. First-quarter growth in 2002 came in

at 0.4%. In the second quarter of 2002 (compared with the first quarter), net trade, government consumption and household expenditure made a positive contribution to growth. Gross fixed capital formation, however, still posted a negative performance and shrank more than in the preceding quarter. This trend was evidence of continued concerns about the further course of the economy and still low overall order book levels.

The European Commission's indicator for quarterly GDP growth for the euro area forecasts a range of 0.3% to 0.6% real GDP growth for the third quarter of 2002; the model estimates growth to stay in this range in the fourth quarter of 2002. The most recent forecasts of international institutions point to a slowing of the recovery: The IMF revised downward its projections for the euro area for 2002 from 1.4% to 0.9%. The latest downtrend of most leading indicators, such as the European Commission's Economic Sentiment Indicator or the Business Climate Indicator of the German research institute Ifo suggest that the sustainability and the strength of the economic upturn remain highly indefinite.

In the first three quarters of 2002, the rise in lending to households continued to decelerate marginally. The main reason is likely to be the reduced demand for loans in an environment characterized by more unfavorable growth prospects.

Inflationary developments relaxed in the course of the first half of 2002. Year on year, Harmonized Index of Consumer Prices (HICP) inflation declined from 2.7% at the beginning of the year to 1.9% in July, above all because the annual rate of price increase no longer reflected the impact of the hefty price hikes of 2001 for energy and unprocessed food. In August 2002, inflation quickened to 2.1%, a level which is easily reconciled with the anticipation that the HICP rise will fluctuate around the 2% mark in upcoming months. Inflation ran to 2.1% in September. Core inflation amounted to 2.6% from January through June 2002 and dropped to 2.5% in both July and August. The future course of oil prices, which currently hinges on international politics, represents the greatest uncertainty factor in inflation forecasts.

The fast pace of monetary growth eased a bit in the past three months, sinking to 7% in August 2002 against 7.1% in July 2002. The relatively high rate of monetary expansion may be traced to skittish investors' move out of higher-risk investment in an environment of uncertainty in financial markets. Lower opportunity cost has also contributed to the shift into more liquid assets. Hence, portfolio shifts are largely responsible for the upward distortion of monetary growth.

Japan's Economy Recovers Slightly
Despite Persistent Problems in the Banking Sector
In the second quarter of 2002[1]) Japan's economy began to bounce back, propped up by solid exports. For the first time in five quarters, real GDP augmented, climbing by 0.6% on the previous quarter. However, this rise must be seen against the substantial downward revision of the result of the previous

---

1   New method to estimate GDP: For the first time, the estimate emphasizes supply-side aggregates such as output and retail sales. The data are now published one month earlier than they used to be.

quarter. Listless household spending, contracting corporate investment and weak industrial output, along with a strong yen exchange rate (especially against the U.S. dollar), huge stock price losses and the uncertain global economic out-look are a threat to a sustained recovery.

Domestic demand remains the key to a lasting economic upturn. Falling nominal wages, increasingly unpredictable prospects on the labor market, unbroken price deflation and flagging consumer confidence let it appear unlikely that consumer demand will gather momentum.

The most recent Consensus Economics forecast for the calendar year 2002 projects a decline of 0.8% in real GDP; the IMF is a bit more optimistic with its forecast of –0.5%. The Bank of Japan's quarterly Tankan survey recorded a marginal improvement of sentiment in the second quarter of 2002, but the fragile recovery is expected to lose strength again in the next few months, so that there is no assurance that the country is set for a decisive rebound.

Since March 2001, the Bank of Japan has steered the size of commercial banks' liquidity reserves. With this step, the Bank of Japan pushed short-term interest rates to zero, effectively exhausting its scope for monetary action. The most pressing need for reform is in the banking sector. With equity prices having plummeted, banks can no longer offset low margins and losses on problem loans with their stock portfolios. Moreover, banks' ratings have been downgraded.

Robust GDP Growth in the CEECs; High Budget Deficits
Central and Eastern European Countries (the CEECs) also felt the impact of the international economic slowdown in the first half of 2002. Except in Croatia and the Slovak Republic, real GDP growth in the first half of 2002 fell short of the GDP expansion rate for 2001. Overall, the Oesterreichische National-bank (OeNB) assumes that growth will lose less momentum in the CEECs in 2002 than in the EU, the CEECs' main trading partner region. Russia posted a decline in GDP growth, albeit from a high level, in the first quarter of 2002. The OeNB expects Russian real GDP to nevertheless gain nearly 4% in 2002.

Although the CEECs pulled ahead of the EU in 2001, current account deficits did not widen across the board. In fact, the current account shortfall in Poland, Slovenia and the Czech Republic contracted in the first six months of 2002, and the marked deterioration of the Slovak current account of 2001 practically came to a halt. The Croatian and Hungarian current account deficits enlarged in the course of 2002, but not as sharply as in the Slovak Republic in 2001, where the deficit had run to 8.6% of GDP in 2001. The CEECs primarily finance their current account deficits by means of direct investment.

Fiscal consolidation, however, represents a challenge for all countries in the region. The impact on the current account of the expansionary fiscal policy course steered during the parliamentary election period in the Slovak Republic and Hungary was particularly notable.

Exacerbation of the Latin American Economic and Financial Crisis

After GDP had posted lively 4% growth in 2000, the expansion lost consider-able steam on account of the downturn in the U.S. economy and the Argentine crisis, slowing to 0.7% in 2001. The IMF predicts a contraction of real GDP by 0.6% in the current year and a recovery to 3% growth only in 2003.

So far in 2002, Latin America's economy has worsened drastically. The quandary began with the Argentine crisis, which has still not been resolved – the IMF has not extended any new loans yet. The crisis spread to Uruguay and Paraguay, whose economies are closely interlinked with that of Argentina, prompting financial markets to rate the risk of these regions higher (citing e.g. high debt levels, the large need for foreign capital, unstable banking systems).

When the yield gap between numerous Latin American bonds against U.S. government bonds began to widen dramatically mid-2002, signaling the threat of contagion, the international community reacted swiftly to the most critical cases, namely those of Brazil and Uruguay. The IMF granted Brazil a USD 30 billion 15-month stand-by credit line, the biggest loan package in IMF history. At the end of August, a group of international commercial banks decided to keep open credit lines to Brazilian enterprises. However, analysts do not expect uncertainties on Brazil's financial markets to cease before the new president takes office at the beginning of 2003.

Currently, short-term risk in Latin America is predominantly downside. Overcoming the uncertainties at the political and at the economic level is the prerequisite to ending the crisis of confidence.

International Financial Markets

Tumbling Stock Prices, Government Bond Yields and Money Market Interest Rates Mark Second and Third Quarters of 2002

U.S. *stock markets* rallied sharply just after the terrorist attacks on September 11, 2001, and returned to a calmer pace at the end of the year. Although the terrorist attacks of course had a negative economic impact, prices shot up by more than 20% following price losses of 12% from September 11 through 21, 2001. Equity prices in the euro area fluctuated much more strongly than in the U.S.A. prior to and after September 11. Until April 2002, prices moved more or less sideways.

Chart 3

DJ EURO STOXX and Standard & Poor's 500

January 1, 1997 to October 9, 2002

Index: January 1, 1999 = 100

— DJ EURO STOXX
— S&P 500

Source: Datastream.
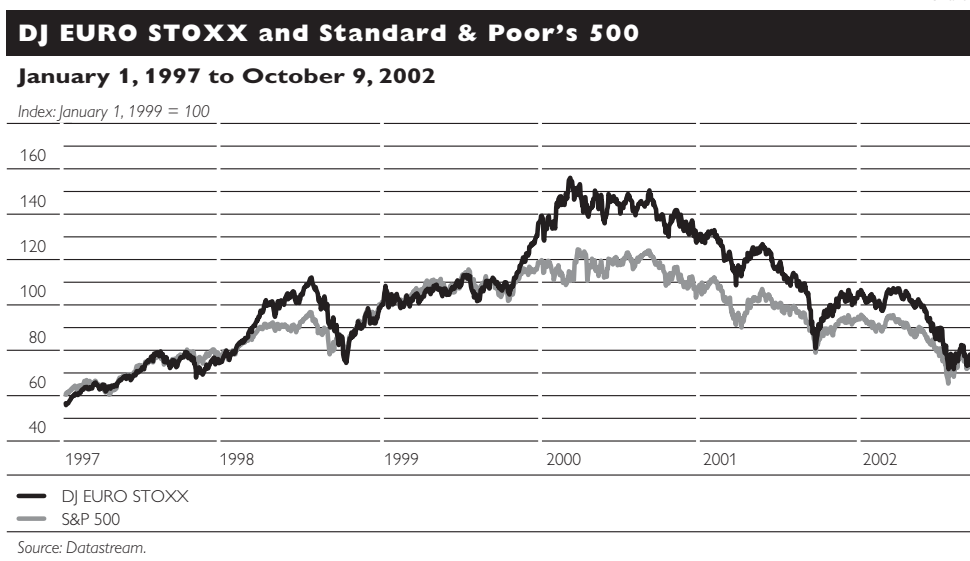
The persistent equity price decline during the second and third quarters was initially triggered by the accounting scandals involving large U.S. companies, which hurt the credibility of disclosure and accounting practices. The slide in stock prices was then compounded by the growing uncertainty about the onset and strength of the global recovery and about its impact on corporate profits and was additionally reinforced by geopolitical tension (Iraq, relations between Pakistan and India). U.S. equity prices dropped faster and faster until the end of July 2002, by which time they had sunk 7% below the September 2001 low. Prices finally bottomed out, but the recovery was short-lived – the rally lasted only one month. In October 2002 equity prices in the U.S.A. fell below the nadir of July 2002. The downtrend in the euro area lagged a bit behind that on U.S. equity markets, but was more pronounced, so that the higher European price gains after the 9-11 events had all but vanished by April 2002. All in all, the setbacks have brought equity prices in the U.S.A. and the euro area back down to the 1997 level.

Government bond markets also bounced back after the September 11 events, though not until around two months later. Healthy macroeconomic data, above all a pickup in retail sales, were pinpointed as the reason for the powerful boost in U.S. bond yields. A brighter outlook for business activity, but also expec-

Interest Rate Development in the Euro Area and in the U.S.A.

January 1, 2001 to October 9, 2002

Ten-year euro bonds
Ten-year U.S. bonds

Source: Datastream.
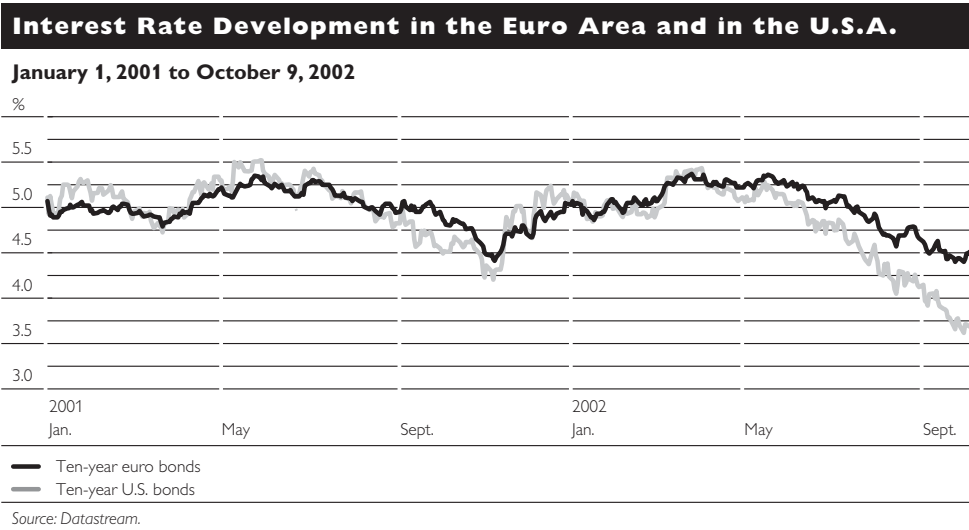
tations that inflation would pick up on account of mounting oil prices prompted yields to rise to the level at which they had stood at the beginning of 2001. Euro area yields developed largely along the same lines as those in the U.S.A.

The trend on U.S. *bond markets* reversed in June 2002. As in the case of equity market developments, the slowdown in growth from the first to the second quarter of 2002 and fears that prospects for the economy would deteriorate were cited as the main factors. In addition, investors became more cautious and shed equities to switch into government bonds. Insurance companies appeared to be an important player in this development, as they opted to build bond portfolios to safeguard their capital base. Yields on U.S. bonds sank by a total of 150 basis points from June through October 2002 to a level last recorded in the 1960s. Euro area yields also declined, though not as substantially and with a time lag against U.S. yields, so that the euro area offered a noticeable long-term interest rate advantage of some 80 basis points.

The growing insecurity investors have displayed over the past quarters was a key reason for the decline in prices and yields, above all of corporate bond yields, where risk premia for lower-rated bonds increased. Like lower stock prices, bigger risk premia are likely to reflect a combination of doubts about the quality of information provided by companies and greater uncertainty about future economic developments, which heightens the risk of company failures. In parallel, funding became more costly for emerging markets, as a generally more pronounced risk aversion, along with local developments, enlarged spreads. Brazil has been a case in point in the last few months: even though the country received a USD 30 billion IMF loan, investors had growing qualms about Brazil's willingness and ability to service its foreign debt.

The volatile nature of assessments of the course of economic growth and inflationary developments were particularly obvious on U.S. and euro area *money markets.* Soon after the U.S. Federal Reserve's Federal Open Market Committee and the Governing Council of the ECB had cut interest rates in the wake of the terrorist attacks of September 11, optimism about global economic

growth prospects became stronger and stock and bond markets firmed. As a consequence, investors expected short-term interest rates to rise. As 2002 got under way, however, bad news about inflation due to a substantial increase in the price of oil further reinforced the expectation that short-term interest rates would augment. U.S. and euro area short-term interest rates peaked in March 2002. Whereas rates at the short end eased fairly steadily in the U.S.A. after the March high, euro area rates crested again in May 2002, to diminish at a relatively stable pace afterwards. The reduction of short-term interest rates in both economic areas is a sign that uncertainty and pessimism about the magnitude and onset of the next upswing is growing in both regions. At the beginning of October 2002, interest rates at the short end of the market are at or below the level of Fed and ECB key interest rates.

Chart 5a

Interest Rate Developments in the Euro Area

September 1, 2001 to October 9, 2002

Three-month rate
Six-month rate
Nine-month rate
Twelve-month rate
ECB refinancing rate

Source: BBA.
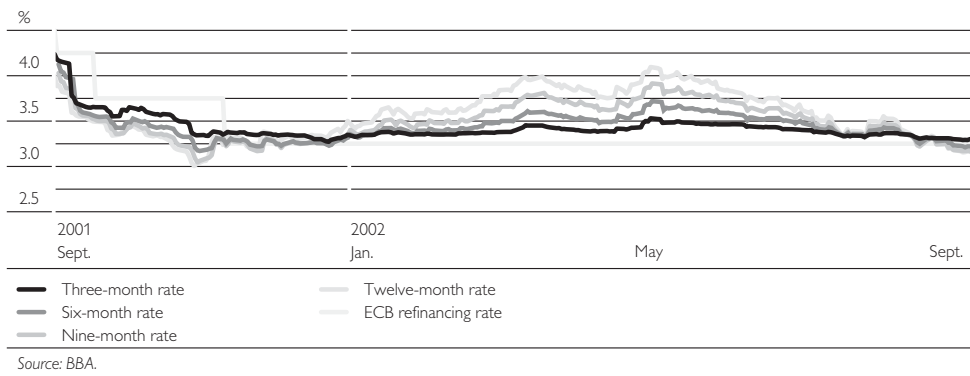
Chart 5b

Interest Rate Developments in the Euro Area

September 1, 2001 to October 9, 2002

Three-month rate
Six-month rate
Nine-month rate
Twelve-month rate
Federal funds rate

Source: BBA.
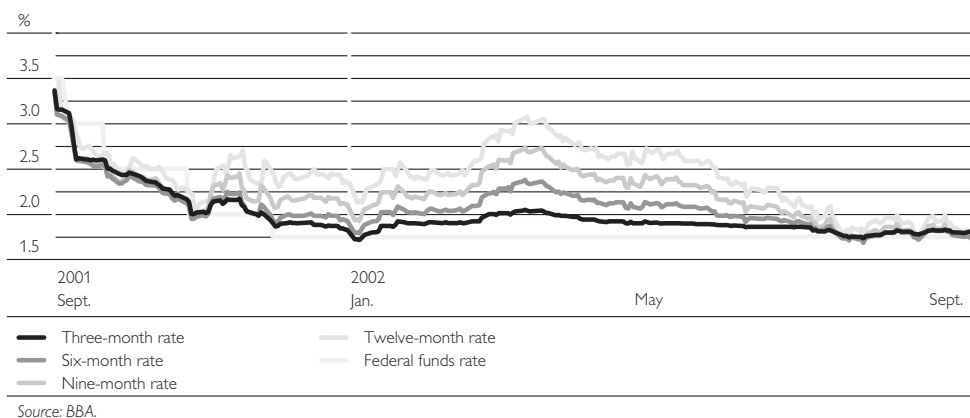
Euro Exchange Rate Up Against the U.S. Dollar

The euro's exchange rate against the U.S. dollar was a bit soft, leading to losses on the order of about 5% from the last quarter of 2001 to March 2002. The weakness of the euro was generally seen as a consequence of the surprisingly high U.S. growth figures: the strong U.S. data confirmed the perception that the U.S. economy was relatively robust to shocks, causing the U.S. dollar to appreciate against all major currencies. However, with the economic outlook becoming clouded, fears being voiced about the sustainability of the current account deficit and U.S. interest rates declining rather sharply, the U.S. dollar lost ground again from March. As a result, the euro briefly hit parity with the U.S. dollar in July 2002. The euro gained considerably less against other currencies, such as the Japanese yen, the pound sterling and the Swiss franc. Ever since, the euro has moved within a relatively narrow range of around EUR 0.98 to the U.S. dollar, some 11% higher than in March 2002.

Chart 6

Exchange Rate Development Against the Euro

January 4, 1999 to Oktober 9, 2002

USD/EUR

JPY/EUR

USD/EUR (left-hand scale)
JPY/EUR (right-hand scale)

Source: Datastream.
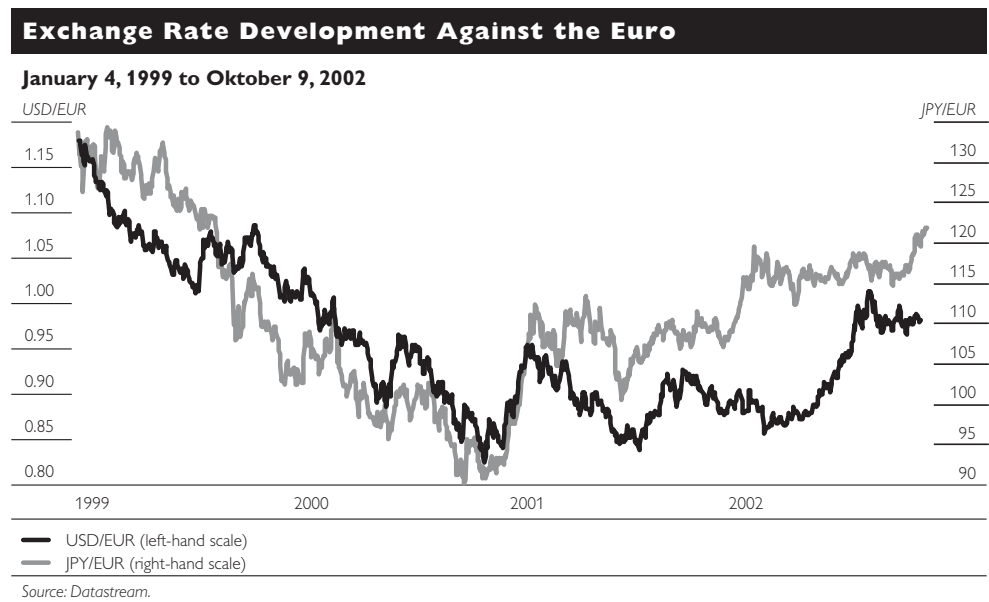
Central and Eastern Europe
Financial Stability Continues to Increase in Central and Eastern Europe
Brazilian Crisis Causes Only a Minor Widening of Bond Spreads

Given the massive widening of Brazilian government bond spreads, foreign currency-denominated bonds of Central and Eastern European Countries (CEECs) have once again proved resilient to contagious effects caused by turmoils in the emerging markets.

Charts 7a and 7b, which show bond spreads of euro-denominated government bonds issued by Brazil, Turkey, Russia and various CEECs, clearly indicate that until the cut-off date for data, the financial crisis in Brazil has had only a limited effect on bond spreads in the EU accession countries. The differentiated evaluation in international markets of euro-denominated CEEC government bonds reflect the differentiated views investors have of the repayment capabilities of individual sovereign debtors.

Chart 7a

Yield Spreads of Euro-Denominated Government Bonds

Monthly averages in basis points

Turkey — Poland
Russia — Brazil

Source: Bloomberg, JP Morgan, OeNB.

Chart 7b

Yield Spreads of Euro-Denominated Government Bonds

Monthly averages in basis points

Slovak Republic — Romania — Poland
Croatia — Hungary
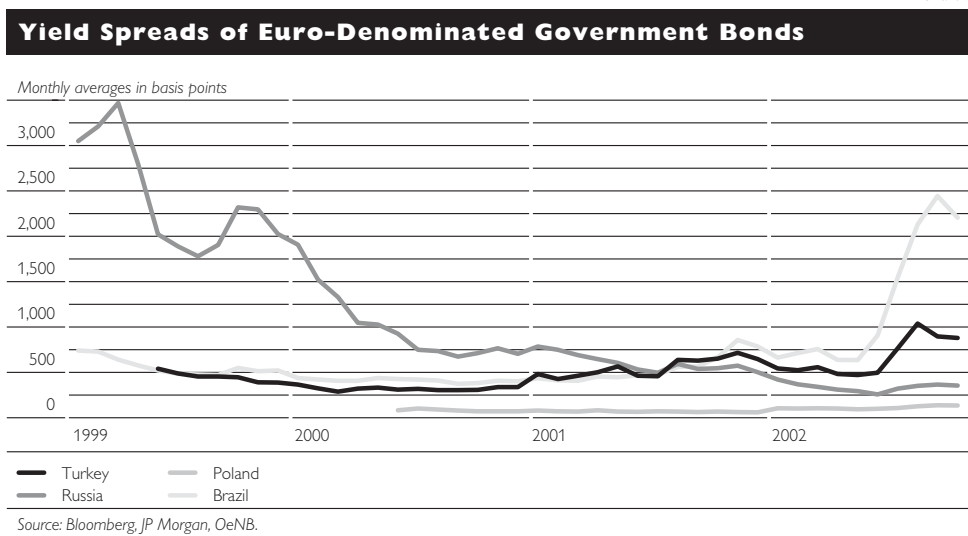
Source: Bloomberg, JP Morgan, OeNB.
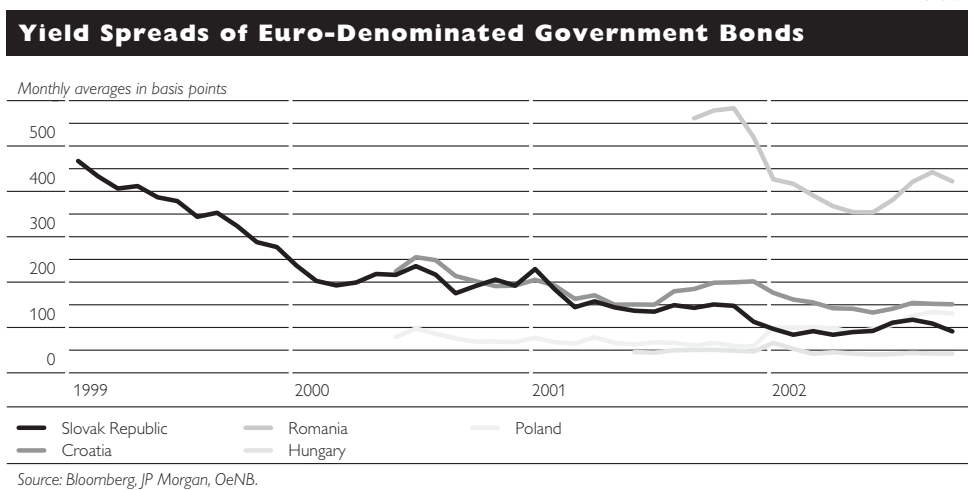
The Brazilian crisis had the strongest impact on Turkey (where bond spreads doubled to more than 1,000 basis points in the period from May to July 2002) as well as on low-rated countries such as Russia and Romania, while government bond spreads in central Europe remained largely unaffected. Since January 2000, the yield spreads of eurobonds have narrowed by more than 100 basis points on average (see chart 7b).

Poland is an exception here in the sense that the country is currently struggling mainly with internal problems (high budget deficit, low GDP growth); in other words developments appear to be in line with national fundamentals. The fact that in Poland, bond spreads had already begun to widen before the Brazilian crisis confirms this assumption. Quite similarly, the brief widening of spreads in the Slovak Republic is likely to be traceable to uncertainties in the run-up to the parliamentary elections rather than to contagious effects. Hungary's sovereign risk assessment has remained entirely unchanged until the cut-off date for data. However, the country's expansionary fiscal policy might cause spreads to widen slightly in the course of the year.

Brazilian Crisis Has No Visible Effect on Central and Eastern European Currencies
The Brazilian crisis appears to have had a less visible impact on the assessment of Central and Eastern European currencies than the Argentine crisis had between July and October 2001.

The widening of the spread of euro-denominated Brazilian government bonds to around 2,400 basis points in August 2002 (see chart 8a, right-hand scale) only caused the Russian and, to some extent, the Polish currency to weaken. It is important to note, however, that in the case of Poland, fundamental factors and the development of the euro/dollar exchange rate had triggered a depreciation trend vis-à-vis the euro already in spring 2002. The remaining Central and Eastern European currencies have remained practically unaffected, although volatility has been on the rise since mid-April 2002. The Slovak koruna

Chart 8a

Euro Exchange Rates of Central and Eastern European Currencies

and Bond Spread of Euro-Denominated Brazilian Government Bonds

Monthly averages (index: first quarter 1999 = 100)   *Basis points*

Legend:
— EUR/HUF (left-hand scale)
— EUR/PLN (left-hand scale)
— EUR/CZK (left-hand scale)
— Spread of Brazilian euro-denominated bonds vs. Bunds (right-hand scale)
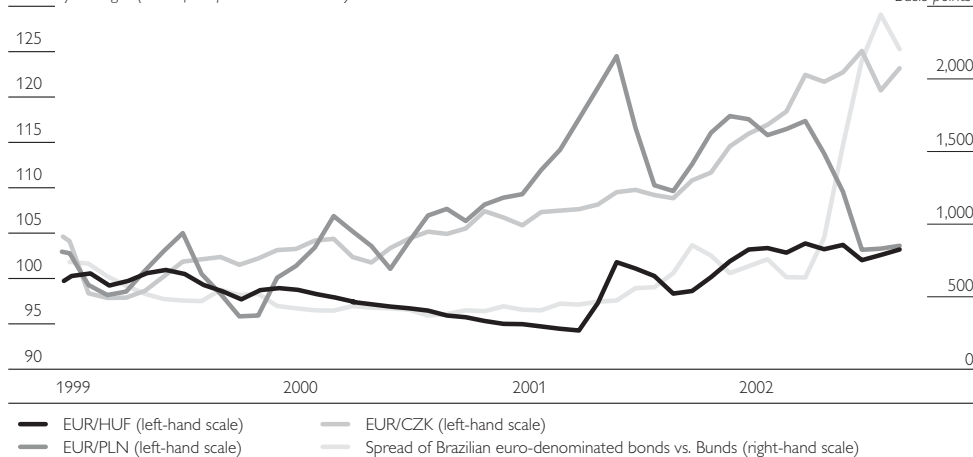
Source: Bloomberg, Datastream, JP Morgan, OeNB.

Chart 8b

Euro Exchange Rates of Central and Eastern European Currencies
and Bond Spread of Euro-Denominated Brazilian Government Bonds

Monthly averages (index: first quarter 1999 = 100) *Basis points*

EUR/SKK (left-hand scale) EUR/SLT (left-hand scale)
EUR/RUR (left-hand scale) Spread of Brazilian euro-denominated bonds vs. Bunds (right-hand scale)

Source: Bloomberg, Datastream, JP Morgan, OeNB.
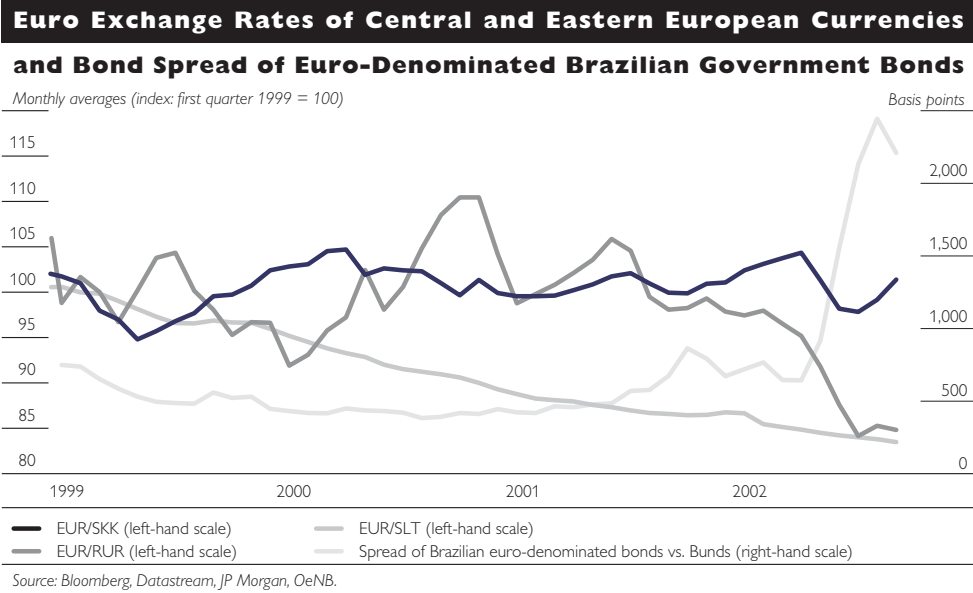
experienced a brief downward dip in mid-2002, to which Národná Banka Slovenska (NBS), the Slovak central bank, successfully reacted by intervening three times on the foreign exchange markets. Meanwhile, the Slovak koruna is back at the level of early 2002. Owing to healthy GDP growth and sound disinflationary developments in Hungary in the current year, the forint has remained stable at the lower end of the fluctuation band, while the Slovenian currency remained entirely undisturbed and continued on a slightly downward path as observed in previous years (see chart 8b). The Czech koruna, by contrast, has been appreciating for quite a while, gaining around 15% on the euro since January 2001. Its uptrend was only briefly interrupted in August 2002. Foreign direct investment (FDI) in the Czech Republic went up markedly in the first half of 2002 compared to the previous year and will thus be easily sufficient to cover the gap in the current account balance, which had stood at around 5% of GDP in the last three years.

Stock Market Developments in Accession Countries Positive Despite International Slump (Exception: Poland)

Over the past two to three years, the longer-term stock market developments in the Czech Republic, Hungary and Poland have only to a very small degree been fundamentally determined by national factors (see chart 9). By and large, stock indices moved in parallel with the DJ EURO STOXX price index (SXXE), albeit at a clearly higher volatility. These more extensive relative fluctuations are probably traceable to institutional features of these markets and, above all, to the principally higher risk rating international equity funds generally attribute to these markets.

In 2002, Central and Eastern European bourses, however, remained relatively unaffected by the negative trend observed at other international stock exchanges. While the DJ EURO STOXX, for instance, has lost more than 30% in value since the beginning of the year (see the comparison of monthly averages

Chart 9

Stock Indices in the Euro Area and in Selected Accession Countries

Monthly averages (index: fourth quarter 1997 = 100)

| SXXE index (euro area) | WIG20 index (Poland) |
| BUX index (Hungary) | PX50 index (Czech Republic) |

Source: Bloomberg, OeNB.
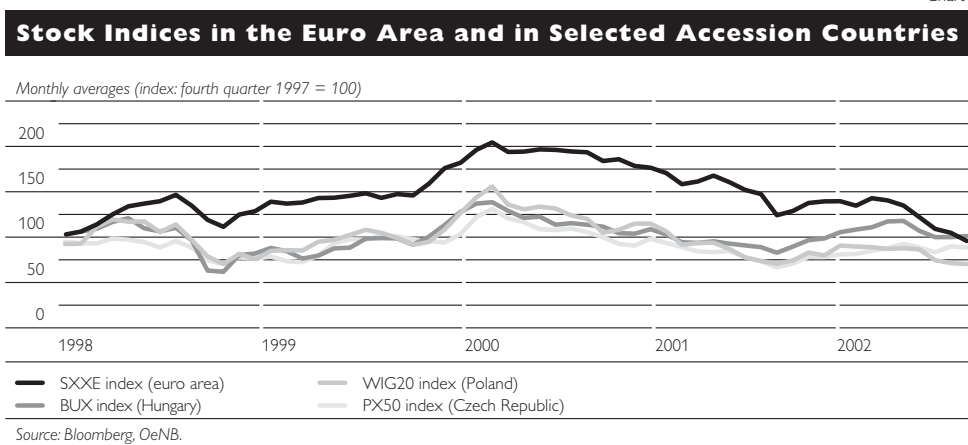
of January and September 2002), the Hungarian BUX and the Slovak SAX16 index only went down by around 4% and 8.5%, respectively. Of all CEE stock market indices, only the Polish stock index (WIG20) has felt the international lows as strongly as the European and American markets. Since the beginning of 2002, the WIG has slumped by more than 22%; this contraction is in part also attributable to low economic growth (GDP increased by only around 0.8% year on year in the first half of 2002).

The Czech PX50 index, by contrast, has climbed by almost 9% since January 2002, while the Slovenian index (SBI20) also recorded a remarkably strong uptrend and the Russian RTS index increased by just under 25%. These figures indicate that investors have a more differentiated view of CEE markets today than in previous years and that they assess individual accession countries' stable economic development and growth prospects separately from the global economic slowdown.

Yield Curve Flattens in Poland

The Polish yield curve has flattened compared to the fall of 2001, which indicates that market participants do not seem to expect inflation to go down any further (in August 2002, the inflation rate came to 1.2% year on year, see chart 10a). Moreover, the continuous decline in inflation and the reduction of key interest rates caused a sharp downward shift in the Polish yield curve (the reference rate for 28-day liquidity-absorbing open market operations of banks stood at 7.0% at the cut-off date for data in October 2002).

The Hungarian yield curve has been inverted since the creation of a multi-year debt securities market in the first half of the 1990s; it thus reflects market expectations of a slight, long-term disinflation process (see chart 10b).

The sustained decline in inflation also caused a shift in the Czech yield curve (see chart 10c), with the interest rate level having gone down by around 2.5% compared to September 2000. This means that the already narrow yield gap between Czech and German government bonds (Bunds) has contracted even further or has even become negative.

Chart 10a

Yield Curve in Poland

Effective interest rate in % p.a.

| | 1 month | 1 to 3 years | 3 to 5 years | 7 to 10 years |

— September 2000
— September 2001
— September 2002
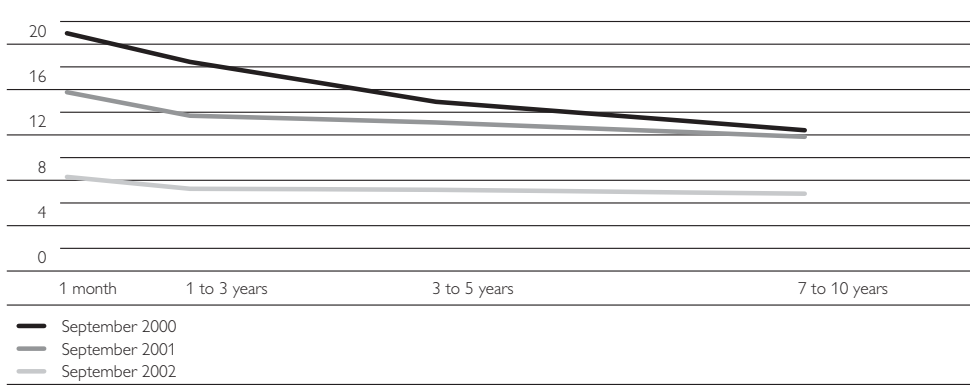
Source: Bloomberg, OeNB.

Chart 10b

Yield Curve in Hungary

Effective interest rate in % p.a.

| | 1 month | 1 to 3 years | 3 to 5 years | 7 to 10 years |

— September 2000
— September 2001
— September 2002
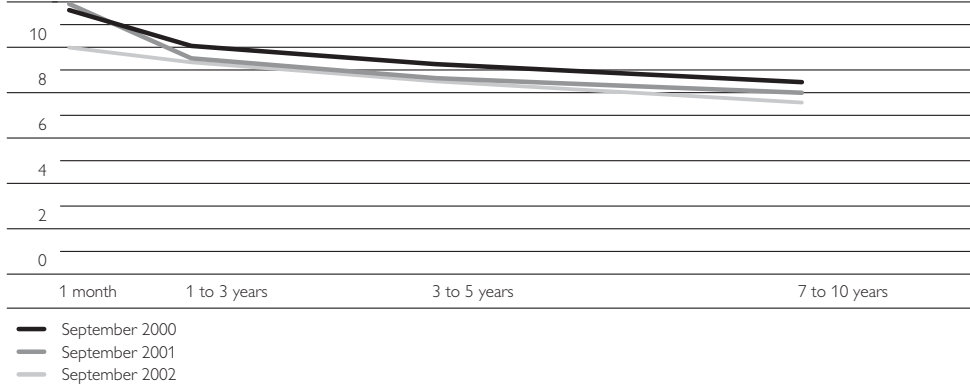
Source: Bloomberg, OeNB.

Chart 10c

Yield Curve in the Czech Republic

Effective interest rate in % p.a.

| | 1 month | 1 to 3 years | 3 to 5 years | 7 to 10 years |

— September 2000
— September 2001
— September 2002

Source: Bloomberg, OeNB.

Chart 11

Inflation in Poland, Hungary and the Czech Republic

Annual changes in CPI index in %

Poland
Hungary
Czech Republic
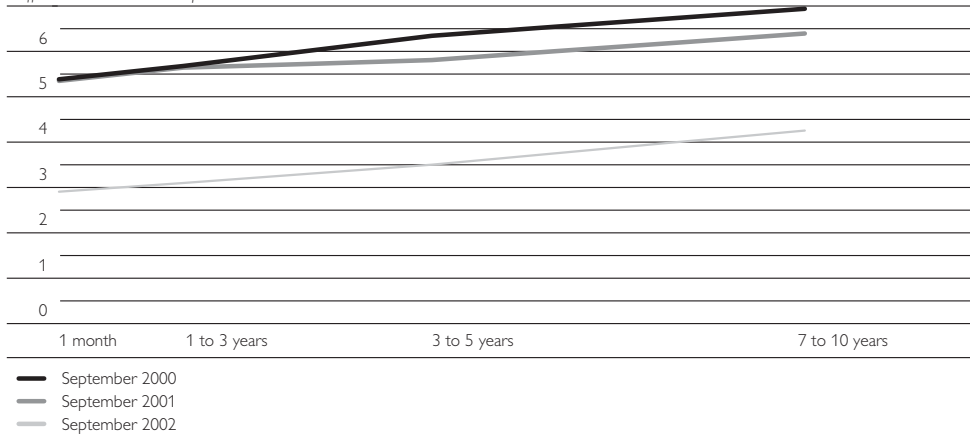
Source: Bloomberg, OeNB.
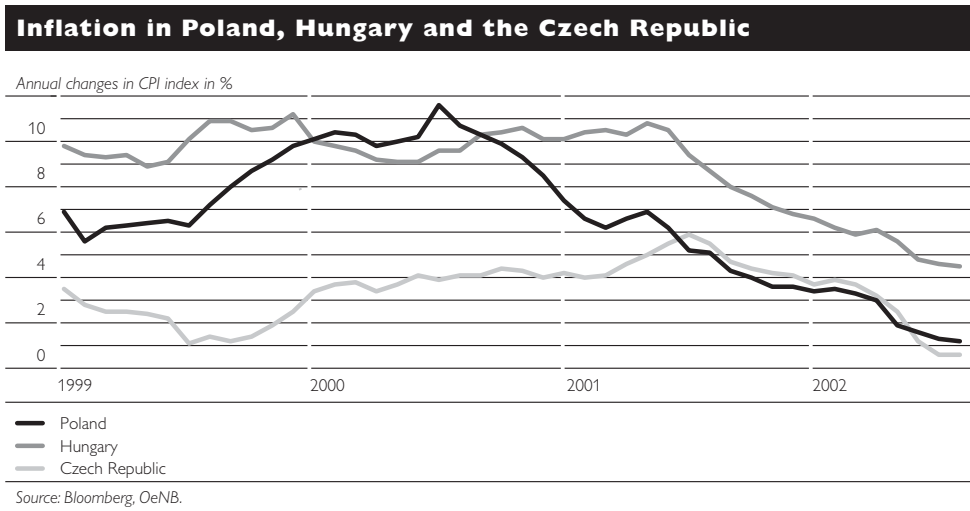
Since the beginning of 2000, the differentials between interest rates along the yield curve on the one hand and inflation on the other have been relatively high in Poland. In Hungary, inflation did not dip below the yield level until the second half of 2001, and to a much lesser degree than in Poland. From the beginning of 2002 until the cut-off date for data, the difference between long-term yields and current year-on-year inflation has slightly increased reflecting the prevailing longer-term inflation expectations.

The Banking Sector in Central Europe

Solid Growth of Banking Sector Assets in 2001

In 2001, all banking sectors in Central Europe reported a rise in total assets, with real growth rates ranging between 27% (Croatia) and 2% (Slovak Republic).[1] In countries that had reported difficulties in their banking sectors in the recent past (Croatia, Czech Republic, Slovak Republic) real asset growth was faster than in 2000, while Poland and Hungary suffered a slowdown of growth. The exceptionally strong asset growth in Croatia is mainly attributable to a rise in deposits during the euro cash changeover.

Banks' exposure to the corporate and household sectors reflects the situation in the real sector in 2001. In Croatia, the Czech Republic, Hungary and the Slovak Republic, loans to businesses and households contributed essentially to total asset growth, while in Poland, this balance sheet item augmented at a much slower pace. In Croatia, the share of claims against nonbanks in total assets declined as the massive growth in deposit intake was not matched by the expansion in lending to businesses and households, even though loans to nonbanks went up by an impressive 23% in real terms. In Poland, the trend toward foreign currency borrowing continued, with households accounting for a major share in this segment in 2001. At year-end, 26% of commercial banks' loans to nonbanks were denominated in foreign currencies (compared to 23% at end-2000).

1   *Data on Slovenia are only available for the first half of 2001.*

Profitability Clearly Augmented in Almost all CEECs

With the exception of Poland and the Slovak Republic, return on equity (ROE) went up in all countries under review in 2001. In the Slovak Republic, this indicator was at a particularly high level in 2000, however. The majority of Polish banks, by contrast, are faring worse than the aggregate ROE might suggest, with just two banks accounting for 60% of aggregate annual profits before tax, one of which – a state-owned bank – owed its remarkable profits not least to the state support it received. Foreign-owned banks' ROE went down by around 5 percentage points to 10% in 2001.

Hungarian banks' rise in profitability is partly attributable to one-time effects (reflecting one large transaction as well as changes in accounting standards), but even without them the Hungarian banking sector would have yielded record results in 2001. In the Slovak Republic in 2001, one-time factors (in this case state-funded bank restructuring measures) in fact had a more prominent effect on the consolidated annual surplus of domestic banks than in Hungary. According to preliminary data for the first half of 2002, the Slovak banking sector appears to continue on a very profitable path. Finally, it is particularly remarkable that Czech banks' balances were positive in 2001 without government support, following several years of losses and a first positive, albeit state-backed result in 2000.

Table 1

Return on Equity

	1997	1998	1999	2000	2001
	%				
Croatia	. .	−16.1	4.8	10.7	14.1
Poland	37.7	9.2	12.9	14.5	12.6
Slovak Republic	. .	−13.4	−36.5	25.2	22.7
Slovenia	10.3	11.3	7.8	11.3	. .
Czech Republic	− 5.3	− 5.2	− 4.3	13.1	14.4
Hungary	11.9	7.5	4.0	12.5	16.2

Source: National central banks, OeNB.

The net interest rate spreads (net interest income as a percentage of average banking assets) recorded in most of the countries under review in 2001 largely corresponded to those for 2000; only in Poland, this indicator went down markedly, which can be attributed to a combination of narrowing interest margins, a rise in the importance of foreign currency loans (on which fees are higher but margins lower) and a clear increase in bad loans.

Table 2

Net Interest Rate Spreads

	1997	1998	1999	2000	2001
	%				
Croatia	. .	. .	. .	4.2	. .
Poland	5.4	4.7	4.0	4.0	3.3
Slovak Republic	. .	. .	. .	. .	. .
Slovenia	4.5	4.1	3.7	4.2	. .
Czech Republic	1.8	3.0	2.6	2.3	2.4
Hungary	3.8	4.3	4.0	3.7	3.7

Source: National central banks, OeNB.

With the exception of Croatia, banking sectors in all Central European countries were able to reduce their cost/income ratio in 2001 (compared to 2000). As operating expenses increased faster than inflation in all countries under observation except Poland, the lower cost/income ratio is mainly attributable to higher operating income.

Table 3

Cost / Income Ratio

	1997	1998	1999	2000	2001
	%				
Croatia	..	..	54.2	56.7	58.5
Poland	55.6	63.0	65.2	63.2	62.2
Slovak Republic	..	62.0	78.6	67.7	65.7
Slovenia	57.3	59.5	61.5	55.3	..
Czech Republic	48.6	49.2	48.7	54.1	53.6
Hungary	70.9	71.2	83.0	73.3	66.5

Source: National central banks, OeNB.

The massive release of risk provisions in Slovakia in 2001 is attributable to the removal of bad loans from banks' balance sheets. In Poland, risk provisions as a percentage of operating income continued to climb even further from an already high level.

Table 4

Risk Provisions as a Percentage of Operating Income

	1997	1998	1999	2000	2001
	%				
Croatia	..	..	..	..	..
Poland	4.4	13.3	14.3	16.3	17.6
Slovak Republic	..	38.4	103.3	−17.1	23.9
Slovenia	21.9	17.0	21.8	23.9	..
Czech Republic	34.0	14.6	0.1	−48.4	2.2
Hungary	− 1.9	9.6	15.2	− 0.9	4.2

Source: National central banks, OeNB.

Capital adequacy ratios in Central Europe remain at a safe level. It must be highlighted in this context that the capital base of Polish banks, which operate in a difficult environment, has been strengthened through external capital and retained earnings. In Hungary, by contrast, tighter competition appears to prompt banks to reduce their capital input in order to raise their return on equity. While the Hungarian capital adequacy ratio clearly declined in 2001 compared with 2000, the two results are hardly comparable as the method of calculation has changed (different asset base) and as new regulatory provisions apply for the capital adequacy ratio.

Table 5

Banks' Capital as a Percentage of Risk-Weighted Assets

	1997	1998	1999	2000	2001
	%				
Croatia	16.4	12.7	20.6	21.3	18.5
Poland	12.5	11.7	13.2	12.9	15.0
Slovak Republic	..	3.1	5.3	12.5	19.7
Slovenia	19.0	16.0	14.0	13.5	..
Czech Republic	9.5	12.1	13.6	14.9	15.4
Hungary	16.7	16.5	15.0	15.2	12.3

Source: National central banks, OeNB.

Sustainability Gains, Threatened by the Economic Situation in Poland
With the exception of Polish banks, 2001 was a very good year for banks in Central Europe. The economic slowdown in 2002 should not have any considerable repercussions for the Central European banking sector. Particularly in the Czech Republic, banking reform and privatization seem to bear fruit. In Hungary, the reduction of the cost/income ratio must be highlighted as particularly positive, bearing in mind, however, that Hungarian banking sector results were obviously boosted by the favorable economic situation. Thus, higher risk provisions would sharply reduce the profits of Hungarian banks. By maintaining a strict cost discipline and strengthening their capital base, Polish banks seem to have adjusted comparatively well to the difficult macroeconomic climate; the slow pace of economic recovery, however, threatens to keep loan losses at a high level.

The Russian Banking Sector
Russian Banks Recover Further from the 1998/99 Financial Crisis,
but Serious Structural Problems Remain
Following the major losses and decapitalization of Russian banks triggered by the 1998/99 financial crisis, banking sector recovery has accelerated over the last few years. After a law on bank bankruptcy was passed in 1999, the Central Bank of Russia (CBR) was able to withdraw the licenses of some of the banks that had been most heavily affected by the crisis. Moreover, selected (particularly state-owned) banks were recapitalized and prudential regulations were eased in order to give the banking sector room for maneuver during the adjustment process. According to the CBR, by the end of 2001, the Russian banking sector had more than compensated the losses caused by the financial crisis. At the end of December 2001, total banking assets in real terms were 22% higher than in July 1998. (Measured in U.S. dollars, however, their value had only increased slightly to around USD 103 billion.) Both the volume of loans to the corporate sector and the total volume of deposits climbed by around one fifth in real terms. Banks' total capital expanded by around 10%. (Based on

Chart 12

Claims on the Private Sector (1993–2001)
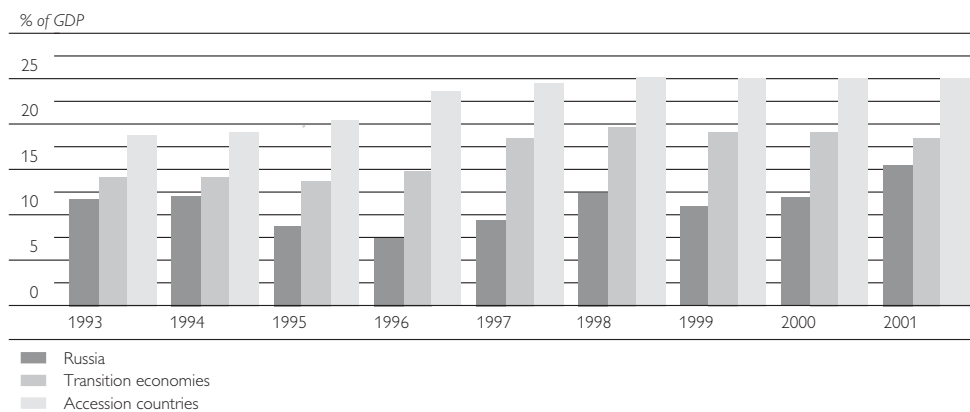
Source: ECB, IMF.

the U.S. dollar, banks' capital base had not yet reached pre-crisis levels, however.)

Compared to other transition economies, and in particular to the EU accession countries, however, the degree of financial intermediation has remained relatively low in the Russian banking sector, even though the situation improved slightly in 2001. While loans to the private sector averaged around 25% of GDP in the accession countries in 1998 and 2001, they climbed from 12.5% to 15.5% in Russia (see chart 12). The rise in banking activity observed in Russia during the last few years is attributable, among other things, to the rise in oil prices (which entailed an upswing in the raw material sector), to the low exchange rate of the ruble, the heightened competitiveness of other economic branches, a pronounced increase in wages and pensions (which stimulated savings), as well as to the general economic uptrend caused by these factors and by savers' diminishing skepticism toward banks.

Coming to more than 1,300 by mid-2001, the total number of Russian banks still appears to be rather high. 80% of Russian banks are rather small, with their total assets amounting to no more than EUR 5 million, while the total assets for almost 50% of banks even remain below EUR 1 million. These very small banks are often considered instable. The Russian banking sector is dominated by two large, state-owned banks (Sberbank and Vneshtorgbank) and 15 to 20 medium-sized private banks. With a staff of 190,000 and 20,000 branch offices, Sberbank, the state-owned savings bank, is by far the largest bank in Russia. Vneshtorgbank, the former state-owned bank for foreign trade, today mainly extends loans to industrial and commercial enterprises. Between them, the two banks hold around one quarter of overall banking sector assets. If we add the banks that are owned by various central, regional and local authorities and state institutions, around 30% of all Russian banks are in public ownership. Together, the 20 largest Russian banks (both privately owned banks and state-owned banks) account for around two thirds of total banking assets.

Sberbank holds around 70% of household deposits and around 50% of total banking deposits; it is the only bank that offers an explicit public deposit guarantee. While Sberbank used to be the largest buyer of public debt instruments, it has strongly expanded its exposure to the corporate sector, in particular to the oil and natural gas industries, over recent years, thus incurring greater risks. Private banks typically take the form of agent banks or pocket banks, which function as a kind of financial department for their owners – mostly larger firms or conglomerates that are often the banks' major depositors or debtors. Some of these "pocket banks" are rather big, such as Gazprombank (associated with the natural gas monopolist Gazprom) or Rosbank (Norilsk Nickel). Against this background, the expansion in credit volume is, among other things, tied to an upswing in the primary sector caused by augmenting oil and raw material prices. Average maturities for deposits and loans have increased somewhat over the past few years. Larger private banks, by contrast, have deposited a considerable part of their resources in foreign hard currency accounts.

Some of the major reasons for the still comparatively modest level of financial intermediation in Russia and, in part, for the above-mentioned behavior of credit institutions are the lack of information on firms and their creditworthiness, insufficient creditor rights and a weak rule of law in general,

as well as the very low capital stock of most banks. To come to grips with the lack of information, rule of law and resources, Russian banks have tended to rely on networks. Another typical feature of the Russian banking sector is that foreign direct investment (FDI) plays only a minor role. At the beginning of 2002, the 35 majority foreign-owned banks accounted for 8.8% of total banking assets. These banks mainly focus on international enterprises, exporters and wealthy private customers. Citibank and Raiffeisenbank, for instance, rank among the 20 largest Russian banks in terms of deposit intake, and Bank Austria-Creditanstalt ranks among the top 30. The low presence of foreign banks is mainly due to the country's relatively unfavorable investment climate.

Today, the major risks affecting the Russian banking system differ from those before the financial crisis of 1998/99: Neither is there a currency mismatch between claims and liabilities nor do banks record a heavy exposure in investment in short-term treasury bills (GKOs). Taking into account the often intransparent nature of lending operations (insider lending) and their partly fragile basis (high prices for oil and raw materials), the recently swift expansion in lending bears a high risk potential, which is aggravated by the fact that a small number of debtors and creditors account for the majority of both loans and deposits.

At the end of 2001, the CBR and the government agreed on a joint plan for further banking sector reform, which inter alia, provides for measures to create a level playing field for state and private banks, to strengthen banking supervision, adapt accounting standards and improve commercial banks' risk management. Authorities also strive for better law enforcement with regard to credit contracts and other contracts.

The resignation of central bank governor Gerashchenko and his succession by Sergei Ignatiev in March 2002 are likely to speed up banking reform policies. By 2004, international accounting standards (IAS) are to become binding for Russian banks. According to estimations, around half of Russian banks would have significant trouble in immediately applying the IAS regime, as their net assets would probably be substantially lower when measured by IAS standards. The creation of a general deposit insurance scheme is scheduled to follow one year after the implementation of IAS; this move would put an end to the privileged position of Sberbank. All banks are to adjust their minimum capital requirements to EUR 5 million by 2007. Today, most banks would have major problems to fulfill such a requirement owing to their extreme undercapitalization.

The Real Economy
and Financial Markets in Austria

Economic Activity

In the first half of 2002, the Austrian economy remained weak, with GDP growing by no more than 0.4% given the extremely modest development of all components of domestic demand, above all a massive decline in gross capital formation. In view of the unfavorable developments on the labor market, household consumption stagnated. Following a declining tendency in previous periods, however, construction investment increased slightly compared to 2001. In the first half of 2002, overall domestic demand contributed −1.5 percentage points to GDP, while net exports accounted for around 2 percentage points. The external balance grew as imports slowed down markedly while subdued economic activity in the EU kept the rise in exports in check. Moreover, the disastrous floods of August 2002 had a slight dampening effect on economic growth in Austria (see box "The Cyclical and Budgetary Impact of the Floods in Austria").

The prolonged economic slack has had obvious repercussions on the labor market. While the number of employed persons (excluding persons doing compulsory military service and persons on paid childcare leave) went down in 2002, the number of unemployed persons went up. In this overall environment, consumers tended to be increasingly pessimistic about the economic situation. Given the modest rise in real income and consumers' heightened uncertainty, households' consumption expenditure expanded only slightly, with the purchase of consumer durables and investment in residential construction contracting in particular.

In the course of the year, the unfavorable economic prospects have prompted enterprises to markedly cut their capital expenditure. Thus, investment in plants and equipment in Austria went down by no less than 14.4% in the first half of 2002. Investment in machinery and electrical appliances and investment in transport equipment saw the most dramatic cuts. The results of the semiannual WIFO Investment Survey indicate a clear decline in businesses' investment intentions in 2002. The manufacturing industry in particular has revised its investment intentions downward because of the unfavorable economic situation.

Austrian industrial output climbed by 0.7% on balance from January to June 2002 against the corresponding period of 2001, with electricity, gas and water utilities reporting the strongest growth, while manufacturing contracted by 0.2%. In the second quarter of 2002, trade turnovers in real terms stagnated at 2001 levels. Following a longer period of negative growth rates in construction, the situation in this sector improved slightly in the first half of 2002, however.

According to the latest budget report to the EU Commission (before September 1, 2002), the general government fiscal balance is no longer expected to be zero, as originally planned, but to come to a deficit of EUR 2.8 billion or 1.3% of GDP. The Federal Ministry of Finance ascribes around one third of this deterioration to government-sponsored flood relief. The remaining two thirds are mainly traceable to the fact that so far, there has been no substantial economic recovery in Austria.

The Cyclical and Budgetary Impact of the Floods in Austria

The devastating floods in Austria in August 2002 caused eight fatalities and entailed an enormous financial damage for the affected areas. From the current point of view, it is difficult to estimate the overall economic impact the floods will have for Austria. Given their dimension, however, the floods can be expected to affect the output level and growth trend of the Austrian economy, government revenues and expenditure — and thus the budget deficit — and the development of the inflation rate, both in the current quarter and in the next quarters.

From an economic point of view, the flood is a typical example of a negative supply shock, as it damaged important infrastructural facilities, caused crop failures, destroyed production sites or forced temporary interruptions in production. We distinguish the following damage categories and consequential effects of natural disasters: First, any direct damage of private and public capital stock; second, any indirect damage caused by shortfalls in production and the possible loss of jobs; third, consequential effects for the economy, attributable to both indirect damage and investments in reconstruction.

Negative supply shocks caused by natural disasters, in turn, tend to entail a positive demand shock triggered by investments in reconstruction — provided that there is no complete crowding out, i.e. that money earmarked for other investment projects is not reallocated to corporate and public reconstruction investments (of the same amount) or that households do not effect their replacement purchases at the expense of other consumptions. Given the adequate provision of additional public funds (transfer payments and investments) and private funds (donations, dissaving and reconstruction loans), the positive demand shock will ironically be higher, the bigger the natural disaster is. The overall effect on GDP growth can also be positive, in total, as losses in wealth caused by direct damage — unlike indirect damage and consequential effects — do not affect the GDP.

According to first estimates, the volume of direct damage will total at least EUR 3 to 5 billion. Determining the indirect damage is more difficult, as in many cases, it is not possible to clearly establish a relation between production losses or losses of jobs and the effects of the flood. It will therefore take quite a while before more exact estimates will be available. As only a few larger enterprises in the flood-stricken areas had to interrupt production, however, the indirect damage (losses in production and wages) caused by the current floods is likely to be smaller — in relation to the amount of direct damage — than that of other natural disasters in the past (around 0.25% of GDP). The effects of the flood vary widely across sectors, with tourist enterprises and farms recording the strongest impact. The bulk of damages impacting GDP growth will become effective in 2002. Investment in reconstruction becomes effective with a certain time lag and will constitute a major growth stimulus in 2003, the impact of which will, in the end, also depend on the size of government support.

We used the Oesterreichische Nationalbank's (OeNB) macroeconomic model to carry out a first, careful quantification of the flood-related damage in Austria, based on the assumption that the government's flood relief package provides around EUR 1.5 billion. Our calculations show that economic growth in Austria is going to decline by 0.12% in 2002 vis-à-vis the baseline scenario but is expected to be 0.2% to 0.3% higher in 2003 owing to investments in reconstruction and replacements. The most important contribution to growth stems from additional investment in construction. As this sector reports excess capacities, the flood will have only minor effects on inflation, if any. Together, the burden of flood relief measures on the revenue and expenditure sides of public finances and the flood's impact on economic activity are anticipated to cause the forecast budgetary balance to deteriorate by 0.4% of GDP both in 2002 and 2003.

Nonfinancial Corporations

In tune with the cyclical dip, the growth of loans to nonfinancial corporations clearly slowed down in the course of 2002. In July 2002, the annual growth rate came to no more than 0.5%, while the volume of loans outstanding decreased by 2% since the beginning of the year. The reduced investment activity dampened businesses' need for funds, while the subdued development of corporate turnover drove down the demand for working capital loans. Both short-term and long-term loans recorded a decline.

Chart 13

Loan Expansion and Economic Growth

Loans to businesses (left-hand scale)
Nominal GDP (right-hand scale)

Source: OeNB.
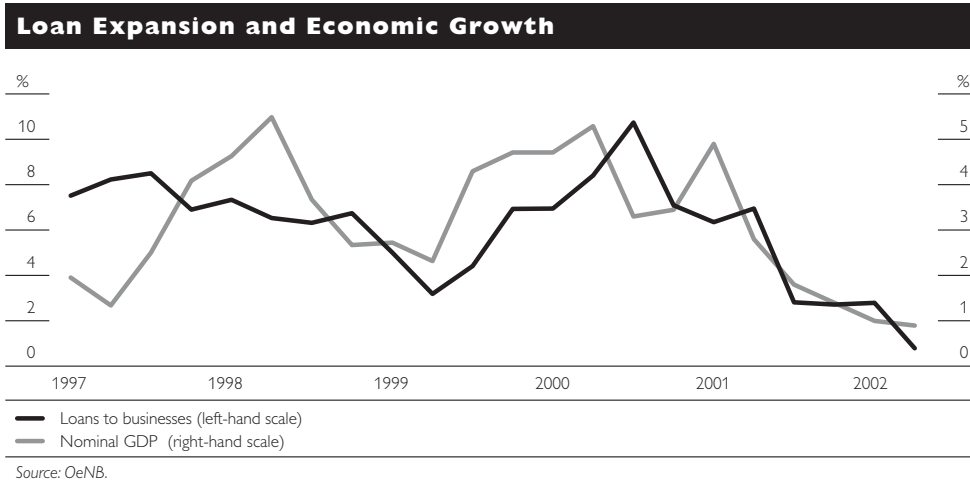
Moreover, the cyclical situation caused corporate credit ratings to deteriorate. While the number of new insolvency proceedings went down by 0.8% in the first three quarters of 2002 compared to 2001 (which so far posted a record in new insolvencies), the number of insolvency proceedings that were closed as "no asset" cases went up markedly again. All in all, the number of Austrian companies which have folded has gone up by about 4%. In the reporting period, liabilities remained 3.6% below the comparable value for 2001, as unlike in the previous year, no large-scale insolvencies occurred. Moreover, the cyclical weakness drove down corporate profits. Austrian businesses' operating surplus

Chart 14

Real Changes in Operating Surplus

Source: Bloomberg, OeNB.
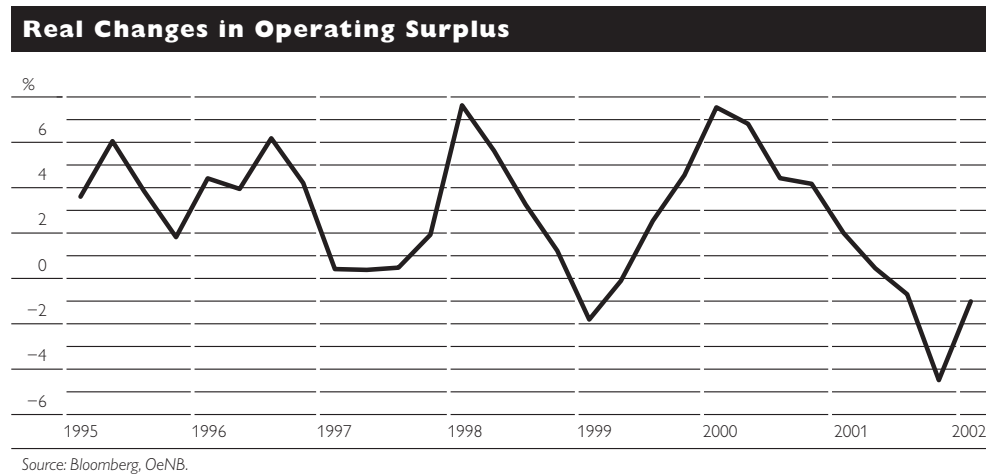
(in real terms) has been on the decline since mid-2001 (see chart 14). The same is true for the Austrian industrial sector's cash flow rate, which went down in 2001 owing to cyclical developments.

In lending to corporate customers[1] the interest margin has widened again since spring 2002, after its expansion had been interrupted between December 2001 and March 2002 (chart 15).[2]

Loan demand decreased not only owing to the cyclical slump in general, but also because in the first half of 2002, businesses replaced bank loans with direct borrowing from capital markets. While the volume of newly issued corporate bonds augmented significantly in 2002, the funds raised by companies via the stock exchange played a comparatively lesser role. In contrast to larger corporations, which are the major issuers of shares and bonds, small and medium-sized enterprises (SMEs) rather tend to rely on loans to meet their need for funds (see e.g. the OeNB's Financial Market Stability Report 1, June 2001). Given their current profitability performance, SMEs were probably not able to rely more heavily on internal sources of corporate finance.

Chart 15

Interest Margin of Commercial Loans

Percentage points

Interest on commercial loans minus one-year money market rate
Interest on commercial loans minus five-year swap rate

Source: OeNB.

---
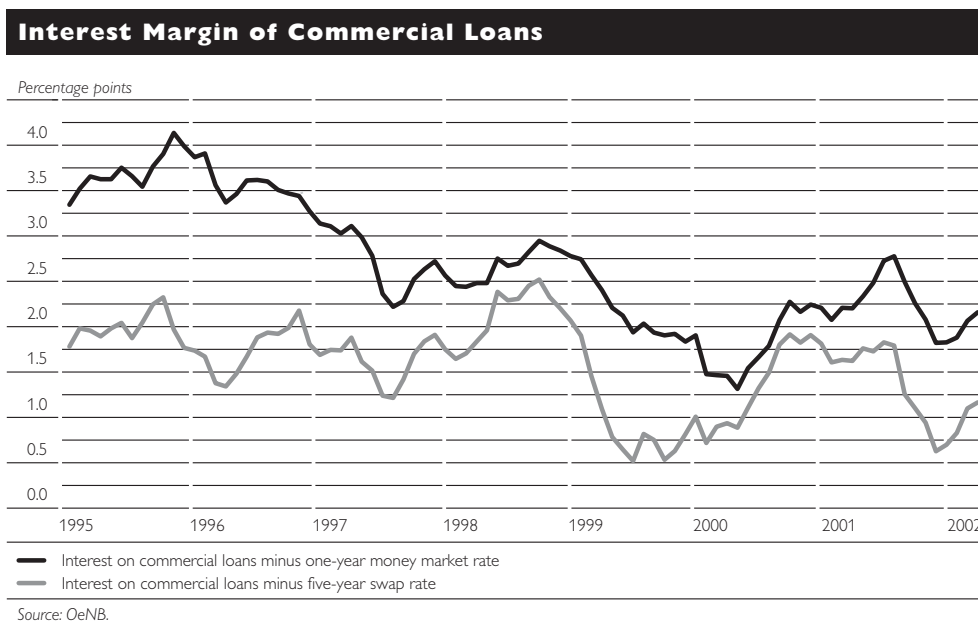
1   *The method we use to determine the interest margin is based on the study "EU Banks' Margins and Credit Standards" (ECB, December 2000), which compares interest on commercial loans to interest on alternative forms of investment with equal maturity periods. As a reference rate for corporate loans, the ECB uses the five-year swap rate. Given the uncertainties this method is necessarily fraught with, we used the one-year money market rate as an additional reference rate. Both rates depict more or less the same interest margin development over time.*

2   *It must be pointed out, however, that the interest margin is affected by a variety of factors, such as the maturity period of loans and the yield curve, and that it is therefore not advisable to use the interest margin as the only indicator in risk assessment.*

Chart 16

Funds Raised by Austrian Businesses

Changes in EUR million

| | First six months 2000 | First six months 2001 | First six months 2002 |

■ Loans
■ Stock exchange issues
■ Bond issues

Source: OeNB.
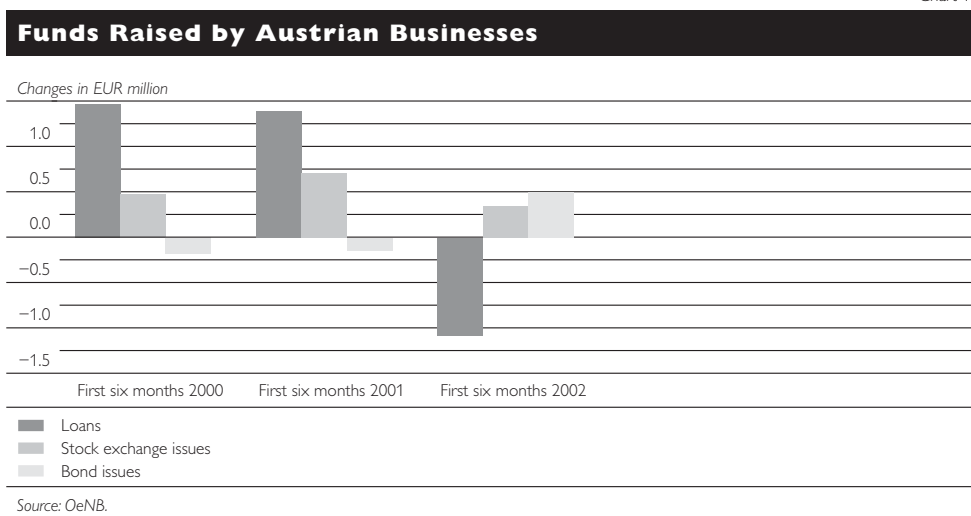
The broadening of Austrian businesses' refinancing base and the increased use of financing instruments that qualify as equity are not primarily attributable to the use of risk-mitigating strategies or companies' enhanced profitability, but were triggered by the flattening output and cash flow. Since corporate loans essentially developed in line with the economy in general, there is no evidence for a credit crunch that would go beyond a cyclically induced fall in the demand for loans (see also box "Is There a Credit Crunch in the Euro Area?"). The default probability of corporate financing remained high, however.

Is There a Credit Crunch in the Euro Area?

Is the marked slowdown in loan expansion recorded in the euro area since the last quarter of 2000 a cyclical phenomenon or does it indicate a credit crunch?

A credit crunch exists if the credit supply declines because lenders show a heightened sensitivity to credit risk which leads them to tighten their lending standards. In such a case, banks refuse to lend to creditworthy borrowers because they lack adequate funding. If they did lend, borrowers would normally have to pay higher interest for otherwise identical loans. Thus, typically, the spread between lending and deposit rates serves as an indicator of credit rationing. A widening of this spread might indicate that banks have restrained lending.

Chart 17 shows that – compared to the period from 1993 to 1996, when loan growth also markedly declined – in 2001 and 2002 the spread between interest and deposit rates has been relatively stable in the euro area. The only exception was the spread between deposit rates and interest on consumer loans, which, while remaining at a historically low level, still widened considerably compared to 1999 and 2000. In the course of 2001, this gap narrowed again, however.

As chart 17 shows, the spread between lending and deposit rates does not point to a credit crunch in the euro area. It may be, however, that adverse selection prevents banks from raising interest rates, prompting them, instead, to restrain lending to higher-risk borrowers. This means that a credit crunch may in fact exist even though interest rates have not been raised.

Calculations based on the ECB's econometric model for credit demand show that the current slowdown in loan expansion indicates a normalization of lending rather than a credit rationing that

Chart 17

Spread Between Lending and Deposit Rates in the Euro Area

%

- Loans with a maturity of up to one year (nonfinancial corporations)
- Loans with a maturity of more than one year (nonfinancial corporations)
- Consumer loans (households)
- Home and home improvement loans (households)
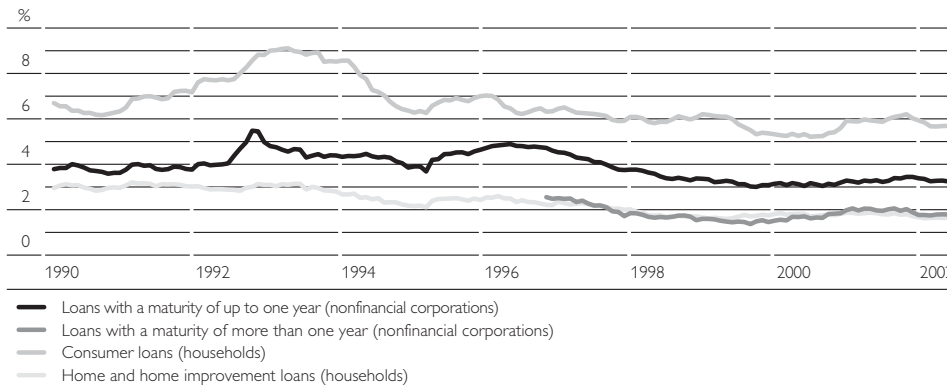
Source: ECB.

might give cause for concern.[1]) In 1999 and 2000, strong economic growth as well as some special factors, such as intense merging and acquisition activities and the booming residential construction activity in some euro area countries, contributed to a boost in lending.

The development of loans as a percentage of GDP over the last few years also points in the same direction, thus offsetting the slowdown in loan growth in the last quarter of 2000. Chart 18 shows that, aside from a short interruption in early 2001, the loan-to-GDP ratio has been continuously on the rise whereas in the period from 1993 to 1996, it had been on the decline.

Chart 18

Loan Growth and Loans
as a Percentage of Nominal Euro Area GDP

% %

- Loans as a percentage of nominal GDP (left-hand scale)
- Loan growth (right-hand scale)
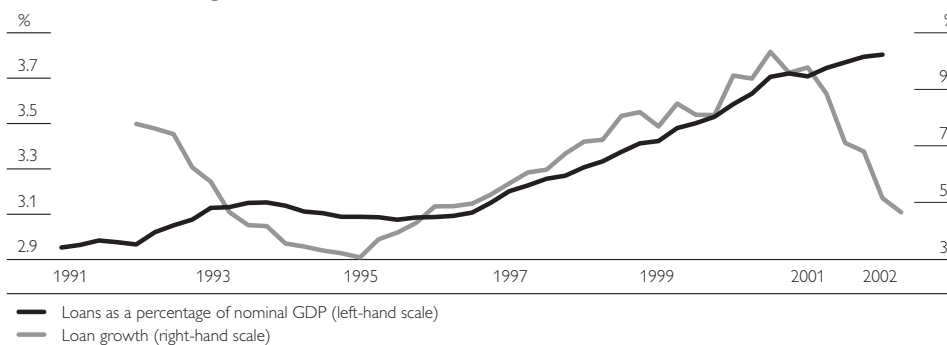
Source: ECB.

Moreover, liquidity in the euro area banking sector has improved and banks have made provisions against loan losses that occurred in 2001. The slow pace of loan growth in the euro area today can thus be primarily attributable to the current weakness of the economy. This study, however, does not analyze differences across countries. It should be pointed out that the availability of loans will also depend on the further development of the European banking system.

1   See Calza, A., Gartner, G. and Sousa, J. (2001). Modelling the Demand for Loans to the Private Sector in the Euro Area. ECB Working Paper No. 55, April.

Households

Households' Portfolios Record Significant Valuation Losses

Given the cyclical downturn in Austria, the growth of households' disposable income slowed down markedly. Consumers either saved less or borrowed more to finance their consumption expenditure, which continued at a high level. As weaker income caused a slowdown in saving, households accumulated fewer financial assets. Funds invested in the financial markets came to EUR 10.9 billion, which is almost EUR 3 billion below the figure recorded in 2000. The acquisition of nonfinancial assets (housing investments) also remained below the average of previous years.

At the same time, the structure of financial investment clearly changed in 2001. Following the remarkable investments in shares and mutual fund shares recorded in previous years, 2001 saw two thirds of new allocations shift to deposits with domestic banks.[1]) Even though households' deposits continued to expand in the first half of 2002, growth rates showed a downward trend. The purchase of securities and mutual fund shares, by contrast, clearly decreased in 2001, and investments in life insurance as well as contributions to pension funds remained below the level recorded in the previous year.

Households' equity portfolios contracted in 2001 and by year-end, the volume of mutual fund shares had gone up by just under EUR 0.5 billion compared to the beginning of 2001. Given the fall in equity prices in 2001, households' portfolios recorded valuation losses to the amount of EUR 2.4 billion. Even though the corresponding financial accounts data are not yet available, this trend is expected to have continued in the course of 2002 and to have been aggravated by the falling exchange rate of the U.S. dollar. Thus, mutual fund statistics recorded a reduction in assets by 19.5% for Austrian equity funds in the first half of 2002. Even so, the development of retail fund sales in the first six months of the year indicates that households probably continued to invest in these funds regardless of the massive price losses.

The considerable valuation losses of equities and mutual fund shares Austrian households were confronted with in 2001 had only little effect on household expenditure (see box "Impacts of Falling Stock Prices on the Austrian Economy"), as the share (and absolute level) of equity investment (direct investment or investment in mututal funds) is still comparably low by international standards despite the uptrend observed over the last few years. In 2001, the valuation losses in households' equity portfolios corresponded to around 2½% of disposable income. The development of households' disposition to save indicates that they smooth their final consumption expenditure over time.

---

1   This augmentation was partly attributable to the euro cash changeover. Cash inventories were clearly on the decline in 2001.

Impacts of Falling Stock Prices on the Austrian Economy

The rise in stock prices observed in international financial markets in the second half of the 1990s prompted Austrian households to adjust their investment behavior. Thus, in this period, private investors increasingly bought marketable securities issued abroad, which clearly drove up the share of equities and mutual fund shares in households' portfolios (from 6.2% to around 16%) between 1995 and 2000. When international stock prices started to fall in 2000, Austrian stock prices deteriorated as well. Since then, the assets households built up by buying marketable securities have seen a considerable correction, with their value diminishing by EUR 3.4 billion. Together with households' more hesitant investment behavior, these negative value corrections contributed to a slight fall (to 15.6%) in the share of equity wealth and funds' assets in total financial assets in the previous year.

Chart 19

Allocation of Households' Assets

Source: OeNB.
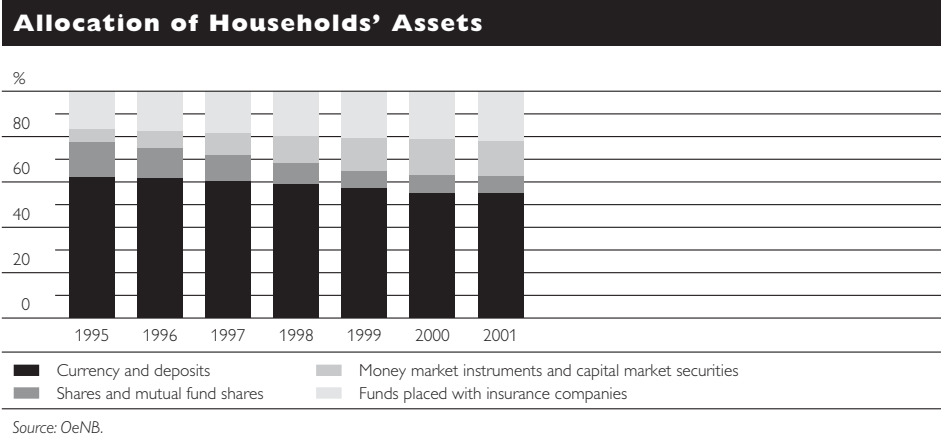
In Austria, the fall in stock prices is unlikely to have a significant dampening effect on consumer demand. Compared with the U.S.A., where the majority of financial assets is invested in equity markets and wealth effects thus have a correspondingly stronger impact on overall demand, the equity wealth held by Austrian private investors is significantly low. Moreover, marketable securities are distributed unevenly among investors. Persons with higher income are able to bear market risks more easily and thus invest more heavily in equity markets than lower income groups; in other words, investor concentration in marketable assets is high. A decline in stock prices thus only affects overall consumer demand to a limited extent. Reduced income replacement benefits from pension funds, which invest large parts of the funds entrusted to them in the capital market, should have no overall economic effects either, as private pension savings do not have the same importance in Austria as in the Anglo-Saxon world. Consumer demand is not expected to slacken owing to losses in the value of financial assets, given households' interest in stabilizing their consumption over time. On the one hand, households might try to offset the losses in wealth by saving more in order to reestablish the desired level of asset wealth. On the other hand, the low share of equities and mutual fund shares in households' portfolios (compared to other types of investment) and the high degree of investor concentration in these two investment categories suggests that households tend to adapt their saving behavior − and thus capital formation − to the current situation on the capital markets rather than their consumption expenditure.

Given that small and medium-sized enterprises prevail in Austria, the equity market plays a relatively smaller role in mobilizing capital here than in other countries. Even though the fall in stock prices in the international financial markets also affected securities listed on the Austrian stock exchange, the drop in stock market prices has up to now not been as pronounced as on the international markets. Therefore, overall investment demand in Austria remains unaffected as falling stock prices have up to now not driven up capital costs.

Price losses, however, have caused cuts in the current (defined-contribution) benefits of several thousand persons drawing supplementary pensions from pension funds. The considerable use of mutual funds and life insurance contracts – and in particular insurance contracts whose performance is linked to that of mutual fund units – as repayment vehicles for foreign currency-denominated loans may also have an effect. If recent equity price developments already impacted the expected performance of these repayment vehicles, it is easily possible that allocations to precautionary saving might have increased at the expense of planned consumption expenditure.

Borrowing is Slowing Down
Low consumer confidence in the face of the cyclical downturn has visibly damp-ened households' demand for loans. In the first half of 2002, loans to households climbed at a markedly slower pace than the long-term average. The slowdown was most pronounced in the demand for housing loans.

Chart 20

Interest Expenses for Loans to Households[1])

Source: OeNB.
[1]) Interest rate payable for loans to households (according to the OeNB's interest rate statistics) applied to loans outstanding to households; quarterly data.
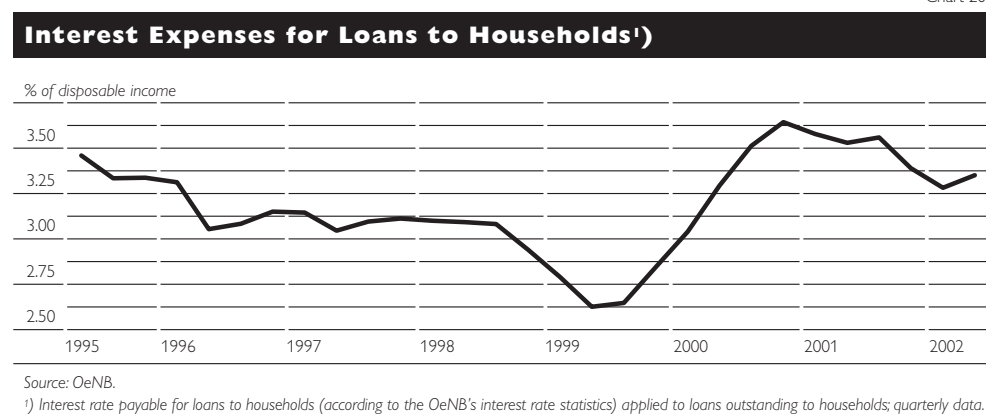
Households' credit burden as a percentage of disposable income has con-tinued to increase, however. By mid-2002, loans accounted for almost 50% of disposable income, compared to 30% at the end of the 1980s. As loans are serviced from future income and income prospects have become more insecure, it cannot be excluded that the risks associated with households' debt-servicing capacity might grow.

Even though households' current repayment capability has most likely profited from the favorable interest rate developments, households have become more dependent on such developments as their debt has increased over the last few years. This means that if interest rates go up, as in 2000, a pronounced rise in the rate of interest expenses can be expected. Moreover, exchange rate developments have a growing influence on debt servicing, as the share of foreign currency loans in total bank loans continues to rise.[1]) The volatility of house-holds' liabilities and the costs of servicing these liabilities are increasing con-tinuously. All in all, households' financial position has become more fragile during the first half of 2002.

1   See the study "Foreigen Currency Loans in Austria – Efficiency and Risk Considerations" in this issue.

Chart 21

Loans to Households Affected by Private Bankruptcies

Share in total volume of loans to households in %

Full year
First half
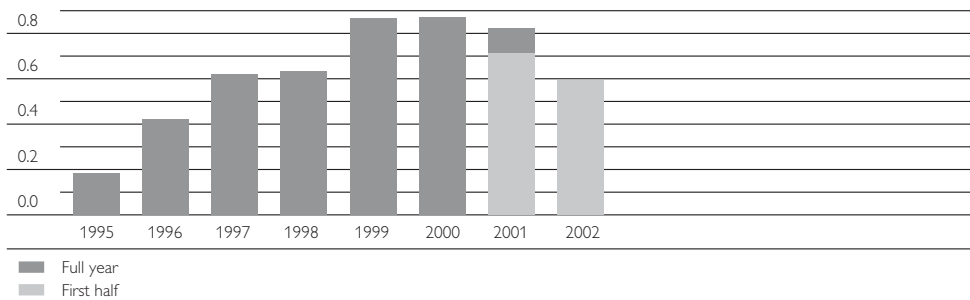
Source: Kreditschutzverband von 1870, OeNB.

During the first six months of 2002, the number of private bankruptcies went up by 6.5%. For the first time since private bankruptcy was made legally possible in 1995, however, the estimated liabilities affected by insolvencies have been on the decline. Before the amendment of the Bankruptcy Act in effect as of July 1, 2002, private bankruptcy petitions could only be filed by persons with a regular income (from wages or pensions). A deterioration in the job market could thus have caused a decline in the number of bankruptcy petitions. The fact that the number of petitions dismissed as "no asset" cases has increased markedly supports this assumption. According to the Kreditschutzverband von 1870, bank loans account for around three quarters of the liabilities involved in private bankruptcy proceedings. This would mean that in the first half of 2002, around 0.6% of the bank loans taken out by private individuals were affected by private bankruptcies; this figure is slightly lower than the comparable figure for 2001 (see chart 21).

Households' Net Investment Position Has Increased
The financial assets held by households at the end of 2001 exceeded households' liabilities by EUR 196 billion. Since 1999, however, households' net wealth in relation to liabilities has contracted (see chart 22). Moreover, households'

Chart 22

Households' Net Financial Assets

EUR billion   *% of liabilities*

Net financial assets (left-hand scale)
Net financial assets as a percentage of liabilities (right-hand scale)
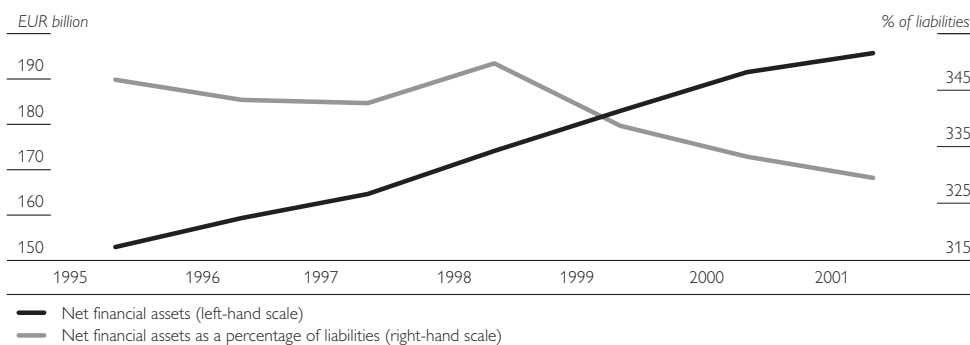
Source: OeNB.

investments and loans are increasingly fraught with risks, as investments are exposed to growing market and price risks and loans to greater exchange rate and interest rate risks.

Stock Markets

Following a climb during the first four months of 2002, the Austrian Traded Index (ATX) was around 6% below the level of end-2001 at the end of the third quarter of 2002. Compared to stock price developments at the Frankfurt, London or New York stock exchanges since the beginning of 2000, losses at Wiener Börse have clearly been less pronounced.

As explained in detail in the OeNB's Financial Stability Report 3 (June 2002), the favorable price performance largely depended on the sectoral structure of the Vienna stock exchange with its high share in "cyclical" values, which tend to be far less sensitive to higher market uncertainties. The general crisis of confidence that hit the international equity markets in the wake of fraud incidents and irregularities in corporate reporting also had an impact on the Vienna stock exchange, however.

Chart 23

Price Development in the Vienna Stock Market

by International Comparison

Index: January 1, 2000 = 100

ATX · DAX · FT All-Share Index · Dow Jones industrial index

Source: Datastream.
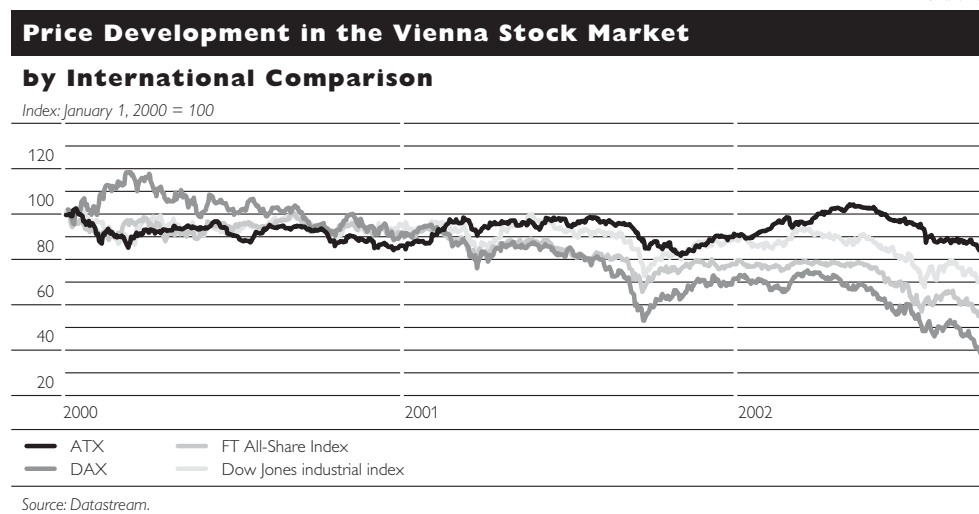
Following price gains in the first months of 2002 and improved profit expectations for the businesses covered by the ATX, the price/earnings ratio of the Viennese stock market has clearly augmented since the beginning of the year. This development was not in line with international markets, which lately had registered pronounced losses in valuation. In the third quarter of 2002, the price/earnings ratio of the ATX was for the first time higher than that of the German DAX index. Still, the current valuation of the Vienna stock exchange remains low by international standards.

Given the weak development of stock prices and the general stock market uncertainty, Wiener Börse AG did not record any new listings in the first three quarters of 2002. However, the issuance of new shares to the tune of around EUR 642 million by Erste Bank marked the largest capital increase in the history of the Austrian stock market so far. Totaling almost EUR 1.2 billion, the volume

Chart 24

Price/Earnings Ratio in the Vienna Stock Market

by International Comparison

ATX — FT All-Share Index
DAX — Dow Jones industrial index

Source: Datastream.
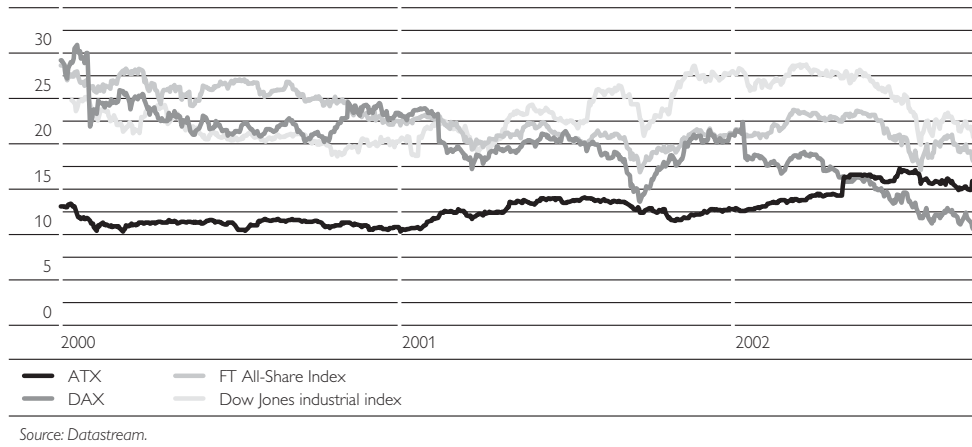
of funds raised by capital increases against cash deposits was almost twice as high
in the first eight months of 2002 than the overall figures of previous years.

The market liquidity on the Vienna stock exchange has remained low, how-
ever. Sales continued to decline in 2002, which is attributable to the low num-
ber of listed enterprises. Even in months of strong capital gains, sales did not
augment. In the first four months of 2002, the volume of domestic shares sold
at Wiener Börse was around 7% smaller than in the following four months.
Over the last few years, bank mergers reduced the number of market partici-
pants; moreover, the merged institutions also gave up part of their market
maker obligations. In addition, large-scale transactions are often handled outside
the stock market and thus do not enter the sales statistics.

Chart 25

Equity Sales at Wiener Börse

EUR million

Source: Wiener Börse AG.
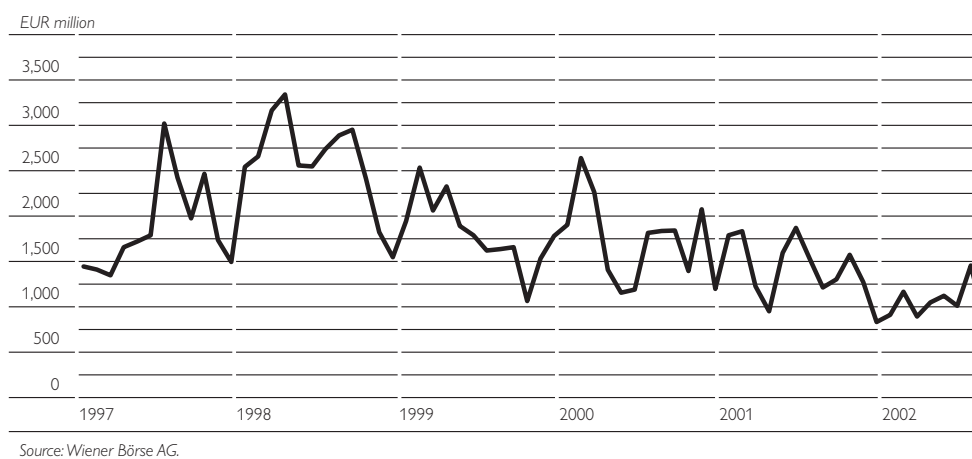
The delisting of stocks traded heavily at the Vienna stock exchange, such as stocks by Bank Austria or Austria Tabak, also contributed to the reduction of trading volumes. All in all, in the first three quarters of 2002, seven enterprises delisted from Wiener Börse, bringing down the number of listed enterprises to 92.

The newly adopted Company Pension Fund Act, which provides for the outsourcing of termination benefits to dedicated severance funds, is expected to boost the demand for shares at Wiener Börse. The equity exposure of these severance funds may reach up to 40%, even though in practice, it is expected to be by far lower. Particularly in the initial stages of implementing this new scheme, the vast majority of funds is likely to be invested in bonds such as to meet the mandatory capital guarantee.

In September 2002, a new state-subsidized personal pension scheme was introduced, which is specifically geared to boost the Austrian capital market. The new scheme requires that at least 60% of the plan assets be invested in shares listed at stock exchanges in the European Economic Area (EEA) which have a market capitalization of below 30% of GDP. Currently, this is only the case in Austria, Greece and Portugal. The Austrian stock exchange would thus play an important role in this scheme.

Moreover, the uniform Austrian Corporate Governance Code, which entered into force in October 2002, is expected to enhance investors' confidence in the Viennese stock market. The code provides an – albeit uncommittal – regulatory framework for corporate management and supervision, containing guidelines for the disclosure of shareholder information and the appointment of board members, the scope of executive responsibility and the interaction of corporate decision-making bodies.

Bond Market

The central government and banks continue to be the major issuers in the Austrian bond market. In the first half of 2002, the central government accounted for 57% and banks for 39% of the total volume of bonds outstanding. Austrian businesses tapped the bond market only to a limited degree, but nonetheless the net issuance of corporate bonds reached a record EUR 494 million in the first half of 2002. Corporate bonds thus made up 2.2% of the total volume of bonds outstanding. While formerly electricity suppliers had been the major issuers, representatives of a range of different sectors have entered the market more recently. The increase in corporate bond issuance may be attributable to rising risk premia as credit ratings deteriorated because of the slowdown in economic activity. Furthermore, the integration of European capital markets has undoubtedly facilitated the issuance of corporate bonds; after all, 60% of all new issues were sold abroad between 1999 and 2001.

Chart 26

Net Issues by Domestic Nonbanks

in the Austrian Bond Market
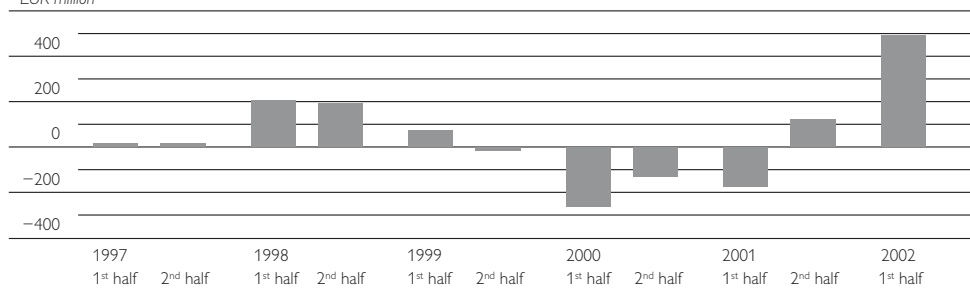
Source: OeNB.

According to financial account statistics, almost two thirds of all bonds issued by Austrians were held by foreign investors at end-2001, about a quarter was part of the portfolio of the Austrian financial sector (banks and institutional investors); however, this share has been trending downwards recently (see chart 27). By comparison, private nonbanks held very small amounts of domes-

Chart 27

Creditor Structure of the Austrian Bond Market

■ Financial sector
■ Nonfinancial sectors
■ Foreign creditors
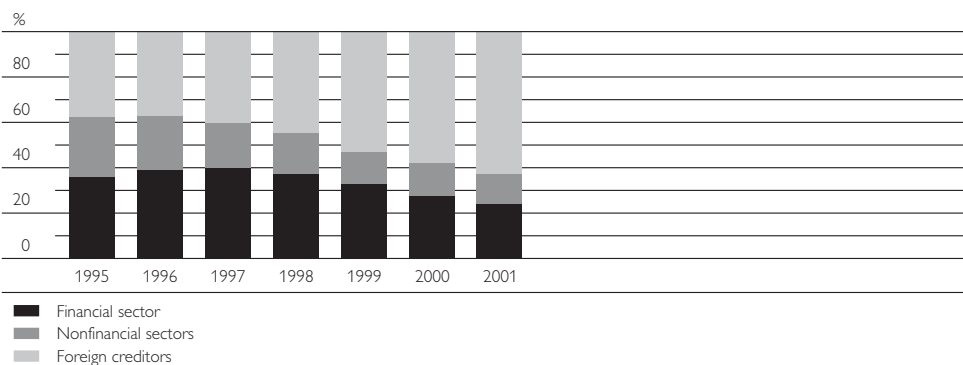
Source: OeNB.

tic bond issues. Households accounted for some 6% of the total volume out-standing and the corporate sector for less than 3%, since over the past few years direct holdings of bonds have been increasingly replaced by mutual fund shares. By contrast, bonds issued by nonresidents have increasingly featured in Austrian investors' portfolios for the past few years. While holdings of domestic debt securities diminished slightly between 1998 and 2001, foreign securities hold-ings more than doubled.

The new severance payment scheme may foster further disintermediation trends, at least in the medium term. Up to now, enterprises have collateralized provisions for severance payments predominantly with domestic debt securities. Once these debt securities are transferred to the newly established severance funds, the share of (Austrian) debt securities in companies' allocation of funds will continue to decrease. If in the course of the liquidation of provisions for severance payments enterprises sell off large amounts of bonds, the price level in the Austrian bond market may go down.

Having narrowed significantly in 2001, the yield spread between Austrian and German 10-year government bonds has hardly changed until the cut-off date. Since spreads have contracted in almost all euro area countries, this devel-opment might be partly traceable to an increasing amount of German govern-ment bonds in the market. Without any doubt, market liquidity continues to be one of the key reasons for differences in government bond yields across the euro area. High issue volumes are hard to achieve for countries with a comparably small domestic issuing potential and a relatively small annual funding volume. Therefore Austria still recorded the highest interest differential to Germany among AAA borrowers in the euro area.

Chart 28

Yield Spread between Austrian and German

10-Year Government Bonds

Percentage points

Source: OeNB.

Financial Intermediaries in Austria
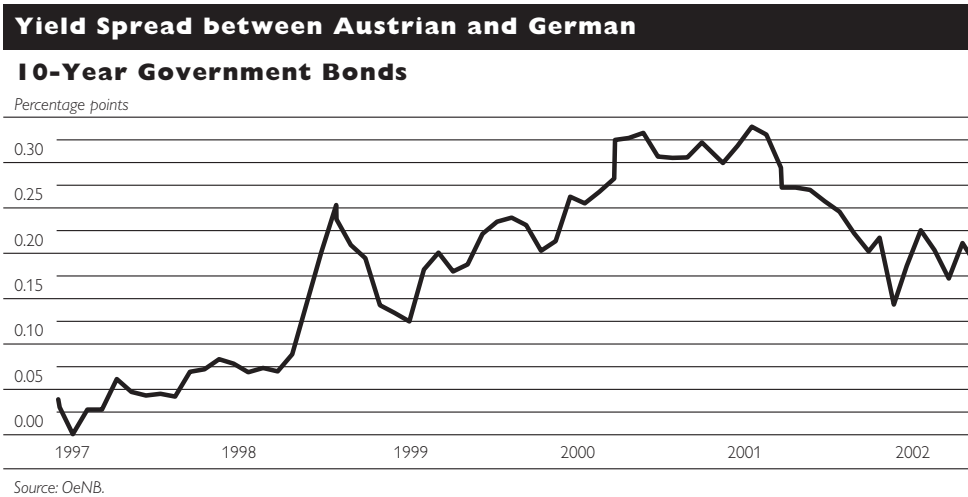
Framework Conditions

Difficult Conditions for Financial Intermediaries

Persistently sluggish international stock markets, a string of accounting debacles in the U.S.A., and plunging corporate profits have further eroded investor confidence. Many European banks are currently faced with deteriorating credit quality and a rising number of credit defaults in the wake of corporate bankruptcies. As the bearish mood prevails, income from fees and commissions as well as from other business activities, such as investment banking and IPOs, has been on the decline. In some countries, including Germany, unfavorable cost structures have increased pressure on banks to lay off staff.

Given the difficult market conditions, Austrian banks' profitability performance has also been deteriorating while loan loss provisions had to be stepped up. Nonetheless, the situation Austrian banks are currently faced with is very different from that of German banks. While the major Austrian banks have embarked on a long-term investment strategy in Central and Eastern Europe, which has yielded high profits for quite some time, many large German banks have entered highly competitive markets, e.g. the U.S.A., and hotly contested market segments such as investment banking. Furthermore, national and international large-scale bankruptcies affect German banks much more strongly than Austrian banks. At 28%, the number of corporate insolvencies in Germany went up more rapidly than in Austria in the first three quarters of 2002. Despite a number of unexpected incidents, including the damage caused by the floods of summer 2002, the Kreditschutzverband von 1870 (KSV) has recorded only a slight increase (by 4%) in insolvencies so far. Also, given that German banks often maintain closer links with insurance companies than their Austrian counterparts, large claims on insurance policies affect them more severely.

Stress tests for a number of scenarios[1]) underpin the perception that Austrian banks have proved fairly robust in this adverse environment. The structural adjustment measures taken in the past few years, greater recourse to synergies within sectors, for instance in the savings bank sector, as well as the banks' strong foothold in the Central and Eastern European markets proved to be key stabilizing factors. External developments are currently not posing a threat to the stability of the Austrian banking sector; however, banks' and insurance companies' profit and cost developments do in fact deserve close monitoring.

Current Financial Market Developments

The newly established Financial Market Authority, responsible for banking, securities, insurance and pension fund supervision, took up operation in April 2002; these areas of supervision have also literally been brought together under one roof in the meantime. The E-Money Act, which entered into force also in April 2002, provides the legal framework for the issuance of electronic money, requiring, among other things, e-money institutes to obtain a license to do business.

---

1   See the study "A Macroeconomic Credit Risk Model for Stress Testing the Austrian Credit Portfolio" in this issue, and Kalirai, H. and Scheicher, M. (2002). Macroeconomic Stress Testing: Preliminary Evidence for Austria. In: Financial Stability Report 3 of the OeNB.

Since August 2002, the Austrian Federal Financing Agency has offered Federal Treasury bills and notes for a minimum of EUR 100 to individual investors. These Federal Treasury bills and notes with maturities of 1, 3, or 6 months yield much higher interest than savings accounts. The issuing value was EUR 100 million; by mid-October 2002, investors had acquired Federal Treasury bills and notes to the tune of about EUR 50 million. Investors thus did not shift their assets on a large scale, the attractive interest rates notwithstanding.

Banks

Subdued Total Asset Growth

Total asset growth was fairly subdued in the first six months of 2002. The takeover of Bank Austria AG by Bayerische Hypo- und Vereinsbank AG (HVB) was, once again, key to this development, as restructuring measures and transfers of Bank Austria AG activities to the balance sheet of HVB, which had already been launched in 2001, fed through to the first months of 2002. Also, the weak total asset growth rate apparently reflected cyclical movements. The economic slowdown notably dampened loan growth and, as a consequence, total asset growth. A calculation not taking into account Bank Austria AG shows that all other large banks also recorded a marked decline in total asset growth in the first half of 2002. By the end of June 2002, the annual total asset growth of Austria's major banks excluding Bank Austria AG came to 2.9%, compared to 8.2% in the previous year. Also, total asset growth calculated for the median bank[1] has been on the decline since the beginning of 2002; year-on-year, however, the median bank registered a rise in total asset growth (June 2001: 5.0%; June 2002: 6.8%). Chart 29 shows that the total asset growth of the median bank has been significantly higher than that of the major banks since the beginning of 2002.

Chart 29

Austrian Banks' Total Asset Growth

Legend: Total | Mean of the largest banks (excluding Bank Austria AG) | Median bank

Source: OeNB.
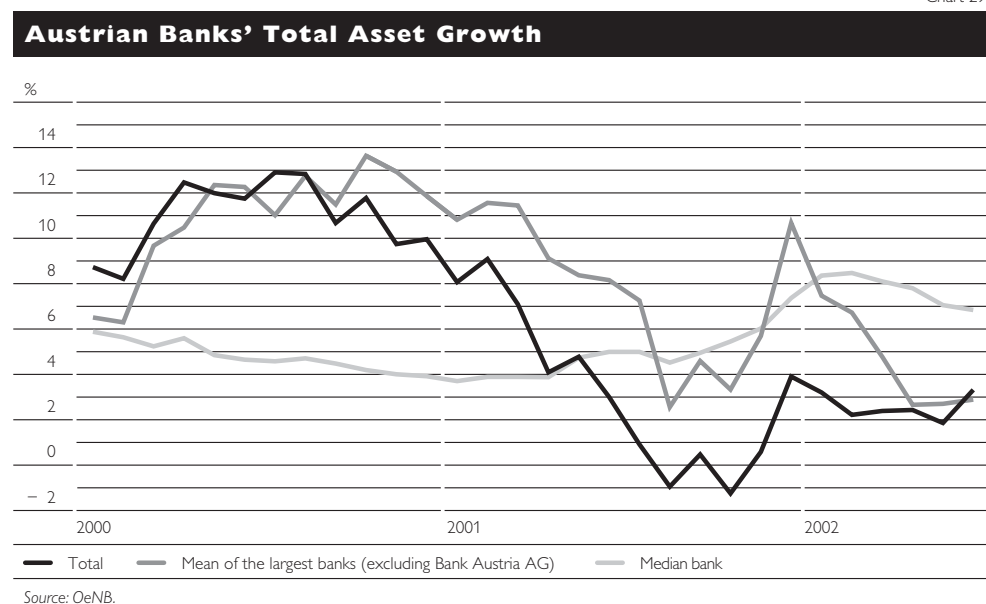
1 The concept "median bank" denotes a hypothetical credit institution of which can be said that its indicator or ratio (e.g. total asset growth, total assets, cost/income ratio, etc.) is lower than that of 50% of all credit institutions. The median bank represents a "typical" or "average" Austrian bank for a given indicator or ratio (for details, see the OeNB's Financial Stability Report 3, p. 28).

In absolute terms, total assets recorded by all Austrian banks (including special purpose banks) amounted to EUR 581.2 billion in June 2002, with special purpose banks and state mortgage banks posting above-average growth rates (+5.6% and +8.4%, respectively) and savings banks a decreasing growth rate (–2.3%). A breakdown by banks reveals that Bank für Arbeit und Wirtschaft AG (BAWAG) registered a significant acceleration in asset growth, which is attributable to restructuring measures after the takeover of Österreichische Postsparkasse AG (P.S.K.). Austrian banks' branches abroad posted a sharply declining growth rate (–8.3%) because Bank Austria AG's foreign branches were incorporated into HVB.

Sustained Growth in Derivatives Trading
The total volume of derivatives traded by Austrian banks (futures, options, swaps, etc.) came to EUR 1,233 billion by end-June 2002, 21% up from the previous year's figure. Thus, the volume of derivatives trading for the first time exceeded Austrian banks' total assets more than twofold. Interest rate contracts[1]) made up the largest share (83%) of derivatives trading and for the first time surpassed the EUR 1 trillion mark at the end of the second quarter of 2002. Exchange rate and gold contracts accounted for the second largest share (16%) of the volume of derivatives traded. Amounting to EUR 7.5 billion, contracts in stocks made up the bulk of the remaining total volume. All other derivative contracts, such as precious metal contracts or commodity contracts, play a subordinate role in the Austrian banking sector.

Chart 30

Derivatives

As a percentage of total assets

Interest rate contracts (left-hand scale)
Exchange rate and gold contracts(left-hand scale)
Annual change in exchange rate and gold contract trading (right-hand scale)
Annual change in interest rate contract trading (right-hand scale)

Source: OeNB.
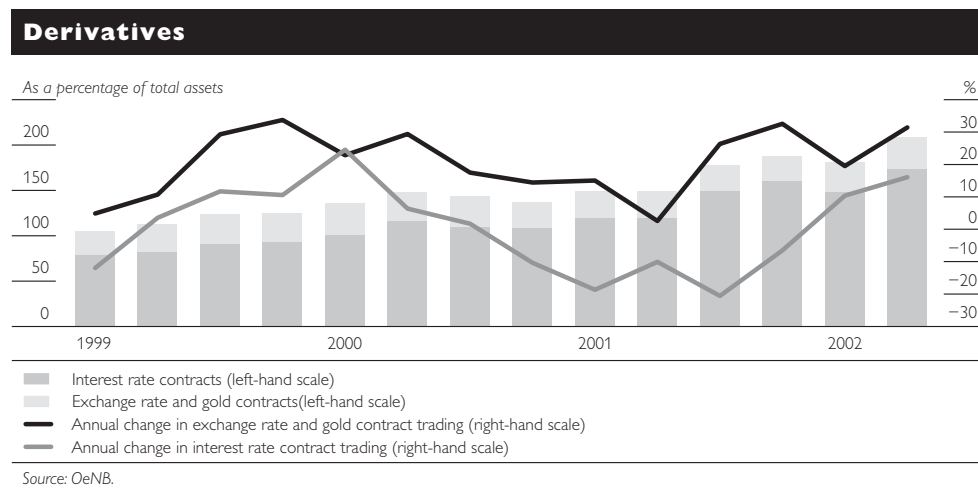
As chart 30 shows, trading in derivative interest rate contracts has been rising steadily since 1999, which can be attributed first and foremost to the increasing importance of interest rate swaps in banks' asset/liabilities manage-

1   An ordinary interest rate swap entails the exchange of a fixed interest rate payment against a floating rate payment. The given volumes refer to the notional amounts, which are used to calculate the interest payments and which are not exchanged between the contracting parties. This is why the actual amounts transferred and the risk involved are much lower than the given volumes.

ment and interest rate risk management. After the growth rates of trading in interest rate contracts as a percentage of total assets had been going down since 2000 and growth almost stalled in the first half of 2001, business has picked up notably since the second quarter of 2001. Compared to the previous year, the total volume of trading in interest rate contracts had widened by 30% to EUR 1,022 billion by end-June 2002. Apart from the basic increase in interest rate contract trading, the changes in the growth of the volume of interest rate contract transactions depicted in chart 30 do not represent an overall trend but can largely be traced to different developments in the volume of derivative trading of the banks involved (mainly major banks). Significantly well over 90% of the total volume of interest rate contract trading are ascribable to the ten largest banks. The bulk of Austrian banks (85%) is in no way active in interest rate contract trading. For another 10% of Austrian banks, the volume of interest rate contracts traded comes to less than 10% of their total assets. This is chiefly attributable to the fact that in the multi-tier sectors, it is usually the central institution (or the Landesbanken in the Raiffeisen sector) which performs assets/liabilities management and controls interest rate risk for the entire sector.

A more in-depth assessment of the interest rate risk that derivative interest rate contracts and other interest rate-sensitive instruments are exposed to will be feasible only in 2003, since all banks will be required to report interest rate risk statistics as of December 31, 2002. Under the transitional provisions, 13 banks are currently required to report interest rate risk statistics for the entire planned portfolio volume. Since only a small number of banks are reporting for the first time, the implications for financial stability are still quite uncertain. The available data indicate, however, that the interest rate risk in the banking book decreased in the second quarter of 2002. A risk measure used by the Basel Committee on Banking Supervision is the decline in a bank's economic value as a result of an interest rate shock of 200 basis points in relation to eligible own funds. For the currently reporting banks these measures averaged 6.6% in June 2002. From a risk perspective it must be acknowledged that none of the reporting banks recorded values surpassing the 20% ceiling specified in the Basel Accord.

Owing to the lower exchange rate risk, the volume of exchange rate and gold contracts had shrunk since the start of monetary union – though with a time lag of approximately one and a half years – from EUR 192 billion in the third quarter of 2000 to EUR 157 billion by end-2001. Since then, the growth rates of the volume of exchange rate and gold contract trading has been on the rise. At the end of June 2002, growth came to 23% against the previous year; the volume of transactions thus reached a high of slightly over EUR 200 billion. This increase may be mainly attributable to transactions associated with collateralizing foreign currency loans, whose total volume continued to augment in the first half of 2002, by almost 7% against the previous year.

Increasing Investment in Lower-Risk Securities
The total volume of Austrian banks' securities portfolios came to EUR 62 billion at end-June 2002, with debt securities accounting for the lion's share (72%), followed by mutual funds (22%) and stocks (almost 6%).

The volume of securities portfolios has thus widened by almost 12% since the end of June 2001. This increase can be traced almost exclusively to gains in debt securities, whose volume had augmented by almost 19% compared to the previous year, whereas the volume of mutual funds and stocks shrank by 9% and 1.5%, respectively. Chart 31 depicts the changes in the structure of the securities portfolios of all Austrian banks since 1999 in absolute terms, the annual change of the share of debt securities as well as the annual change of the share of stocks and mutual funds[1] in the entire securities portfolio. It seemed appropriate to draw up the chart in this way, since in the section below the focus will be on changes in the composition of the securities portfolio. Until end-1999, the share of stocks and mutual funds in the entire securities portfolio rose by an annual average of some 25%, whereas the share of debt securities declined sharply. This is traceable mainly to the increasing volume of mutual funds, which widened from EUR 5.7 billion at the beginning of 1998 to EUR 13.3 billion in the last quarter of 1999, while the volume invested in shares augmented only from EUR 2.8 billion to EUR 4 billion. Thus, the share of stocks and mutual funds in the total volume of the securities portfolio climbed from 26% to almost one third, while the share of debt securities shrank by the same amount, even though their volume mounted from EUR 24 billion to almost EUR 35 billion in absolute terms.

Chart 31

Securities Portfolio

EUR billion

%

52.5
35.0
17.5
0.0

15
0
−15
−30

1999　　　　　2000　　　　　2001　　　　　2002

Volume of debt securities (left-hand scale)
Volume of stocks (left-hand scale)
Volume of mutual funds (left-hand scale)

Annual change in the share of stocks and mutual funds
in the total volume of the securities portfolio (right-hand scale)
Annual change in the share of debt securities
in the total volume of the securities portfolio (right-hand scale)

Source: OeNB.

The annual change in the share of stocks and mutual funds in the total volume of the securities portfolio as depicted in chart 31[2] confirms that the share of these higher-risk investment vehicles has been declining since the trend reversal in international stock markets in early 2000. However, in absolute terms, their volumes initially continued to increase, reaching highs in the first quarter of 2001 at EUR 15.3 billion (mutual funds) and in the second quarter of 2000 at EUR 4.1 billion (stocks). This trend was observable until the second

1　For convenience, the annual changes in the share of higher-risk forms of investment — stocks and mutual funds — are depicted in one category in chart 31 and contrasted with the annual change of the share of low-risk investment vehicles — debt securities — in the total volume of the securities portfolio. It must be taken into account, though, that many mutual funds are fixed-income funds or balanced funds.

2　It must be noted that the data reported by banks provide no information about to what extent the decline in the ratio of mutual funds and shares was caused by decline in security prices and to what extent by actual sales.

quarter of 2002, with the slight rise in the share of stocks and mutual funds in the total volume of the securities portfolio during the year 2001 — as shown in chart 31 — being attributable to a singular event in the first quarter of 2001, when the volume invested in debt securities went down from EUR 45 billion to almost EUR 38 billion.[1])

The overall trend towards less risky investment vehicles continued also in 2001 and was reinforced in the first half of 2002, apparently due to the adverse stock market developments after the terrorist attacks of September 11, 2001, the series of accounting scandals in the U.S.A. and the general cooling of the economy. As of end-June 2002, the share of mutual funds and stocks in the total volume of the securities portfolio had contracted by almost 13% against the year-earlier figure, whereas the share of debt securities had gone up by 6%. The latter, however, is largely the result of an increase in the amount of debt securities by nearly EUR 38 billion in the second quarter of 2001 to EUR 45 billion by the end of June 2002. The amount of assets invested in mutual funds and stocks diminished only slightly in this period, from some EUR 14 billion to EUR 13.8 billion and from EUR 3.5 billion to EUR 3.2 billion, respectively.

**Continued Strong Presence of Austrian Banks
in Central and Eastern European Countries**

2002 first half figures confirm that Austrian banks continue to maintain a strong foothold in the privatization business in the Central and Eastern European financial services sectors. The major Austrian banks have stepped up their acquisition activities not so much in their traditional target countries, but in Croatia and Slovenia, and also in Bosnia and Herzegovina, Serbia, Romania, as well as Bulgaria. They have successfully established a network of subsidiaries in Central and Eastern Europe; Raiffeisen Zentralbank Österreich AG (RZB), e.g., operates subsidiaries in twelve countries, Bank Austria Creditanstalt (BA-CA) in ten countries. Moreover, Erste Bank der oesterreichischen Sparkassen AG's (Erste Bank) stock has been traded on the Prague stock exchange since October 2002.

Total assets of the commercial banks[2]) listed in table 6 amounted to EUR 46.7 billion in June 2002, which equals a EUR 6.5 billion increase since end-2001. These figures, however, do not cover activities in Poland, Bosnia and Herzegovina, and Romania. Taking into account these countries, total assets would come to more than EUR 60 billion. Staff numbers went up only slightly in the first half of 2002, edging up from 30,300 in December 2001 to 31,400. Almost 50% (14,700) were employed in subsidiaries in the Czech Republic, where, inter alia, restructuring measures resulted in a small reduction in staff. Mostly thanks to the above-mentioned takeovers in Croatia, the number of branch offices continued to rise (from 1,578 to 1,665).

---

1   *This decline in the total amount invested by Austrian banks in debt securities is ascribable to one major bank, and most probably related to internal restructuring measures in this bank.*

2   *The figures for June 2002 also include the most recent acquisitions of, for instance, Rijecka banka (Croatia), Istrobanka (Slovakia), and Krekova banka (Slovenia).*

Profitability also trended upwards in the first half of 2002. At EUR 383 million, operating profit notably exceeded last year's figure (EUR 261 million). The higher operating profit is not only attributable to increased activity triggered by the recent takeovers, but also to numerous restructuring measures, which have partly already been successfully completed and which have considerably boosted the operating performance of some banks. Investment in the branch networks and IT facilities are at the core of current modernization plans. The RZB's subsidiaries in Eastern Europe accounted for a noteworthy 66% of the group's operating result at the end of 2001; at Erste Bank and BA-CA, this share came to 41% and 31%, respectively. A comparison with their shares in the respective group's total assets – amounting to between 8% and 24% – illustrates that the Eastern European subsidiaries are of crucial importance to the profitability of Austria's major banks.

Table 6

Key Ratios of Central and Eastern European Commercial Banks

Majority-Owned by Austrian Banks[1])

	Total assets	Operating profit	Risk costs	Market share	ROE	Staff	Banking offices
	EUR million			%		Number	
Croatia							
June 2001	2,461	45	− 9	14	22	1,422	65
December 2001	3,885	90	− 8	18	38	2,108	81
June 2002	5,681	60	− 15	28	30	3,240	162
Slovak Republic							
June 2001	7,790	70	− 9	40	24	8,994	555
December 2001	8,507	115	1	40	21	8,851	566
June 2002	9,311	79	− 18	43	14	9,428	552
Slovenia							
June 2001	780	7	− 2	5	11	407	15
December 2001	944	13	− 5	5	3	413	15
June 2002	1,501	9	− 4	7	17	664	31
Czech Republic							
June 2001	17,595	95	− 41	21	8	16,333	754
December 2001	21,159	272	− 87	25	11	15,486	756
June 2002	24,118	188	− 12	27	18	14,683	754
Hungary							
June 2001	4,264	44	− 8	16	19	2,920	137
December 2001	5,742	98	− 16	15	17	3,455	160
June 2002	6,043	47	− 11	15	14	3,380	166
Total							
June 2001	32,890	261	− 69	×	×	30,076	1,526
December 2001	40,237	588	−115	×	×	30,313	1,578
June 2002	**46,654**	**383**	**− 60**	×	×	**31,395**	**1,665**

Source: OeNB,
[1]) *National totals; excluding Poland for data protection reasons; figures rounded; data from December 2001 take into account mergers with subsidiaries of Bayerische Hypo- und Vereinsbank AG.*

Despite adverse economic conditions, Austrian banks' risk provisions did not increase and remained broadly unchanged at EUR 60 million in the first half of 2002 (against EUR 69 million in the first half of 2001); the risk provisions of subsidiaries in the Czech Republic declined sharply, whereas business in the Slovak Republic and, in particular, in Poland (which is not included in the table for data protection reasons) required higher risk provisions. Return on equity

(ROE) ranges from 14% (in Hungary and in the Slovak Republic) to 30% (in Croatia), with developments differing from country to country. While subsidiaries in Slovenia and in the Czech Republic posted improvements, Austrian subsidiaries in Croatia, the Slovak Republic and especially Poland recorded deteriorating ROE ratios.

Banks majority-owned by Austrian banks successfully defended their market share, some even gained additional market share. Austrian subsidiaries in the Slovak and Czech Republics slightly increased their market share, accounting for a remarkable 43% and 27%, respectively. Česká Spořitelna and Slovenská Sporiteľňa are particularly firmly positioned in these two countries. In Hungary, Austrian subsidiaries kept their market share steady at 15%, while in Croatia, they recorded a marked increase to 28%, mostly thanks to the takeover of Rijecka banka.

Increased Loan Loss Provisions Expected to Reduce Profitability Despite Stable Spread-Based Revenues

As economic conditions in the industrialized countries worsened and as corporate sector indebtedness rose while profits tumbled, Austrian banks – like their European counterparts – have been faced with deteriorating credit quality. The banks responded by raising loan loss provisions pertaining to claims on nonbanks; banks in many European countries will experience reductions in profits because of an anticipated increase in credit defaults in 2002, and Austrian banks will also feel the impact of this trend.

Chart 32

Operating Profit of Austrian Banks[1])

As a percentage of total assets

■ Operating profit
■ Operating income
■ Operating costs

Source: OeNB.
[1]) Half-year figures.
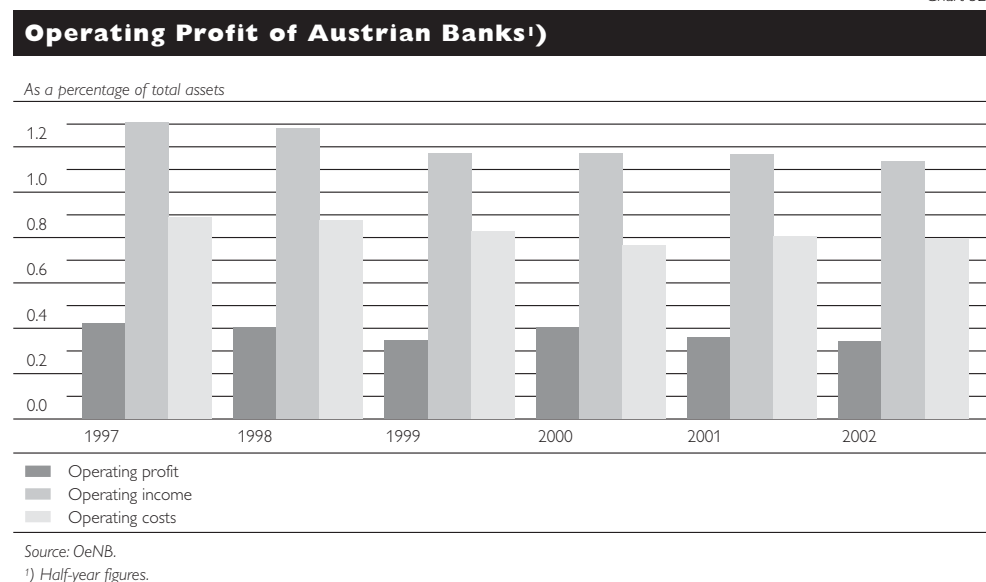
According to unconsolidated data,[1]) banks operating in Austria posted operating profits of EUR 2 billion in the first half of 2002, down by 2.1% from the comparable figure of 2001. The sharp rise in net interest income (by 4.4% to EUR 3.5 billion) did not suffice to offset contractions in fee-based income and

1   *The quarterly return lists the income statement data of banks operating in Austria on an unconsolidated basis. The data presented here are based on the quarterly return of June 2002.*

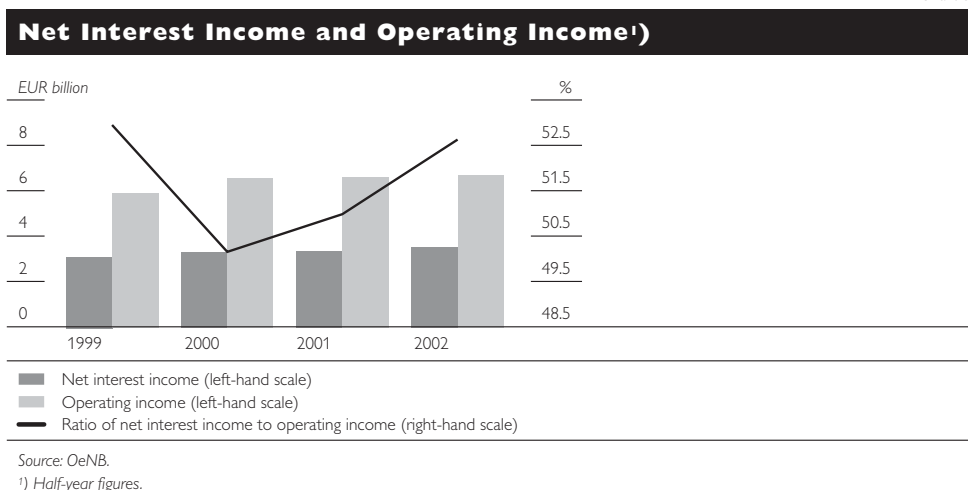income from financial transactions as well as increased administrative expenses. By mid-2002, only four of the 30 largest banks recorded operating profits of more than 1% of total assets. A sectoral breakdown reveals that special purpose banks and Raiffeisen credit cooperatives achieved the highest ratios (1.1% and 1.0%, respectively) in this category.

Austrian banks benefited from the steep yield curve in the first half of 2002. The mid- and long-term EURIBOR rates were well above the ECB's short-term main refinancing rate, thus creating higher profit potentials for banks. At EUR 11.9 billion, interest and similar income trailed the like 2001 figure by 16.8%, but interest payable and similar charges dropped even more markedly (—23.3%). Banks benefited also from the easing of refinancing conditions thanks to the enhanced attractiveness of savings deposits. Thus, the importance of deposit-taking and lending as a source of operating income again increased. The ratio of net interest income to total operating income went up by 1.6 percentage points to 52.6% (see chart 33). A sectoral breakdown shows that deposit taking and lending plays the biggest part in state mortgage banks (71%) as well as building and loan associations (61%), and also in the three multi-tier sectors savings banks (56.7%), Raiffeisen credit cooperatives (53.4%), and Volksbank credit cooperatives (55.6%). Especially in a volatile environment, with securities prices fluctuating strongly, a high share of deposit-taking and lending has a balancing effect on bank revenues.

While net interest income improved in the first half of 2002, the balance on commissions continued its downward trend, deteriorating by 3.5% against the previous year. Poor price developments in the stock markets and investors' dwindling interest in stocks have led to shrinking trade volumes; lower fee-based income from securities also clearly mirrors this trend. Fee-based income from trading in foreign exchange, currency, and precious metals also dropped after the introduction of euro cash at the beginning of 2002, as it was no longer possible to charge exchange fees for the euro's predecessor currencies. Only fee-based income from banking and payment services was on the rise.

Chart 33

Net Interest Income and Operating Income[1])

Net interest income (left-hand scale)
Operating income (left-hand scale)
Ratio of net interest income to operating income (right-hand scale)

Source: OeNB.
[1]) Half-year figures.

The gloom on financial markets also affected banks' own trade, which, for structural reasons, is characterized by higher volatility. Owing to the downturn in the securities business, the balance on financial transactions deteriorated dramatically (by –21.2%) in the first half of 2002 against the like 2001 period.

The slight 1.2% increase in operating income contrasted with a moderate, but still higher 2.7% rise in operating expenses. As a consequence, the cost/income ratio mounted by 1 percentage point to 70.1%. At 66.3%, the average cost/income ratio of the 30 largest banks may be better, but the individual figures tended to be below those recorded in the previous year. The rise in operating expenses can be attributed first and foremost to the 3.7% increase in staff costs. Other administrative expenses went up by no more than 0.8% in the first half of 2002 (against 9.4% in the first half of 2001). Therefore, cost developments have to be aligned more closely with the modest gains on the revenue side.

Taking into account the latest half-year figures, the quarterly updated unconsolidated outlook for the entire financial year indicates that the profitability of banks operating in Austria will deteriorate. The annual surplus of EUR 1.5 billion projected for the entire financial year 2002 trails the estimate for 2001 by a hefty –32%. On the one hand, this can be traced to an increase in projected loan loss provisions, and on the other hand, to the balance of provisions for securities and participations, which is factored into expenses. Loan loss provisions, which had risen also in 2001, are expected to come to almost EUR 2 billion, exceeding the like 2001 figure by 16.5%. This development mirrors the further deterioration in solvency in the corporate and the private sectors caused by the weak economy.

As to provisions for securities and participations, it is expected that a larger amount of provisions will be created than canceled in the financial year 2002. This trend sharply contrasts with the developments observed in the previous years, during which recoveries from risk provisions had surpassed new transfers to provisions.

Consolidated data[1]) provide a similar picture. Even though higher earnings – in particular of the Central and Eastern European subsidiaries – slightly raised operating profits, due to higher risk provisions, the projected annual result for 2002 will trail the like 2001 figure, as the result on the basis of unconsolidated data indicated. The projections provide a rough picture of some trends for groups of systemic relevance and for smaller banks:[2]) Spread-based revenues have been performing very well year on year. Despite difficult market conditions, fee-based and trading income also augmented. However, higher operating profits do not offset the rise in risk provisions. Therefore, annual results are expected to deteriorate for both the major banking groups and the smaller banks because of higher risk provisions. Bank size does not play a significant role in this trend; it can be observed in both major banking groups and smaller

---

1   Consolidated data were calculated for Bank Austria AG, Erste Bank, BAWAG/P.S.K., RZB and Österreichische Volksbanken-AG (ÖVAG) from the consolidated group results of these banks for the first half of 2002.

2   Owing to restructuring measures and reallocations, comparisons with the previous year do not provide firm evidence.

banks. Increasing credit risk and the subsequent need to build up loan loss provisions are key to the trend of banks' profitability.

As regards return on equity (ROE) – without discussing the various calculation methods – it can be said that basically, the average ROE (according to unconsolidated data) trended downwards in the first half of 2002, more or less regardless of bank size. The average ROE of both all Austrian banks taken together and of the 30 largest Austrian banks comes to 5%. It is also striking that the figures differ widely among individual banks and among sectors.

Economic Slowdown Depresses Loan Growth

The current economic downturn has also slowed down the pace of loan growth; at 3% in June 2002, it was well below the average of the past few years. Furthermore, it has been clear since mid-2001 that the decline in loan growth is particularly pronounced at the major Austrian banks. At the end of the second quarter of 2002, the annual loan growth rate at the major banks came to no more than 1.3%, one of the lowest figures recorded in several years (compared with 6.6% in 2001 and 9.1% in 2000). Median bank loan growth had also decelerated by mid-2002 – albeit to a lesser extent than at the ten largest banks – from 5.1% to 3.8%.

A breakdown by economic sectors reveals that corporate loan growth once again slowed down particularly sharply (see chart 34), reaching a modest 1.0% in June 2002, after having already contracted considerably in the previous year. This development has been going hand in hand with the cyclical decline in investment activity, whose nominal growth has been negative since the second quarter of 2001; this may be one of the reasons for the prevailing weak demand for corporate loans.

By contrast, loans to households largely continued the trend observed in the recent past. As consumer spending declined in the past few quarters, lending to households contracted from 4.5% in the second quarter of 2001 to 3.6% in the same quarter of 2002.

Chart 34

Loan Growth Broken Down by Economic Sectors

Financial intermediaries excluding banks (left-hand scale)
Nonfinancial enterprises (left-hand scale)
General government (left-hand scale)
Households (left-hand scale)
Gross fixed capital formation, in nominal terms (right-hand scale)

Source: OeNB.
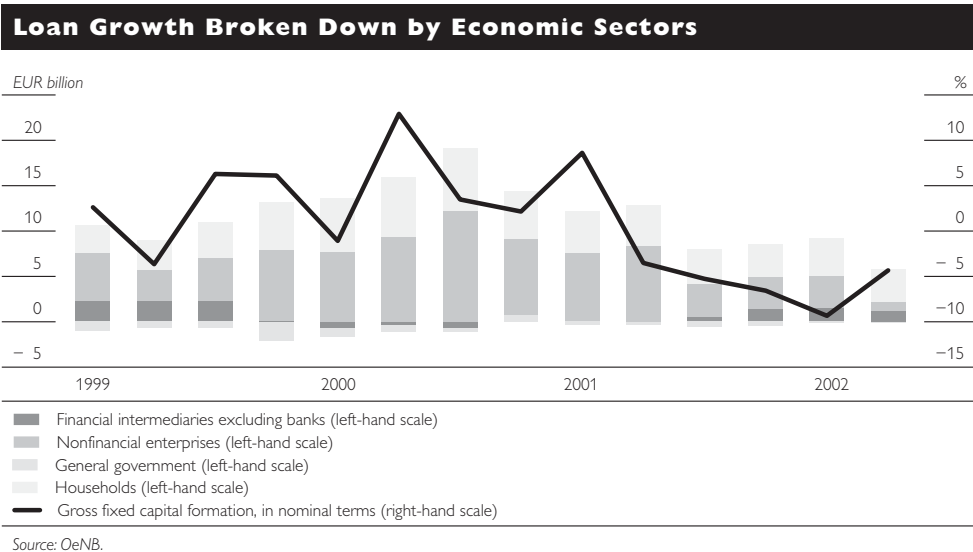
Loan demand by financial intermediaries (excluding banks) has been on the rise since the third quarter of 2001. Thus, at 20.9% in the second quarter of 2002, the contribution of financial intermediaries to loan growth for the first time exceeded that of the (nonfinancial) corporate sector (17.9%). The rise in loan demand by financial intermediaries registered in 2001, which was most likely attributable to the sudden surge in insurance companies' financing need after September 11, 2001, may well continue in the course of 2002, given the extensive damage caused by the August floods.

Credit Quality Deteriorated in the First Half of 2002
Data from the external auditor's annual prudential reports, available since June 2002, allow credit quality and thus the credit risk Austrian banks were exposed to at year-end 2001 to be assessed. In essence, credit quality had largely improved compared to 2000 and was considered to be satisfactory at end-2001. Credit quality at the median bank, i.e. the bank for which it is true that its credit quality is worse than that of 50% of all credit institutions and better than that of 50% of all credit institutions, improved in 2001. In terms of their share in total lending, *nonaccrual and nonearning[1])* assets hit a low at 0.10%; *nonperforming* loans accounted for 2.34% in 2001, down from 2.44% one year earlier, and *irrecoverable* loans for 0.49%, against 0.55% in the previous year (see table 7).

Table 7

Credit Quality According to the External Auditor's
Annual Prudential Reports

	1996	1997	1998	1999	2000	2001
	As a percentage of total lending					
Nonaccrual and nonearning claims on nonbanks						
50% quantile (median bank)	0.15	0.10	0.19	0.16	0.12	0.10
Mean of ten largest banks	1.18	1.14	1.15	1.05	0.95	0.77
95% quantile	4.05	3.89	3.82	3.93	3.38	3.61
Nonperforming						
50% quantile (median bank)	2.10	2.28	2.43	2.30	2.44	2.34
Mean of ten largest banks	2.56	2.92	2.07	1.98	1.73	1.78
95% quantile	8.20	8.67	8.64	8.87	9.07	9.25
Irrecoverable						
50% quantile (median bank)	0.38	0.53	0.55	0.57	0.55	0.49
Mean of ten largest banks	0.48	0.44	0.48	0.51	0.48	0.46
95% quantile	3.86	4.17	4.15	4.11	4.01	4.04

Source: OeNB; see the explanations in footnote 1 on this page.

In 2001, the ten largest (in terms of total assets) Austrian banks posted ratios below the average values of all banks taken together, i.e. their credit quality was above average, although their share of nonperforming loans in total lending edged up from 1.73% to 1.78%. The corresponding share of irrecoverable loans came to 0.46% at end-2001.

1 *Assets are considered nonaccrual and nonearning if payment is not expected within a reasonable period of time. Assets are considered nonperforming when defaults can be expected. Assets are considered irrecoverable if they are in fact realized losses at the time of reporting.*

The ratios for lower credit quality banks were calculated on the basis of the 95% quantile, which reflects the value of the bank for which can be said that it posts a higher ratio than 95% of all banks and thus has worse credit quality. It became clear that in 2001, the ratios deteriorated in all categories compared to the previous year. Especially the share of nonperforming loans in total lending in the 95% quantile had been climbing steadily for the past few years, reaching 9.25% by the end of 2001.

Since the prudential report contains only data on an annual basis, intra-year calculations of credit quality at Austrian banks must be based on loan loss provisions reports in the monthly return. Regarding interbank loans, banks reported, as expected, a low level of loan loss provisions (1.5% at mid-2002). Loss provisions relative to claims on nonbanks are of crucial importance in terms of stability.

At the (ten largest) banks of systemic relevance, loss provisions relative to claims on nonbanks continued to grow in the first two quarters of 2002, with the pace of growth gathering momentum. Given the seasonal pattern in the data, it is reasonable to assess changes on a year-on-year basis. June 2002 saw a sharp rise (by 10.2%) against the like 2001 figure to 2.8% (see chart 35). This development mirrors the economic conditions the Austrian major banks are currently faced with. Recently, the mounting danger of defaults has manifested itself in the rising number of insolvencies also of large companies. Loan loss provisions at the median bank hardly changed compared to the previous year, though by mid-2002, a slight increase by 1.8% to a ratio of 4.6% had been recorded. Thus, the mean of the ten largest banks continued to be markedly below the ratio of the median bank.

Chart 35

Loss Provisions Relative to Claims on Nonbanks

Source: OeNB.
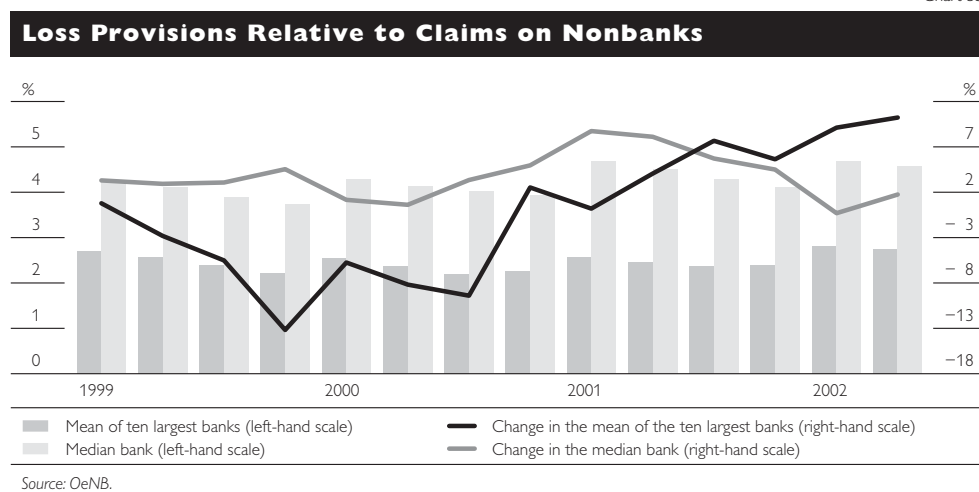
Chart 36 helps assess the changes of the entire loan portfolio of the Austrian banking system on the basis of the reported loan loss provisions for loans to non-banks. It depicts the distribution of loan loss provisions at mid-2001 and mid-2002, respectively, showing a shift to the right, which implies that credit quality deteriorated, albeit not dramatically, but still perceptibly. About 3% of banks which held provisions of between 0% and 6% moved to the above-average

Chart 36

Distribution of Loss Provisions Relative to Claims on Nonbanks

Number of banks

| | Loss provisions in the second quarter of 2001 |
| | Loss provisions in the second quarter of 2002 |

Source: OeNB.
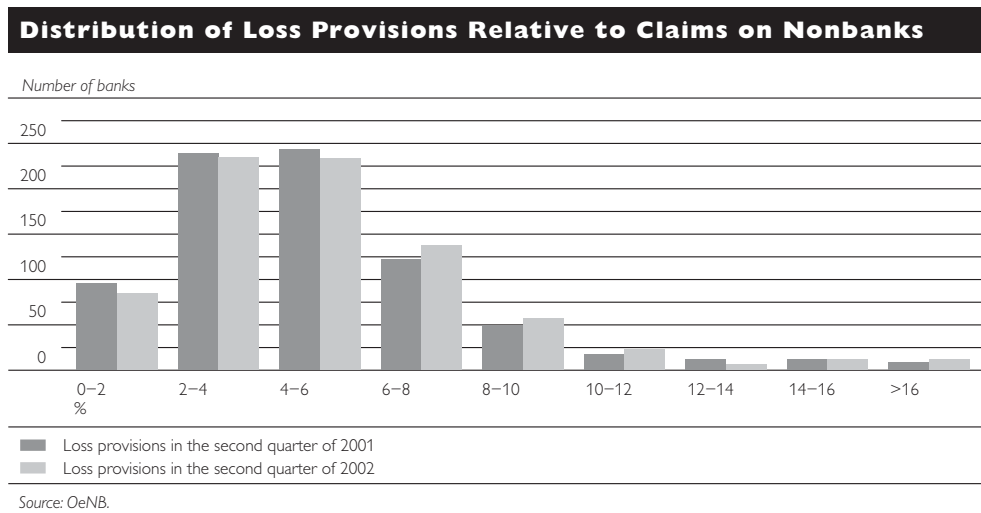
group of those holding more than 6%. At the same time, the number of banks which had high loss provisions (more than 10%) already at mid-2001 did not rise markedly.

Satisfactory Capital Ratio of Austrian Banks

Over the past few years, a trend towards higher capital ratios has emerged. Ranging from 11.8% to 14.5%, the unconsolidated capital ratio of the ten largest banks has fluctuated more markedly than that of the median bank. Since the last quarter of 2001, it has climbed to 13.8%, whereas the median bank's capital ratio has remained at a steady 12% or so for years and amounted to 12.6% in June 2002. Thus, it is slightly more than 1 percentage point lower than the capital ratio of the ten largest banks.

Chart 37

Capital Adequacy (unconsolidated)

%

	Mean of the largest banks
	Median bank
	5% quantile

Source: OeNB.

Table 8

Capital Ratios Broken Down by Sectors

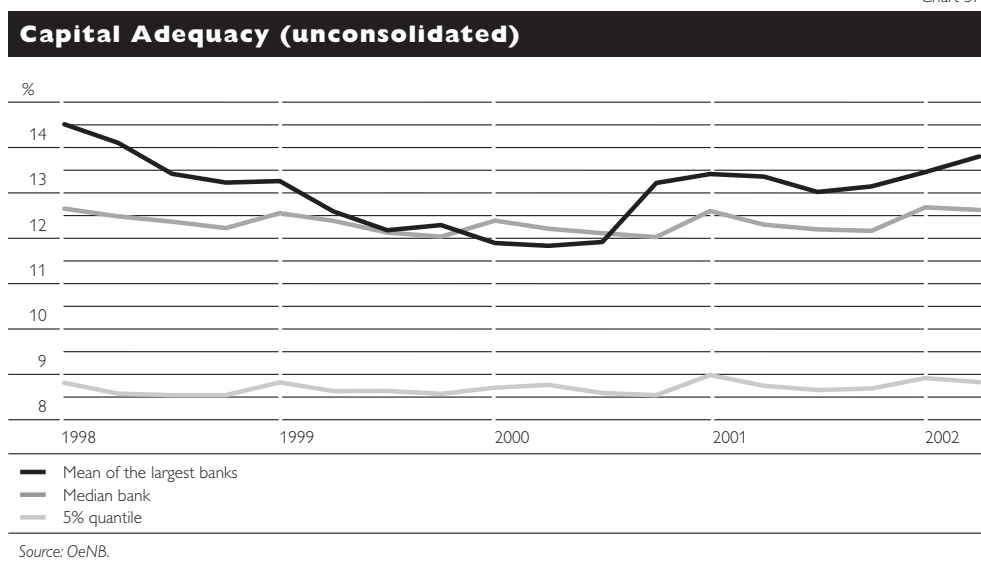|	June 1998	June 1999	June 2000	June 2001	June 2002
	%				
Joint stock banks	12.8	12.0	11.3	13.0	12.2
Savings banks	15.0	14.5	14.5	15.8	16.5
State mortgage banks	12.3	12.0	11.5	11.5	11.1
Raiffeisen credit cooperatives	12.1	11.7	11.9	13.0	13.5
Volksbank credit cooperatives	12.1	11.4	10.6	11.7	13.0
Building and loan associations	8.5	10.2	9.5	9.4	9.8
Special purpose banks	27.1	31.3	25.9	23.8	24.3
All banks	13.6	13.2	12.9	14.0	14.2

Source: OeNB.

Even banks with below average own funds post capital ratios of more than 8%. The 5% quantile (i.e. only 5% of banks post lower figures) depicted in chart 37 has a capital ratio of almost 8.9%.

A sectoral breakdown shows that especially Volksbank credit cooperatives and savings banks have improved their capital ratios (see table 8). Apart from special purpose banks, the savings banks sector posts the highest capital ratio of all sectors; in June 2002, it came to 16.5%. At 9.8% in June 2002, building and loan associations had the lowest capital ratio of all sectors, but it was still higher than in the previous year (9.4%).

Since banks' own funds have notably exceeded the minimum requirement of 8% as laid down in the Austrian Banking Act for years, it can be assumed that the new capital requirements will not pose a serious problem to Austrian banks. The preparations for the New Basel Capital Accord (Basel II) also included the third Quantitative Impact Study (QIS 3, see box), launched in the fall of 2002.

Quantitative Impact Study 3 (QIS 3)

In October 2002, the Basel Committee on Banking Supervision launched the Quantitative Impact Study 3 (QIS 3), a comprehensive field test for banks. QIS 3 is to provide information on whether the draft proposals on risk weighting are suited to realizing the objective of increased risk diversification. QIS 3 will therefore indicate whether and in what way the formulas and percentage ratios which have been specified in the consultation process so far require further modification. Also, the results of the field test may provide information on future capital requirements that banks will have to meet as a result of the new Accord. QIS 3 covers all approaches to calculate credit risk (the revised standardized approach, the internal ratings-based (IRB) approach, and the advanced IRB approach) as well as capital costs of securitization and operational risk.

QIS 3 has been preceded by three field tests (QIS 1, QIS 2, QIS 2.5), two of which took place in 2001. The results of QIS 2, in which 138 banks from 25 countries took part, indicated that the calculation formulas applied would deliver an increase in capital requirements, whereas QIS 2.5 implied that modified calculation methods (increased recognition of collateral or changes in risk weighting functions) would entail lower capital requirements compared to the requirements of the current Basel Capital Accord.

A total of 300 banks in more than 45 countries are to participate in QIS 3. Under the guidance of the Oesterreichische Nationalbank (OeNB), a large number of Austrian banks is also taking part in the field test. The participating banks − a representative selection of big and small

banks from various sectors, pursuing different rating approaches, etc. – are requested to include at least 80% of their worldwide exposures in their calculations. On the basis of the banks' individual reports, the participating countries prepare country reports, whose data will be further aggregated (for instance, for the G-10 countries, non-G-10 countries within the EU, etc.). The results will then be incorporated in the new consultative paper, which is to be released in the second quarter of 2003.

In combination with a large-scale information campaign to be launched by the OeNB in the fall of 2002, the Quantitative Impact Study is aimed at helping prepare Austrian banks for the upcoming challenges of the Basel II Accord.

Other Financial Intermediaries

Institutional Investors and Financial Markets Play an Increasing Role in Retirement Provision

At present, the majority of EU countries relies on pay-as-you-go systems when it comes to pension schemes. However, privately funded pension schemes offered by institutional investors are becoming more and more popular; therefore, the amount of assets managed by institutional investors is expected to rise. In 2000, EU (public and private) pension fund assets amounted to 44% of GDP. By 2010, this figure is expected to rise to over 70%. The European capital markets must be capable of managing capital flows of this size while avoiding destabilizing effects.

Financial markets have already responded to these new market trends. Increasing institutional investor activity in the European markets enhanced competition and fostered financial market efficiency. Higher capital supply increases liquidity and reduces costs in securities markets. In Austria alone, assets managed by domestic mutual funds soared from some EUR 20 billion in the mid-1990s to EUR 89.6 billion in 2002. Moreover, changes must also be expected in financial structures which have so far been dominated by banks. As competition has increased, the boundaries between traditional banking on the one hand and the insurance and mutual fund businesses on the other hand have become blurred. With the savings business declining, a growing number of banks has turned to investment banking or has acquired stakes in institutional investors. The ensuing higher degree of risk diversification has a stabilizing effect on financial markets. More over, the need for risk diversification fosters cross-border investment (apart from profit considerations), which benefits especially the emerging markets,[1]) where capital demand is high and savings capacities are limited.

Another positive effect of institutionalized investment is the rising demand for new financial products to suit investor demand in terms of profit, risk and maturity in the course of portfolio optimization. These trends are encouraged by the creation of appropriate legal frameworks at the national and the European

---

1   *See the study "Private Capital Flows to Emerging Markets in the 1990s and Their Impact on Financial Markets" in this issue.*

levels, such as the implementation of the UCITS directive[1]) or the draft directive[2]) of the European Commission according to which institutions for occupational retirement provision shall be allowed to manage occupational pension plans of companies resident in other Member States. With the EU expanding to Central and Eastern Europe, Austrian institutional investors are also set to benefit from these new provisions. Central and Eastern Europe has already begun to see a trend towards increased investment in mutual funds. However, the stability-enhancing influence generated by the stepped-up activities of institutional investors notwithstanding, there are also potential risks. In periods of bearish stock markets, fiercer competition may prompt investors to opt for riskier assets to keep up with higher profit pressures. Moreover, institutional investors in general tend to herding behavior, which, especially in times of financial crisis, poses potential threats to financial stability that may spread beyond the regions originally affected.
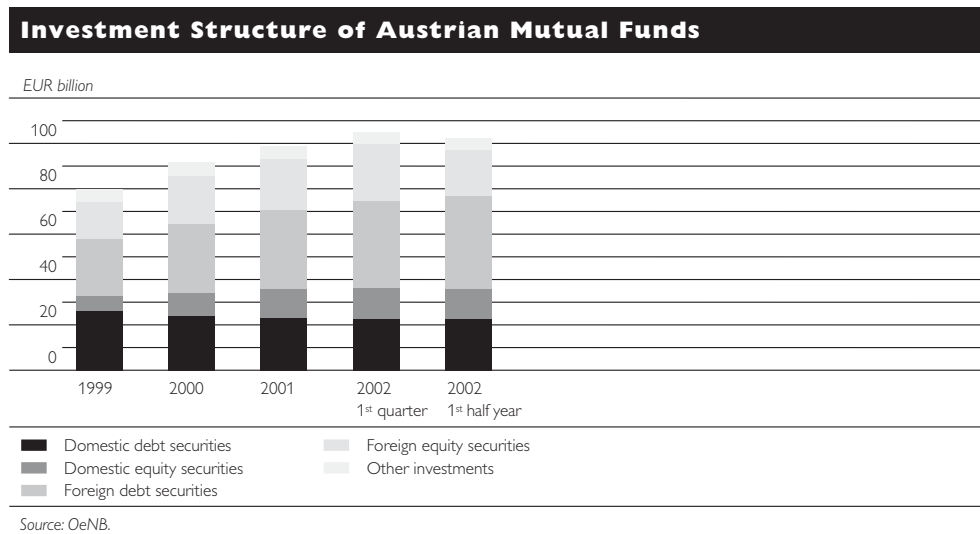
Mutual Fund Holdings Post Moderate Gains
Despite market uncertainty and a faltering economy, private and institutional investors acquired mutual fund shares to the tune of EUR 7.9 billion in the first half of 2002. In June 2002, assets invested by 23 investment companies in 1,806 mutual funds came to EUR 89.6 billion. This amount equals a slight increase by 3.2% against end-2001, which is mainly attributable to the EUR 2.4 billion decline in assets invested in the second quarter due to the slump in stock prices. Tumbling stock prices drove the performance of the bulk of equity funds and balanced funds as well as of a quarter of fixed income funds into the red in the first half of 2002.

Since end-2001, assets managed by domestic mutual funds have augmented by 3.5% to EUR 102.2 billion, mostly due to increased investment in foreign debt securities, which expanded by EUR 5.8 billion in the first half of 2002. By contrast, foreign equity securities went down by 10%. Investment in domestic securities was also on the decline. Only domestic mutual fund shares posted modest increases, which can be ascribed to increased acquisitions by domestic pension funds.

The bulk of assets (EUR 69.8 billion) is managed by publicly-offered retail funds, EUR 32.3 billion by institutional funds. Assets managed by retail funds have shrunk since end-2001, whereas institutional funds registered a 13.2% increase, largely thanks to the newly issued funds with a total volume of EUR 4.3 billion in the first half of 2002. However, in keeping with international trends, it can be expected that the range of products will become smaller, i.e. funds will be merged, also in Austria. Among retail funds, bond funds continued to be the most popular investment vehicle (58.3%), followed by balanced funds (21.2%) and equity funds (19%). Money market funds account for only a small share of EUR 1.05 billion; yet, in line with the European trend, they have

---

1   Directive 2001/108/EC of the European Parliament and of the Council of 21 January 2002 amending Council Directive 85/611/EEC on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), with regard to investments of UCITS. See also Financial Stability Report 3 of the OeNB, p. 45.

2   Draft directive COM (2000) 507 final of October 11, 2000, on the activities of institutions for occupational retirement provision.

Chart 38

Investment Structure of Austrian Mutual Funds

EUR billion

Legend:
- Domestic debt securities
- Domestic equity securities
- Foreign debt securities
- Foreign equity securities
- Other investments

Source: OeNB.

registered gains of some 13% since end-2001. Apart from equity funds, near money market funds have become increasingly popular in Europe, accounting for 16% of total assets managed by European mutual funds. These investment patterns reflect investors' reduced risk appetite in times of stock market uncertainty. Money market funds aim to maximize interest income at the smallest capital risk possible while maintaining high liquidity. Therefore, this type of fund represents one of the "safe havens" of investment.

In general, fixed income securities continued to figure prominently at some 62% in the investment structure of Austrian mutual funds, followed by mutual fund shares (approximately 17%) and stocks and equity securities (some 16%).

Insurance Companies Record Weak Results

Insurance companies have been severely affected by losses in the aftermath of September 11, 2001, and the worldwide stock market crisis. As a consequence, the domestic insurance business posted weak results, which have affected life insurance plans in particular. Bonus payments, i.e. profit shares which are granted beyond the guaranteed rate of return, were announced to be cut from more than 6% to some 5.5%. Austrian primary insurers are faced not only with low revenues from financial assets, but also with costs arising from damage caused by the floods of August 2002; however, the latter are expected to be fairly small, since on the one hand, many Austrians were not insured against flood damage, and on the other hand, a large part of the damage is likely to be covered by reinsurance contracts.

Foreign subsidiaries of Austrian insurers, which have stepped up their activities in Central and Eastern Europe over the past few years, have always made a positive contribution to business development so far. Their activities focus on life insurance plans and, increasingly, on the property insurance business. In the Czech Republic, for instance, the government opened the market for third-party motor vehicle insurance plans for private insurers. The share of Central and Eastern European countries in the total amount of insurance premia paid to domestic insurers has been on the rise for quite some time;

Chart 39

Breakdown of Assets

of Austrian Insurance Companies as of June 2002
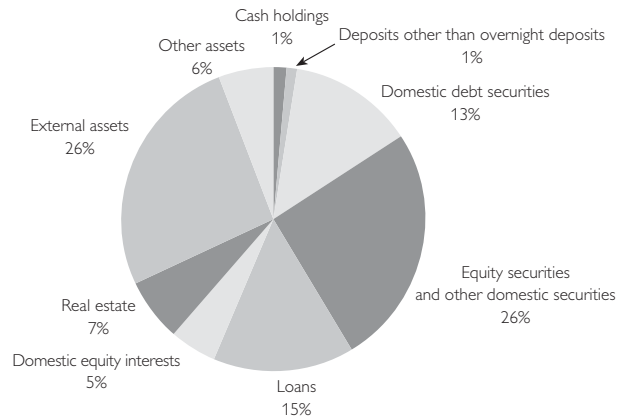
Source: OeNB.

in some companies, it has already passed the 20% mark. Yet it must be borne in mind that Central and Eastern European subsidiaries are also faced with the claims resulting from the 2002 summer flood.

It should also be noted that Austrian insurance companies have hidden reserves, which were accumulated during boom years and which can be drawn on to ward off further cuts in bonus payments. The hidden reserves of major Austrian insurance companies range from 0.4% to 8.4% of total investments. Reductions in profits have so far not impacted on agency ratings, since last year's ratings of the market leaders were confirmed. Lower ratings would increase financing costs, which, in turn, would drive down profit margins.

Austrian insurance companies' total assets had risen by EUR 3.3 billion or 6.2% to EUR 57.5 billion by end-2001 compared to the previous year; thus, the pace of growth again lost momentum. This trend continued also in 2002; by June 2002, total assets had expanded by a mere 0.8% against the previous quarter. Shifts in investment structures compared to the past few years mirrored the change in overall economic conditions. At a growth rate of 28% against the previous year, external assets expanded most pronouncedly in 2001 and at 26% remained a significant category of investment also in the second quarter of 2002, next to equity securities and other domestic securities. Austrian debt securities and loans posted downturns. It is interesting to note that the decline in government debt securities and lending to the public sector persisted.

Insurance technical reserves made up the largest part of liabilities, coming to EUR 45 billion in 2001 or 78% of total assets; the life insurance business accounted for the bulk of these reserves.

Continued Trend Towards Occupational Pension Plans
The trend towards occupational pension schemes to supplement public pension plans continues. The number of contracts climbed by 17.5% in 2001. The number of active and retired pension plan members came to 318,000 at the end of 2001; the Austrian occupational pension fund association expects this figure to

climb by another 10% in 2002. At an annual EUR 236 million, occupational pension plans have become the largest private pension payers in Austria.

Like in the previous two years, asset growth at Austrian occupational pension funds is projected to decelerate. In the second quarter of 2002, assets managed by pension funds shrank by EUR 0.4 billion to EUR 7.8 billion against the previous quarter. Amid continuously weak stock markets, the performance of the 107 investment and risk associations of all 19 pension plans came to between −5% and +5% in 2001. The seven multi-employer pension funds posted a negative investment performance of 4.5% on average. The twelve in-house pension funds even registered a negative average performance of 6%. However, the pension funds have already responded to difficult investment conditions by adapting their investment structures to the current market situation. Even though mutual fund shares issued by residents and nonresidents continue to be the main investment vehicle, accounting for 94% of total investment, the second quarter of 2002 saw a decline by EUR 0.2 billion in new investment in mutual fund shares. By contrast, the share of debt securities − a lower-risk investment vehicle − increased. Following the slump in stock prices in international markets, investment in mutual fund shares issued by nonresidents declined most sharply, by more than a third compared to the first quarter of 2002. The steep decrease can be attributed to some pension funds' change in strategy towards increased investment in domestic securities.

Chart 40

Change in Assets Managed by Pension Funds

Source: OeNB.
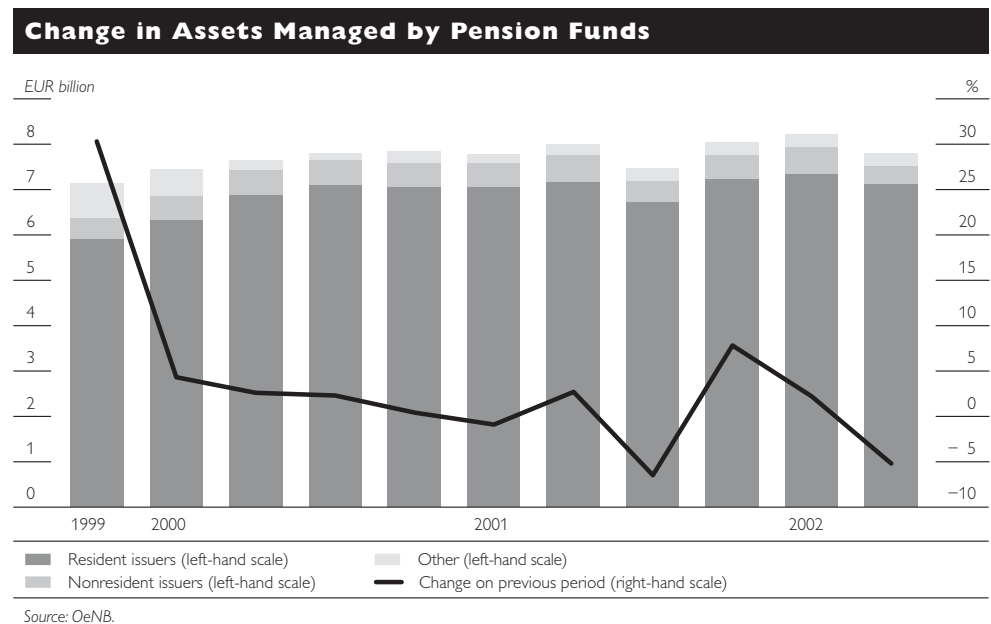
Also, all investment vehicles issued by nonresidents posted declines, with mutual fund shares recording the steepest decrease in the first half of 2002 (see chart 40). Their share in total assets managed by pension funds dropped to the advantage of domestic securities. As the euro appreciated against the U.S. dollar, the share of investment in euro rose at the expense of investment in foreign currency in the first half of 2002, accounting for some 97.6% of total assets managed by pension funds.

SPECIAL TOPICS

A Macroeconomic Credit Risk Model
for Stress Testing
the Austrian Credit Portfolio

Michael Boss

1 Introduction

Over the past few years, dynamic financial market developments have created a business environment for banks that is far more volatile than it was 10 or 20 years ago. Consequently, ensuring financial stability has become more and more important. In the light of this development, financial stability assessment increasingly relies on quantitative methods. In the Financial Stability Report 3 of the Oesterreichische Nationalbank (OeNB), Elsinger, Lehar and Summer (2002) introduce a new approach to assessing the risk of interbank loans and the related systemic risk, while Kalirai and Scheicher (2002) present first results of a macroeconomic stress test model for the Austrian banking sector.

Stress tests are originally a risk management tool banks use to determine how the value of their portfolio would change in the event of sudden crises. Yet, stress tests may produce useful results not only for individual banks. Institutions in charge of maintaining the stability of the entire financial system are faced with the question to what extent a certain unexpected crisis scenario would affect the financial market and the banking system as a whole. Here, it is of particular interest to explore what implications general macroeconomic crisis scenarios, such as a recession or an oil price shock, would have for the financial system. Macroeconomic stress tests serve to shed light on these questions.

The following stress test model for the Austrian banking sector, which draws on individual loan data, allows for estimating credit risk in the Austrian financial sector using methods banks apply in credit risk management. The underlying model captures credit risk in dependence on macroeconomic variables, such as GDP growth, inflation and the interest rate level. A dynamic component reflecting the development of the macroeconomic variables allows for a simulation-based estimation of future default losses and thus of the credit risk of the Austrian credit portfolio. Correlations between individual macroeconomic variables are modeled explicitly to take account of existing interdependencies (a slowdown in GDP growth, for instance, tends to go hand in hand with a rise in unemployment). This model thus serves as a basis for macroeconomic stress tests aimed at estimating the Austrian banking sector's risk-bearing capacity against the examined crisis scenarios.

This study is structured as follows: Section 2 briefly introduces credit risk management as applicable to the Austrian credit portfolio. The model underlying the stress tests is presented in section 3. Section 4 identifies the major risk factors, i.e. macroeconomic indicators, impacting credit risk in the Austrian banking sector and describes the outcome of the model estimation. Section 5 explains the model simulation and the stress testing procedure, the results of which are given in section 6. Section 7, finally, provides a summary.

2 Credit Risk in the Austrian Financial Sector

Credit risk, i.e. the risk that borrowers default or fail to fulfill their credit obligations completely, remains the most important source of risk in the Austrian banking sector. This becomes clear from the fact that 95% of Austrian banks' overall capital requirements are traceable to credit operations. When developing a model for stress testing the Austrian financial system, it is therefore useful to focus first of all on this risk category.

Based on aggregate data on the volume of credits and on loan loss provisions, Kalirai and Scheicher (2002) provide an introductory analysis of credit risk in the Austrian banking sector. Our estimation of credit risk draws on individual loan data. These data stem from Austria's Major Loans Register, maintained by the OeNB, to which data on all credits in excess of EUR 350,000 granted by Austrian banks, insurance companies and other financial intermediaries are submitted on a monthly basis. The reported data also contain information on securitized lending, such as debt securities and other fixed income securities. Since lending to the central and regional governments is not subject to reporting, the Major Loans Register does not contain data on government bonds. On the assumption that loans to the central and regional governments do not carry any default risk, however, this does not really affect risk assessment. More importantly, in this respect, all loans connected to short-term interbank operations are also exempt from reporting regulations. Moreover, loans to foreign debtors are excluded from the data set, as one cannot assume that the default rates calculated on the basis of the number of insolvencies observed in Austria per year (which, in the following, will be used to estimate credit risk) also apply to foreign borrowers. The reported data are combined to form the credit portfolio of a hypothetical "all-Austrian bank:" individual borrowers' risk exposures at several banks are aggregated into one comprehensive item per borrower.

The portfolio thus obtained comprises around 60,000 items totaling EUR 262 billion. This figure refers to credit lines as reported to the Major Loans Register and compares with an actual exposure of altogehter EUR 220 billion at end-June 2002. The following calculations are in principle based on the reported credit lines with a view to estimating the maximum credit risk the Austrian credit portfolio is exposed to. It must be pointed out, however, that the scope of this study is limited to loans granted to Austrian borrowers, which leaves around 25% of the overall Austrian credit portfolio unconsidered. For domestic borrowers, the credit exposures reported to the Major Loans Register cover around 75% of the overall volume of credits to nonbanks and around 55% of loans to domestic banks according to banks' monthly balance sheet data

Chart 1

Histogram of the Austrian Credit Portfolio

in Terms of Credit Volume
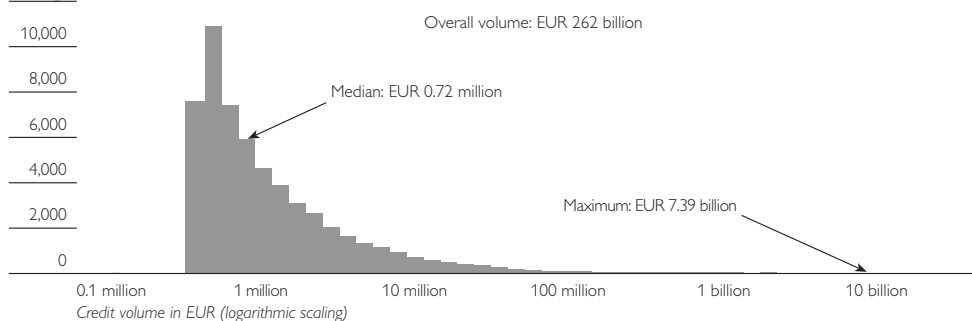
Source: OeNB, own calculations.
Note: The credit portfolio refers to all loans to Austrian borrowers reported to the Major Loans Register by end-June 2002 and thus contains all exposures higher than EUR 350,000. Individual borrowers' exposures to different banks were aggregated into one comprehensive item per borrower.

(monthly return) submitted to the OeNB. The difference regarding loans to nonbanks is traceable to the reporting floor of EUR 350,000, while for interbank loans it is primarily attributable to the fact that short-term interbank operations do not fall under the reporting requirements. Since this study is based on the credit lines reported according to the Major Loans Register, however, the total volume of EUR 262 billion mentioned above covers close to 85% of the credit volume granted to domestic nonbanks and banks according to the monthly returns. For this volume, the credit risk tends to be overestimated, as loans of up to EUR 350,000 and short-term interbank loans, whose default risk is below average, are not taken into account.

Chart 1 shows the distribution of the Austrian credit portfolio for the credit volume recorded as at June 30, 2002. The median credit volume equals EUR 0.72 million. The highest credit exposure amounts to more than EUR 7 billion. This highly skewed distribution of volumes is of critical importance for portfolio risk: If borrowers default, the question of whether their exposure is average-sized or very large makes a major difference in terms of loss. Hence, to be able to capture portfolio risk, it is necessary to take the volumes of the individual exposures into account.

As there is no way of telling beforehand how many and which borrowers will default, the losses caused to a credit portfolio by future defaults cannot be determined with certainty. It is merely possible to determine the loss distribution over a certain time horizon, which indicates the maximum loss that will, with a certain probability, occur during the defined period. The term "expected loss" denotes the maximum loss to occur with a probability of 50% over the observation period. "Unexpected loss" in turn, is the maximum loss that may be incurred with a probability of 99%. The principal idea of credit risk management is that a bank's capital should suffice to cover any unexpected loss, with the unexpected loss referring to the period of time that would be required to liquidate the portfolio, i.e. to close the respective positions.[1]

Chart 2

Loss Distribution of the Austrian Credit Portfolio in June 2002
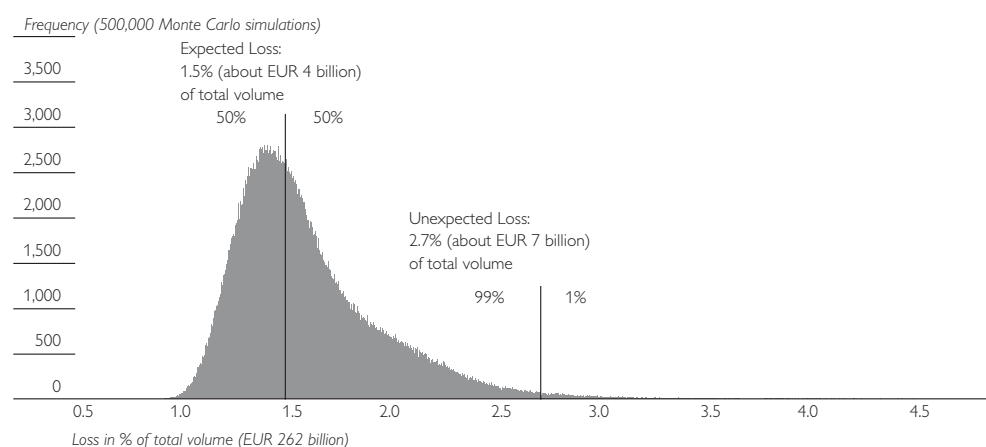
Source: OeNB, own calculations.
Note: The chart shows the cumulated loss distribution of the Austrian credit portfolio, as defined in the note on chart 1, over a three-year time horizon (liquidation period), with an assumed fixed recovery rate of 70%. The annual default probability is constant at 2.04%.

1   This corresponds to the value-at-risk concept as applied in market risk management.

The loss distribution of a given portfolio over a certain time horizon H can be determined by means of a Monte Carlo simulation, with a certain borrower defaulting at a probability of p_{t+h} and not defaulting at a probability of $1 - p_{t+h}$ at each step of the simulation and at each point in time $t + h$. If a given borrower defaults, the ensuing loss (invariably the present value discounted at the respective interest rate) is calculated by taking the respective volume times one minus the recovery rate, which for the sake of simplicity is assumed at a fixed value of 70% in this study.

Chart 2 shows the cumulated loss distribution of the Austrian credit portfolio over three years, based on the annual default rate of $p_t = 2.04\%$ observed in 2001. The three-year liquidation period is chosen because the majority of risk exposures recorded in the Major Loans Register are nontradable loans to nonbanks that can either not be unwound at all or only under major difficulties. The total volume of the Austrian credit portfolio comes to EUR 262 billion at end-June 2002. The unexpected loss amounts to just above EUR 7 billion over a three-year period, corresponding to 16.5% of Austrian banks' aggregate funds, which stood at EUR 42.3 billion at the end of June 2002. The unexpected loss is thus sufficiently covered by banks' own funds, even more so as the already existing loan loss provisions are not taken into account.

This value, however, is based on the assumption that the default probability remains stable over time. This will normally not be the case, though, as in times of recession, the number of credit defaults is expected to be higher than during a cyclical boom. The following section introduces a model describing how the default probability changes in dependence on macroeconomic variables.

3   A Macroeconomic Credit Risk Model

The model underlying the macro stress tests presented in this study is based on CreditPortfolioView®, a credit risk model developed by McKinsey & Co. We will briefly introduce this model; for a detailed description, however, refer to Wilson (1997a and 1997b). McKinsey & Co originally developed CreditPortfolioView® to capture the risk to banks' credit portfolios. Unlike comparable credit risk models[1]) CreditPortfolioView® is particularly suited for macroeconomic stress testing as it explicitly models credit risk in dependence on macroeconomic variables. This approach is based on the empirical observation that the default probability is higher, on average, during a recession than in times of an economic upswing. The second empirical observation CreditPortfolioView® relies on is that the sensitivity to macroeconomic shocks and business cycles varies across different industrial and economic sectors. One can assume, for instance, that the construction sector reacts more strongly to cyclical fluctuations than the agricultural sector. CreditPortfolioView® models the default probability of a certain industrial sector as a logistic function of a sector-specific index which, in turn, depends on the current values of the macroeconomic variables under observation:

$$p_{s,t} = \frac{1}{1 + e^{-y_{s,t}}} \tag{1}$$

---

[1]   For an overview of current credit risk models, see e.g. Crouhy, Galai and Mark (2000).

where $p_{s,t}$ denotes the default probability for a borrower and $y_{s,t}$ the sector-specific index of the industrial sector s at the time t. This index can be understood as an indicator of the overall state of the economy; it is determined by the macroeconomic factors under consideration. In particular, the index takes the following form:

$$y_{s,t} = \beta_{s,0} + \beta_{s,1}x_{s,1,t} + \beta_{s,2}x_{s,2,t} + \ldots + \beta_{s,K}x_{s,K,t} + \varepsilon_{s,t} \qquad (2)$$

where $x_{s,t} = (x_{s,1,t}, x_{s,2,t}, \ldots, x_{s,K,t})$ denotes the set of macroeconomic variables for the industrial sector s at time t and $\beta = (\beta_{s,0}, \beta_{s,1}, \beta_{s,2}, \ldots, \beta_{s,K})$ stands for the parameters which determine the direction and extent of the impact these factors have on the index and, finally the sector-specific default probability. These parameters are estimated by means of linear regression, where the error term $\varepsilon_{s,t}$ of the regression can be understood as a random innovation or shock to the index in the industrial sector s at time t. The error term is assumed to be an independent, normally distributed random variable

$$\varepsilon_{s,t} \sim N(0, \sigma_{s,\varepsilon}) \text{ or } \varepsilon_t \sim N(0, \Sigma_\varepsilon) \qquad (3)$$

where ε_t denotes the vector of the index innovations in all sectors and Σ_ε their covariance matrix. To add a dynamic component to the model, CreditPortfolio-View® assumes that each of the macroeconomic variables follows a univariate autoregressive of order two (AR(2) process)

$$x_{s,k,t} = \gamma_{k,0} + \gamma_{k,1}x_{s,k,t-1} + \gamma_{k,2}x_{s,k,t-2} + \nu_{s,k,t} \qquad (4)$$

where $x_{s,k,t}$ is the k-th macroeconomic variable in the industrial sector s at time t, $\gamma_k = (\gamma_{k,0}, \gamma_{k,1}, \gamma_{k,2})$ denotes the parameters to be estimated and $\nu_{s,k,t}$ the error term of the autoregressive process which, in turn, is assumed to be a normally distributed, independent random variable with

$$\nu_{s,k,t} \sim N(0, \sigma_{k,\nu}) \text{ or } \nu_t \sim N(0, \Sigma_\nu) \qquad (5)$$

The data available for this study did not allow for individually modeling the default probabilities of the different industrial sectors, as this would require a sufficiently long time series of historical default rates in the respective sectors. As the available data did not facilitate a differentiation between industrial sectors, however, this study models the aggregate default probability p_t for all economic sectors as a logistic function of the macroeconomic variables. In the following, the subscript s is therefore omitted. Furthermore, the modeling as described by Wilson (1997a) had to be altered in such a way that it is not the macroeconomic index y_t that is regressed on the explanatory macroeconomic variables, but its annual change $\Delta y_t = y_t - y_{t-1}$. As the macroeconomic index itself contains a unit root and is not stationary, a consistent estimation of the parameter vector β would not be possible using this index.

All in all, the above modifications of the original model by McKinsey & Co result in the following equation system, which will be used in our macro stress tests below:

$$p_t = \frac{1}{1 + e^{-(y_{t-1} + \Delta y_t)}} \qquad (6.1)$$

$$\Delta y_t = \beta_0 + \beta_1 x_{1,t} + \beta_2 x_{2,t} + \ldots + \beta_K x_{K,t} + \varepsilon_t \qquad (6.2)$$

$$x_{k,t} = \gamma_{k,0} + \gamma_{k,1} x_{k-1} + \gamma_{k,2} x_{k-2} + \nu_{k,t} \qquad (6.3)$$

$$E_t = \begin{bmatrix} \varepsilon_t \\ \nu_t \end{bmatrix} \sim N(0, \Sigma) \qquad \Sigma = \begin{bmatrix} \Sigma_\varepsilon & \Sigma_{\varepsilon,\nu} \\ \Sigma_{\nu,\varepsilon} & \Sigma_\nu \end{bmatrix} \qquad (6.4)$$

where E_t denotes the $(K+1)$ vector of innovations or shocks in the equation system, composed of the error terms in equations (6.2) and (6.3), and Σ the $(K+1) \times (K+1)$ covariance matrix of these shocks. The covariance matrix models the interdependence of shocks in the macroeconomic variables and their impact on the macroeconomic index. This approach is based on the notion that an oil price shock, for example, also has a negative impact on industrial production and on other macroeconomic variables.

4 Model Estimation

Before the model described by the equation system (6.1 to 6.4) can be used in stress testing, it is necessary to estimate the parameter vectors β and γ and the covariance matrix Σ. To establish which macroeconomic variables should in fact be used to explain the annual index changes Δy_t and, finally, the default probability p_t, univariate regressions are performed as a first step, where the annual index changes are regressed separately on each macroeconomic variable. These univariate regressions provide ground for identifying the factors that have a basic influence on the default probability. These factors are then used as a starting point for multivariate modeling according to equation (6.2).

The approach Kalirai and Scheicher (2002) adopt in explaining the credit risk in the Austrian banking sector bears a close resemblance to the univariate regressions used in this study. Like the approach introduced here, their approach is based on the hypothesis that credit risk is related to the general economic environment, but while they measure credit risk in terms of the loan loss provisions reported by banks in their monthly returns, we base our measurements on default probability. To be precise, Kalirai and Scheicher perform separate regressions for each macroeconomic variable to explain the annual changes in loan loss provisions. In the following we are choosing an analogous approach; however, in our regression equation the dependent variable does not cover the annual changes in aggregate loan loss provisions but the annual changes in the macroeconomic index.

This approach calls for a sufficiently long time series with historical observations on default probabilities, for which we use the annual default rates observed in Austria. The annual default rate reflects the ratio of insolvencies per year — as reported by the Kreditschutzverband von 1870 (KSV) — to the overall number of enterprises.[1] To determine the annual index changes Δy_t

---

1 Insolvencies refer to the opening of bankruptcy proceedings as well as to dismissals of bankruptcy filings for lack of assets. The number of enterprises per year was calculated from data provided by the Association of Austrian Social Security Institutions and by Statistics Austria.

in regression equation (6.2) from the observed default rates p_t, we first calculate the annual index values y_t as the inverse of the logit function in equation (6.1) and then establish the annual differences Δy_t. Instead of the macroeconomic index itself, we use its annual changes because, as mentioned above, because the index values have a unit root and are not stationary, respectivly. In any case, the null hypothesis that the index values contain a unit root could be rejected neither on the basis of the Augmented Dickey Fuller test nor on the basis of the Phillip Perron test at any common significance level. Spanning several business cycles, the sample contains the changes observed in the annual default rates from 1965 to 2001.

Table 1

Descriptive Statistics of Macroeconomic Variables

	Expected sign	Observations (year/number)	Mean	Standard deviation	Maximum (year)		Minimum (year)	
Cyclical indicators								
Gross domestic product (GDP)	−	1965/37	2.962	1.605	6.229	(1970)	− 0.399	(1975)
Industrial production, total	−	1965/37	3.477	3.518	11.136	(1969)	− 6.493	(1975)
Industrial production less energy	−	1965/37	3.531	3.879	10.682	(1969)	− 7.841	(1975)
Price stability indicators								
Inflation rate	−	1965/37	− 0.032	1.349	2.650	(1980)	− 2.650	(1966)
Monetary aggregate M1	−	1981/21	3.549	5.749	12.489	(1999)	− 11.030	(1981)
Monetary aggregate M3	−	1981/21	5.568	2.347	9.361	(1983)	− 1.117	(1998)
Household indicators								
Household consumption	−	1965/37	3.014	1.384	6.505	(1971)	0.748	(1985)
Disposable income	−	1965/37	2.846	1.678	6.230	(1970)	− 0.394	(1975)
Unemployment rate	+	1965/37	0.092	0.413	1.250	(1982)	− 0.825	(2000)
New car registrations	−	1965/37	3.024	18.053	42.672	(1971)	− 62.578	(1978)
Corporate indicators								
Gross fixed capital formation (GFCF), total	−	1965/37	2.963	4.070	13.030	(1971)	− 5.538	(1982)
GFCF, machinery and equipment	−	1965/37	3.464	5.931	13.174	(1971)	− 9.012	(1975)
GFCF, construction, nonresidential	−	1965/37	2.558	5.169	15.024	(1990)	− 9.088	(1995)
GFCF, construction, residential	−	1965/37	2.461	5.134	13.081	(1971)	− 8.569	(1990)
Industrial confidence	−	1968/34	0.015	15.122	35.216	(1976)	− 26.488	(1975)
Ifo business climate index	−	1965/37	− 0.916	17.794	44.895	(1994)	− 25.509	(1993)
Stock market indicators								
ATX (Austrian Traded Index)	−	1965/37	3.759	19.498	60.842	(1985)	− 27.515	(1991)
DAX 30 (German Stock Index)	−	1965/37	5.762	16.278	38.544	(1986)	− 23.227	(1974)
EURO STOXX	−	1965/37	6.424	14.922	34.510	(1986)	− 29.544	(1974)
DJIA (Dow Jones Industrial Average)	−	1965/37	6.768	12.387	29.432	(1983)	− 20.225	(1974)
DAX volatility	+	1971/31	0.051	2.195	8.140	(1987)	− 7.434	(1988)
DJIA volatility	+	1971/31	0.126	1.502	3.470	(1987)	− 4.002	(1988)
Interest rate indicators								
Nominal short-term interest rate	+	1965/37	− 0.015	1.420	3.700	(1980)	− 2.925	(1982)
Nominal long-term interest rate	+	1965/37	− 0.035	0.749	1.575	(1990)	− 1.750	(1983)
Real short-term interest rate	+	1965/37	0.017	1.290	4.125	(1977)	− 2.075	(1993)
Real long-term interest rate	+	1965/37	− 0.003	1.178	3.050	(1966)	− 2.450	(1984)
Slope of the yield curve	+/−	1965/37	− 0.020	1.074	2.250	(1982)	− 2.425	(1980)
External variables								
Exports	−	1965/37	8.925	6.315	26.826	(1974)	− 4.271	(1993)
Exchange rate index	+/−	1965/37	0.270	2.141	4.014	(1986)	− 4.653	(1997)
Oil price (Arab Light) in ATS	+	1965/37	5.585	32.285	121.293	(1974)	− 93.335	(1986)
Oil price (Brent Crude) in ATS	+	1965/37	5.273	31.064	121.186	(1974)	− 54.749	(1986)
Dependent variable								
Changes in the macroeconomic index		1965/37	2.629	13.013	32.394	(1993)	− 23.282	(1984)
Changes in the annual default rate		1965/37	0.034	0.177	0.566	(1993)	− 0.277	(1997)
Annual default rate in absolute terms		1965/37	1.303	0.592	2.300	(1999)	0.565	(1990)

Source: OeNB, WIFO, KSV, Statistics Austria, Datastream, U.S. Energy Information Administration, own calculations.
Note: All values in % or logarithmic differences times hundred.

4.1 Macroeconomic Credit Risk Indicators

To ensure the comparability of results, we select the variables based on the indicators used in Kalirai and Scheicher (2002). We also adopt their categorization of macroeconomic variables: cyclical indicators, price stability indicators, household indicators, corporate indicators, financial market indicators and external variables, with financial market indicators subdivided into stock market indicators and interest rate indicators. Table 1 shows the set of variables used and the respective descriptive statistics.

The factors $x_{k,t}$ used in regression equation (6.2) basically correspond to the annual changes of the respective underlying values. For the unemployment and inflation rates as well as for all interest rates and the slope of the yield curve we calculate the absolute differences of the annual averages. For all other factors, we compute the differences of the logarithmic values, using annual averages as a basis (except for those variables that rely on the System of National Accounts (SNA)[1]) and for exports). A unit root test was performed on the changes in the macroeconomic variables used in the regressions. The null hypothesis of a unit root was rejected for all variables at all common significance levels.

Table 1 indicates the expected signs for the regression coefficients of the individual explanatory variables. A positive (negative) sign means that theoretical considerations suggest that the respective factor $x_{k,t}$ has to be expected to have a positive (negative) influence on the change of the macroeconomic index Δy_t and, finally, on the default probability p_t. This, in turn, corresponds to a regression coefficient β_k with a positive (negative) sign. It can be assumed, for instance, that the default probability increases as the economy slows down which, in turn, should result in slackening industrial production or declining GDP growth. For a detailed description of the indicators used as well as a comprehensive explanation of the expected signs for the regression coefficients indicated in table 1, refer to Kalirai and Scheicher (2002).

4.2 Univariate Regression Results

This section discusses the results of the univariate estimations. Regressions of the change of the macroeconomic index Δy_t are performed both on one respective factor $x_{k,t}$ at time t and on the same factor $x_{k,t-1}$ of the previous year. This is to guarantee that any lagged effects of certain variables on the default probability are also taken into account. Table 2 shows the results of the univariate estimations. As the factors listed in table 1 are autocorrelated, which is considered in equation (6.3) of the modeling, the t-statistics and the respective p-values are calculated on the basis of the Newey-West estimator[2]).

All indicators reflecting the current state of the business cycle have a highly significant influence on the change of the macroeconomic index and consequently on the default probability, with all the signs of the parameter estimates meeting expectations. In particular, the regression on the change in industrial

---

1   These are GDP, household consumption, disposable income and gross fixed capital formation (GFCF). Export data stem from the Austrian trade statistics.
2   The Newey-West estimator allows for a consistent estimation of the covariance matrix for the parameters if the residuals show heteroskedasticity and/or an autocorrelation of unknown order.

production less energy produces the highest value for the t-statistics and, at $R^2 = 0.44$, also displays the best fit of all univariate regressions. The hypothesis that a deterioration of the current cyclical situation drives up the default probability is thus clearly confirmed. A lagged effect of the cyclical situation on the default probability cannot be ascertained, however, as all the corresponding parameter estimates are insignificant.

For the indicators of price stability, the result is far less conclusive: only the changes in the inflation rate of the current period and of the monetary aggregate M1 in the previous period display statistically significant parameter estimates with the expected sign. While the change in M3 shows a significant parameter estimate, the positive sign does not correspond to the expectation that default probability and inflation are negatively correlated. Caution is required, however, when interpreting the results for the monetary aggregates, as at only 21 observations, the sample is rather small.

Table 2

Results of the Univariate Regressions

	Regression on current factor $x_{K,t}$				Regression on lagged factor $x_{K,t-1}$			
	Coefficient	t-statistics	p-value	R^2	Coefficient	t-statistics	p-value	R^2
Cyclical indicators								
Gross domestic product, (GDP)	**−3.932**	−3.800	0.001	0.24	*0.292*	0.179	0.859	0.00
Industrial production, total	**−2.273**	−5.597	0.000	0.38	− 0.349	−0.554	0.584	0.01
Industrial production less energy	**−2.230**	−6.720	0.000	0.44	− 0.303	−0.558	0.580	0.01
Price stability indicators								
Inflation rate	**−0.021**	−2.024	0.051	0.05	*0.018*	1.536	0.134	0.03
Monetary aggregate M1	− 2.273	−1.379	0.184	0.04	**−1.091**	−2.888	0.010	0.24
Monetary aggregate M3	***2.220***	2.688	0.015	0.15	− 0.797	−1.156	0.263	0.02
Household indicators								
Household consumption	**−3.292**	−1.860	0.071	0.12	− 0.523	−0.374	0.711	0.00
Disposable income	**−4.037**	−4.163	0.000	0.27	*0.253*	0.160	0.874	0.00
Unemployment rate	**0.150**	2.823	0.008	0.23	0.026	0.588	0.561	0.01
New car registrations	**−0.163**	−1.856	0.072	0.05	− 0.171	−1.297	0.203	0.06
Corporate indicators								
Gross fixed capital formation (GFCF), total	**−1.685**	−5.081	0.000	0.28	− 0.505	−0.814	0.422	0.02
GFCF, machinery and equipment	**−1.229**	−5.754	0.000	0.31	− 0.435	−1.079	0.288	0.04
GFCF, construction, nonresidential	**−0.999**	−3.071	0.004	0.16	− 0.213	−0.465	0.645	0.01
GFCF, construction, residential	− 0.168	−0.288	0.775	0.00	*0.116*	0.239	0.813	0.00
Industrial confidence	**−0.366**	−2.465	0.019	0.17	− 0.073	−0.569	0.574	0.01
Ifo business climate index	**−0.222**	−1.751	0.089	0.09	− 0.197	−1.652	0.108	0.07
Stock market indicators								
ATX (Austrian Traded Index)	**−0.252**	−3.165	0.003	0.14	− 0.096	−1.108	0.276	0.02
DAX 30 (German Stock Index)	**−0.190**	−2.718	0.010	0.06	− 0.159	−1.111	0.274	0.04
EURO STOXX	**−0.268**	−3.421	0.002	0.09	**−0.200**	−1.702	0.098	0.05
DJIA (Dow Jones Industrial Average)	− 0.118	−0.853	0.400	0.01	**−0.289**	−1.745	0.090	0.07
DAX volatility	0.021	0.034	0.973	0.00	1.160	1.259	0.218	0.04
DJIA volatility	− *2.327*	−1.416	0.168	0.06	0.352	0.317	0.753	0.00
Interest rate indicators								
Nominal short-term interest rate	**−0.027**	−2.176	0.036	0.09	**0.030**	2.775	0.009	0.11
Nominal long-term interest rate	− *0.009*	−0.270	0.789	0.00	**0.062**	3.425	0.002	0.13
Real short-term interest rate	− 0.010	−0.667	0.509	0.01	0.016	1.269	0.213	0.02
Real long-term interest rate	0.023	1.201	0.238	0.05	0.000	−0.028	0.978	0.00
Slope of the yield curve	**0.042**	2.871	0.007	0.12	− 0.023	−1.513	0.139	0.04
External variables								
Exports	**−0.683**	−1.782	0.084	0.11	*0.120*	0.310	0.759	0.00
Exchange rate index	0.236	0.282	0.780	0.00	**2.603**	4.565	0.000	0.18
Oil price (Arab Light) in ATS	**0.073**	2.468	0.019	0.03	0.010	0.121	0.905	0.00
Oil price (Brent Crude) in ATS	**0.062**	1.857	0.072	0.02	0.023	0.261	0.795	0.00

Source: OeNB, WIFO, KSV, Statistics Austria, Datastream, U.S. Energy Information Administration, own calculations.

Note: The parameter estimates in bold print are significant at a confidence level of 90%. Parameter estimates whose signs do not correspond to the expectations according to table 1 are printed in italics. All regression estimates contain a constant with a highly significant corresponding parameter estimate. The t-statistics and the p-values, respectively, are based on the Newey-West estimator for the covariance matrix of the parameters.

Just like the variables for the general cyclical development, the variables for the current position of households show, without exception, significant parameter estimates with the expected negative sign. However, the results are not so clear (in particular with a view to household consumption, which depends only partly on the cyclical situation). This also holds for the corporate sector, with the exception of investment in residential construction, for which the regression coefficient is clearly nonsignificant. Particularly the parameter estimates for the current change in total investment as well as those for investment in machinery and equipment are highly significant, with R^2 standing at just below (or above, respectively) 0.3. The results for industrial confidence and for the Ifo business climate index are more ambiguous, as both the t-statistics and R^2 are much lower. With a view to the respective changes in the previous year, it is valid for both the corporate sector and households that none of the factors has a significant impact on changes in the default rate over the current period. All in all, the findings for both sectors confirm the assumption that their situation is closely connected to the general cyclical situation.

Among the stock market indicators examined, all parameter estimates have the expected sign (with the exception of the nonsignificant volatility of the DJIA). For the current period, however, the parameter estimates are statistically significant only for the ATX, the DAX and the Euro STOXX, while for the previous period, they are relevant for the DJIA and the EURO STOXX. Yet compared to the cyclical indicators their fit is relatively poor. In general, volatilities do not have any statistically significant impact on the changes in the default probability.

For the interest rate indicators of the current period, a significant parameter estimate results only for the slope of the yield curve and for the nominal three-month interest rate. The negative sign of the latter does not, however, meet the expectation that the default probability increases in line with interest rates owing to higher borrowing costs. The parameter estimates are highly significant both for short-term and long-term nominal interest rates of the previous year. Obviously, then, nominal interest rates have a lagged influence on the development of the default probability. In none of the cases do we find any statistically significant relation to real interest rates.

As for the external variables, exports and oil prices of the current period as well as the exchange rate index of the previous period have significant parameter estimates, with their signs matching expectations. Just as nominal interest rates, the exchange rate of the schilling and of the euro, respectively, thus seems to have a lagged effect on credit defaults.

When we compare these results to the findings of Kalirai and Scheicher (2002), who measure credit risk on the basis of loan loss provisions, we find that there is some degree of concordance even though the samples used[1]) differ widely. In both cases, the cyclical situation (as measured by industrial production), various stock market indices and short-term interest rates are identified as having substantial influence on credit risk. Based on the sample used in this study, which spans several business cycles, a clear majority of the factors under

---

1   Based on quarterly data from 1990 to 2001, the sample of Kalirai and Scheicher (2002) does not cover consecutive business cycles.

examination had a significant impact on defaults. For households, the major
determinant is disposable income, while investment in machinery and equip-
ment plays a key role for the corporate sector, and the exchange rate index
(in the previous period) and the oil price are of major influence for external
variables.

4.3 Multi-Factor Credit Risk Models

Based on the univariate regressions presented in the last section, we could now
conduct stress tests by shocking the explanatory variable in the regression equa-
tion according to the crisis scenario and by subsequently establishing the
expected and/or unexpected portfolio loss on the basis of the resulting default
probability. The stress tests carried out in Kalirai and Scheicher (2002) follow
this approach, focusing – in accordance with the dependent variable in the
regression equation – on the impact of a shock in one macroeconomic variable
on the development of loan loss provisions. As the authors point out, this
approach, however, neglects an essential aspect, namely the interdependencies
among the macroeconomic variables. An oil price shock is, for instance, likely
to also have a negative impact on industrial production. In the models intro-
duced in this section, a number of variables affect the credit risk simultaneously,
in line with equation (6.2). The interdependence of the shocks in the macro-
economic variables is here modeled through the covariance matrix in equation
(6.4). Moreover, it is reasonable to assume that the effects of a single shock –
e.g. negative GDP growth – will last for several years. This dynamic aspect is
accounted for in equation (6.3).

In the following, we are introducing multivariate models for tracing the
development of the default probability, i.e. models in which the dependent var-
iable is explained by several macroeconomic factors at the same time. The mod-
eling is based on the univariate regressions introduced in the previous section.
Basically we cannot use all variables in the multivariate model at the same time,
as some factors are interdependent. This phenomenon is known as collinearity[1]
and causes a higher variance in parameter estimates, thus rendering impossible a
consistent estimation of the regression coefficients.

As this study aims at performing stress tests, however, and we would like to
examine – if possible – one crisis scenario in relation to each of the seven
categories of variables, we select our models according to the following
strategy: Possible candidates for a multivariate model are all variables for which
the univariate regression results in a statistically significant parameter estimate
whose sign corresponds to the expected sign according to table 1. We then
proceed to estimating all models containing a combination of these variables
with the restriction, however, that they contain only one variable, at the most,
from each of the seven categories. From among the models whose parameters
all show a significant estimate at a confidence level of 90% and for which no

---

1   Collinearity exists if (nearly) linear relations are present in the explanatory variables, i.e. if one or several
    variables can be represented as a linear combination of one or several other variables. The explanatory variables
    are tested for collinearity on the basis of the variance-decomposition-proportion matrix by Belsley, Kuh and
    Welsch.

Table 3

Results of the Multivariate Regressions

	General business cycle model		Corporate sector model		Household sector model		Export sector model	
R^2	0.65		0.59		0.57		0.52	
$\bar{R}^2$	0.60		0.52		0.50		0.44	
Variables	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Constant	0.092	0.000	0.062	0.000	0.123	0.001	0.113	0.003
Industrial production less energy	−1.977	0.000						
Investment, machinery and equipment			−1.036	0.000				
Disposable income					−3.365	0.000		
Exports							−1.031	0.002
Inflation rate	−0.025	0.008	−0.027	0.066	−0.029	0.017	−0.025	0.072
ATX (Austrian Traded Index)	−0.137	0.006	−0.211	0.002	−0.218	0.000	−0.203	0.001
Nominal short-term interest rate, previous year	0.016	0.051	0.024	0.000	0.027	0.006	0.027	0.003
Oil price (Arab Light) in ATS	0.153	0.000	0.131	0.000	0.123	0.000	0.215	0.000

Source: OeNB, WIFO, KSV, Statistics Austria, Datastream, U.S. Energy Information Administration, own calculations.
*Note: The t-statistics and the p-values, respectively, are based on the Newey-West estimator for the covariance matrix of the parameters.*

collinearity can be found in the explanatory variables, we finally choose the models shown in table 3.

The general business cycle model allows for stress testing the general economic development, as mapped by industrial production less energy. Moreover, this model covers price stability, developments on stock and interest rate markets and the external factor of oil price developments. With the exception of the previous year's interest rate change, which shows a p-value of just over 5%, the parameter estimates are all highly significant. At $R^2 = 0\dot{.}65$ and $\bar{R}^2 = 0.60$, respectively, their fit is also satisfactory.

Chart 3

Observed and Forecast Annual Default Rates
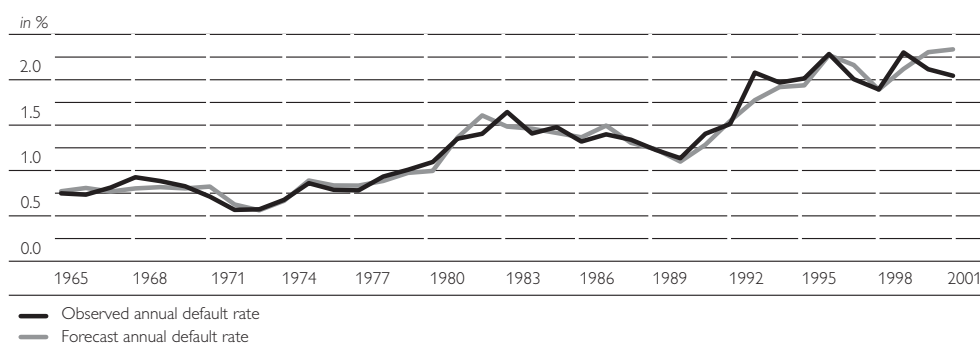
Source: KSV, own calculations.

Chart 3 shows the observed default rates from 1965 to 2001 and the corresponding forecast for the default probability, based on the general business cycle model. It is striking that the forecasts for the default probability are far less favorable for 2000 and 2001 than in most of the other years under observation. Obviously the values observed for the macroeconomic variables in 2000 and 2001 might have suggested a higher default probability than the one that actually occurred. This may be attributable to the fact that banks, hoping for the repeat-

edly forecast economic upturn which has, up to now, failed to manifest itself, tended to demand immediate repayment of loans less often during the last few years.

To be able to perform stress tests on the household and corporate sectors and on external factors other than oil price-induced, we replace industrial production in the basic model by disposable income, investment in machinery and equipment, and exports, respectively. The results of these estimations are also included in table 3. Naturally, a general cyclical shock is, as a rule, also attributable to a shock in one of these sectors. For the stress tests, however, we consider all models presented in table 3, on the one hand, to examine the impact of a cyclical shock on the basis of the general business cycle model without explicitly specifying the sector concerned. On the other hand, we intend to examine the implications of sector-specific cyclical shocks on the basis of other models as well.

5 Model Simulation and Stress Testing

5.1 Simulation of the Model

Having selected all the relevant macroeconomic factors and having estimated the parameters of the equation system (6.1 to 6.4)[1] we use the model to determine the loss distribution of the Austrian credit portfolio over a certain time horizon H. We no longer assume the future development of the default probability to be constant (as in section 2), but to be determined by the dynamics of the model. Starting with the current values $x_t = (x_{1,t}, x_{2,t}, \ldots, x_{K,t})$ of the macroeconomic variables, we perform a Monte Carlo simulation where, at every step, a forecast for the default probability for the point in time $t + 1$ is drawn up as follows:

1. Draw a $(K + 1)$ vector Z_{t+1} of $N(0, 1)$ distributed random numbers.
2. Compute the $(K + 1)$ vector E_{t+1} of the shocks or error terms in equations (6.2) and (6.3) according to $E_{t+1} = AZ_{t+1}$, where A is the $(K + 1) \times (K + 1)$ matrix of the Cholesky decomposition of the covariance matrix Σ in equation (6.4), i.e. the matrix determined by $\Sigma = AA'$.
3. According to equation (6.3), calculate the forecast for time $t + 1$ of the macroeconomic variables $x_{t+1} = (x_{1,t+1}, x_{2,t+1}, \ldots, x_{K,t+1})$.
4. According to equations (6.2) and (6.1), calculate the forecast for time $t + 1$ of the default probability p_{t+1}.

By substituting the current variables for time t by the respective forecasts for time $t + 1$ after a time step and repeating steps 1 to 4, we get a forecast of the default probability p_{t+2} for time $t + 2$. This procedure can be iterated until the desired time horizon H is reached. This method thus renders a path of future default probabilities $(p_{t+1}, p_{t+2}, \ldots p_{t+H})$ for which the loss distribution is determined as described in section 2. The entire loss distribution, covering both the expected and unexpected loss, finally results from the distribution of losses over all simulated paths of default probabilities.

---

1   *Due to lack of space the results of the estimation of the AR(2) processes (equation 6.3) as well as of the covariance matrix (equation 6.4) as estimated from the residuals of the respective regressions cannot be presented here.*

Table 4

Results of the Model Simulation Based on 2001 Data

	General business cycle model	Corporate sector model	Household sector model	Export sector model
Average annual default probability in %	2.17	2.17	2.25	2.14
Expected loss				
EUR billion	4.32	4.32	4.47	4.26
% of total credit volume	1.65	1.65	1.70	1.62
% of own funds	*10.19*	10.19	10.54	10.05
Unexpected loss				
EUR billion	8.05	8.03	8.34	7.94
% of total credit volume	3.07	3.06	3.18	3.03
% of own funds	18.99	18.95	19.67	18.73

Volume of the Austrian credit portfolio according to the Major Loans Register:	EUR 262.14 billion
Banks' aggregate own funds (= tier 1 capital plus tier 2 capital less deduction items):	EUR 42.38 billion

Source: OeNB, own calculations.

Note: We choose a fixed recovery rate of 70% and a time horizon of three years.

Table 4 shows the results of a Monte Carlo simulation with 50,000 simulation steps for the Austrian credit portfolio as introduced in section 2. The expected and unexpected losses are set in relation to Austrian banks' aggregate own funds[1]. Banks' own funds must adequately cover the unexpected loss.[2] As is evident from table 4, Austrian banks' risk-bearing capacity appears to be sound according to each of the four models. Depending on the model, unexpected loss accounts for between 18.7% and 19.7% of banks' aggregate own funds, which is 1 to 2 percentage points higher than the value of 16.5% determined in section 2 on the basis of the constant default rate of 2001. Again, it must be noted, however, that banks' actual loan loss provisions are not even included in these considerations. Therefore, banks' own funds provide sufficient cover for the loss expected for the Austrian credit portfolio for the period from 2002 to 2005 as well as the respective unexpected loss for this period. We infer this from model simulations based on the values for macroeconomic variables as recorded in 2001. The following stress tests will examine whether this also holds if a certain crisis scenario suddenly takes effect by end-2002.

5.2 Crisis Scenario Simulation

A macroeconomic stress test is conducted to find out what losses are to be expected in the sudden event of a macroeconomic crisis situation reflected by a corresponding shock in one of the macroeconomic variables. To be precise, we aim to determine the extent of the expected and unexpected losses and to see whether these are sufficiently covered by banks' own funds if a certain variable takes on the value $x^s_{k,t+1}$ at the point in time $t+1$. The goal is thus to estimate the future losses to the Austrian credit portfolio if, for instance, industrial production decreases by 5% in 2002 or if the oil price doubles.

1   In the following, own funds comprise eligible capital according to Article 23 of the 1993 Austrian Banking Act (tier 1 capital plus tier 2 capital less deduction items).

2   The unexpected loss is the maximum loss that can occur with a probability of 99%, which implies that the expected loss is included in this figure.

To perform a stress test, we proceed as follows: The crisis scenario $x^s_{k,t+1}$ for time $t+1$ is decomposed into a "normal" part, which results from the autoregressive process, and an "unexpected" part:

$$x^s_{k,t+1} = \gamma_{k,0} + \gamma_{k,1}x_{k,t} + \gamma_{k,2}x_{k,t-1} + \nu^s_{k,t+1} \qquad (7)$$

The unexpected part $\nu^s_{k,t+1}$ describes the (artificial) shock implied by the crisis scenario $x^s_{k,t+1}$. In the Monte Carlo simulation, in the first step of the above algorithm the corresponding element $z_{k+1,t+1}$ in the vector Z_{t+1} of the $N(0,1)$ distributed random numbers is replaced by the artificial shock $z^s_{k+1,t+1}$, where it is necessary to normalize $\nu^s_{k,t+1}$ with the respective standard deviation:

$$z^s_{k+1,t+1} = \nu^s_{k,t+1}/\sigma_{k,\nu}$$

This procedure ensures that in the second step of the simulation, the impact of the crisis scenario on the other macroeconomic variables is accounted for by the covariance matrix.

6 Results of the Macroeonomic Stress Tests

A crucial aspect of employing stress tests is the selection of scenarios. It is true that stress tests are aimed at exploring the impacts of extreme events. However, if these events are in general regarded as extremely unlikely or implausible, little importance will be attached to the results of such stress tests. Breuer and Krenn (1999) provide a profound introduction to the difficulties of selecting crisis scenarios.

One possibility is to examine the impact of a historically observed maximum movement of a certain risk factor, in this case a macroeconomic variable. Such a stress test is generally regarded as plausible, since this particular event has already taken place. This is why, in the following, we choose this strategy to select scenarios. It must be pointed out that the selected scenarios are still hypothetical in character and that we do not attempt to provide an exact representation of historical events. Thus a so-called general cyclical shock is to be understood as a cyclical shock whose cause remains unspecified. It is merely the extent by which industrial production declines that is based on historical observations (the decline was actually caused by an oil price shock). Other events might of course also trigger a similar decline. In detail, stress tests are performed on the basis of the following historical scenarios:

- General cyclical shock: Fall in industrial production by 6.3% (observed in the wake of the 1975 oil shock).
- Household sector shock: Fall in disposable income by 0.4% (also observed in 1975).
- Corporate sector shock: Fall in gross investment in machinery and equipment by 7.3% (observed in 1982).
- Export sector shock: Fall in exports by 4.2% (observed during the 1993 recession).
- Inflation shock: Fall in the inflation rate by 2.7 percentage points (observed in 1966).
- Equity crash: Fall in the ATX by 24% (observed in 1991).

— Interest rate shock: Rise in nominal short-term interest rates by 3.7 percentage points (observed in 1980).

— Oil price shock: Surge in oil prices by 263% (observed in 1974).

We perform a Monte Carlo simulation of the respective model with 50,000 simulation steps for each crisis scenario, with the general business cycle model forming the basis of the simulation for the inflation shock, interest rate shock, equity crash and oil price shock scenarios. Chart 4 shows the changes in the expected and unexpected losses for the historical crisis scenarios compared to the values determined on the basis of the actual end-2001 scenario. Again, a time horizon of three years is assumed for determining the loss distribution. The crisis scenario of the general cyclical shock, as described by the decline in industrial production, has the greatest impact on the loss distribution. In the event of that crisis scenario, the expected and unexpected losses are found to increase by more than 35% and just under 30%, respectively, vis-à-vis the values determined on the basis of the scenario at end-2001.[1]

Chart 4

Changes in Expected and Unexpected Losses

Source: OeNB, own calculations.
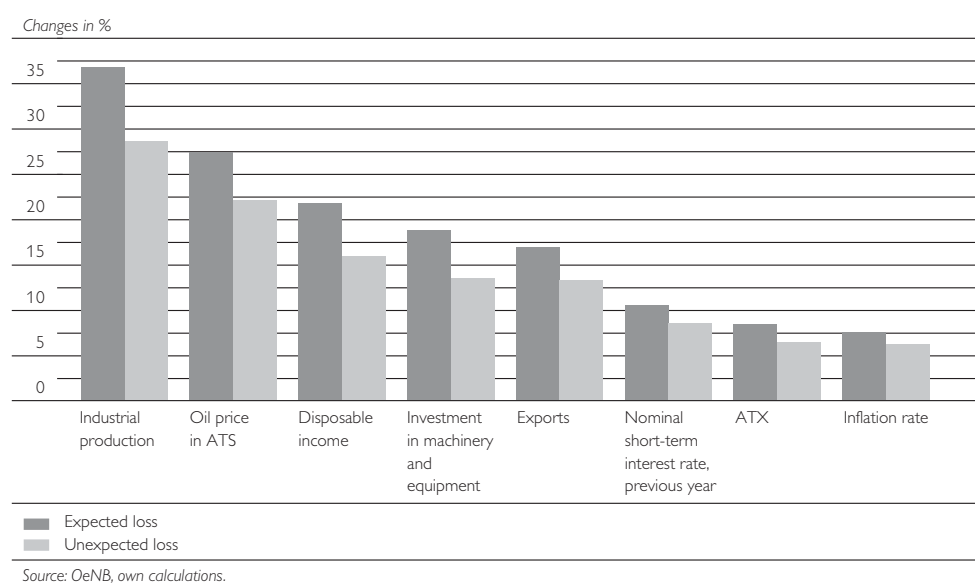
The oil price shock causes the second strongest impact, followed by household, corporate and export shocks. Obviously, cyclical indicators (and, of course, the oil price) have the strongest impact on the default probability and hence on credit risk. By contrast, an interest rate shock of +3.7 percentage points, after all, only drives up the expected loss by 10%. The effects of the equity crash and the inflation shock are weaker still.

Table 5 summarizes the results of the stress tests in absolute and relative figures. According to the crisis scenario employed, the expected and unexpected losses for the period from 2002 to 2005 climb to values between

---

1   The differences in the growth rates of the expected and unexpected losses can be ascribed to the fact that the skewness of the loss distribution declines as the default probability increases.

EUR 4.7 billion and EUR 8.6 billion, respectively (inflation shock), and EUR 6.8 billion and EUR 11.3 billion (general cyclical shock). As a percentage of the aggregate Austrian credit portfolio, this corresponds to a maximum unexpected loss of 4.3%. Depending on the crisis scenario, the capital required to cover the unexpected loss goes up by amounts ranging from 1.2 percentage points to almost 6 percentage points, thus reaching a range of 20.2% to 26%, as can be seen in a comparison of tables 4 and 5. Austrian banks' aggregate own funds thus provide sufficient cover for the unexpected loss in all historical crisis scenarios. This is all the more true as the loan loss provisions already effected by banks to hedge against expected credit defaults have not even been taken into account in the above figures.

Compared to the results presented in Kalirai and Scheicher (2002), capital requirements are found to be clearly higher in the individual crisis scenarios. While according to their model, for instance, a shock to industrial production only raises loan loss provisions (relative to own funds) by 1 percentage point, we find that the expected loss (relative to own funds) – which on average corresponds to loan loss provisions – goes up by almost 6 percentage points. This obvious difference may be explained primarily by the fact that in the modeling introduced here several macroeconomic variables impact the credit risk simultaneously and that their interdependencies are taken into account through the correlated shocks, while the stress tests presented by Kalirai and Scheicher (2002) are merely based on univariate regressions.

Table 5

Summary of Stress Test Results

	Average default probability	Expected loss			Unexpected loss		
	%	EUR billion	% of volume	% of own funds	EUR billion	% of volume	% of own funds
Historical crisis scenarios							
Industrial production less energy	3.45	6.84	2.61	16.14	11.28	4.30	26.62
Fixed capital formation	2.68	5.31	2.03	12.54	9.28	3.54	21.90
Disposable income	2.86	5.71	2.18	13.47	9.92	3.78	23.40
Exports	2.58	5.13	1.96	12.09	9.15	3.49	21.60
Inflation rate	2.35	4.67	1.78	11.02	8.57	3.27	20.22
ATX (Austrian Traded Index)	2.59	5.16	1.97	12.17	9.26	3.53	21.85
Nominal short-term interest rate, previous year	2.55	5.07	1.94	11.97	9.09	3.47	21.45
Oil price in ATS	2.99	5.95	2.27	14.05	10.33	3.94	24.37
Three-year recession							
Industrial production less energy	5.30	10.40	3.97	24.53	15.89	6.06	37.49

Volume of the Austrian credit portfolio according to the Major Loans Register: EUR 262.14 billion
Banks' aggregate own funds (= tier 1 capital plus tier 2 capital less deduction items): EUR 42.38 billion

Source: OeNB, own calculations.
Note: We choose a fixed recovery rate of 70% and a time horizon of three years.

Finally, we stress test the Austrian banking sector's risk-bearing capacity for a scenario of extreme stress, namely a severe three-year recession.[1]) Our stress test is based on a simulation of the general business cycle model. We simulate a shock to industrial production at the maximum rate of decline of 6.3% as recorded in 1975 three years in a row. In that year, the fall in industrial production corresponded to a GDP decline by 0.4%. The stress test result confirms the positive impression of Austrian banks' risk-bearing capacity gained from the historical scenarios. On the one hand, the average annual default probability rises to 5.3%, thus driving up the expected loss to EUR 10.4 billion. Put differently, in the assumed three-year crisis scenario, banks would have to expect losses of close to 25% of their aggregate funds which, while certainly an immense drain on the banking system, would still be manageable, however. On the other hand, even under this dramatic crisis scenario, the unexpected loss – i.e. the maximum loss occurring with a probability of 99% – of EUR 15.9 billion or 37.5% of banks' own funds is three times covered by these funds. Based on the stress tests presented in this study, we can thus say that the risk-bearing capacity of the Austrian banking system is more than adequate. Moreover, the loan loss provisions made by banks by end-June 2002 with respect to claims on domestic nonbanks and credit institutions come to around 20% of banks' aggregate own funds. In other words, the main part of losses to be expected in this dramatic crisis scenario is already covered by such provisions.

7 Summary

This study introduces a credit risk model for stress testing Austrian banks' credit portfolio on the basis of individual loan data. Credit risk is modeled in dependence on macroeconomic variables while their correlations and interdependencies are simultaneously accounted for. Starting from univariate regressions, we first identify a set of indicators for credit risk, and, in a next step, select a multivariate model capable of explaining credit risk via industrial production, the inflation rate, the ATX, the nominal short-term interest rate of the previous year and the oil price. To perform sector-specific stress tests, we use alternative models to substitute industrial production by investment in machinery and equipment, disposable income, and exports, respectively. By introducing a dynamic component, we can use these models to assess the future losses on the Austrian credit portfolio on the basis of simulations of these macroeconomic variables. The model is used in particular to conduct stress tests drawing on historically observed maximum changes in the selected macroeconomic indicators. On the basis of these historical crisis scenarios, the loss to be expected within three years (relative to aggregate own funds) is found to be up to 6 percentage points higher than the value derived from the actual end-2001 scenario. The maximum loss to occur with a probability of 99%, however, comes to 26.6% of banks' own funds at the most, which confirms that Austrian banks' risk-bearing capacity is more than adequate (which is all the more true as our examination did not account for already existing loan loss provisions). The

---

1   A similar scenario of three years of zero growth was chosen for stress testing in the International Monetary Fund's Financial System Stability Assessment program for Finland (IMF, 2001).

crisis scenario, under which a severe three-year recession is assumed, confirms this result: while considerable losses to the Austrian credit portfolio would have to be expected, these would still be sufficiently covered.

The results presented in this study basically constitute another step toward developing a macroeconomic stress test model for the Austrian banking sector. They must, however, be interpreted with great caution and under the assumptions made in this study. Granted, the modeling itself has been improved in a number of ways compared to the initial findings by Kalirai and Scheicher (2002), e.g. by taking into account the portfolio structure or the interdependence of the macroeconomic variables. Yet, it leaves the risk arising from loans to foreign borrowers entirely unconsidered. Moreover, the available data do not cover the entire volume of loans to domestic debtors. Further research should therefore attempt to incorporate the full scope of the Austrian credit portfolio by combining the data from the Major Loans Register and banks' monthly returns. In addition, an improved model should account for the different default risks in the individual industrial sectors. Also, this study assumes a constant recovery rate of 70%. As collateral is to be reported to the Major Loans Register as of January 2003, it will henceforth also be possible to improve the modeling with regard to the actual loss given default. Finally, it would be desirable to give up the approach of assuming a hypthetical "all-Austrian bank" and to examine credit risk separately for each bank, which would allow for identifying the systemic aspect of credit risk more easily. Combining this model with the approach presented by Elsinger, Lehar and Summer (2002), which explicitly models the systemic risk resulting from banks' mutual obligations, would yield a comprehensive macroeconomic stress test model for the Austrian banking sector.

References

Breuer, T. and Krenn, G. (1999). Stress Testing. In: OeNB. Guidelines on Market Risk, Vol. 5.

Elsinger, H., Lehar., A. and Summer, M. (2002). A New Approach to Assessing the Risk of Interbank Loans. In: OeNB. Financial Stability Report 3, 75–86.

Crouhy, M., Galai, D. and Mark, R. (2000). A Comparative Analysis of Current Credit Risk Models. In: Journal of Banking and Finance 24, 59–117.

IMF (2001). Finland: Financial System Stability Assessment. Country Report No. 01/214.

Kalirai, H. and Scheicher, M. (2002). Macroeconomic Stress Testing: Preliminary Evidence for Austria. In: OeNB. Financial Stability Report 3, 58–74.

Wilson, T. (1997a). Portfolio Credit Risk (I). In: Risk, Vol. 10, No. 9.

Wilson, T. (1997b). Portfolio Credit Risk (II). In: Risk, Vol. 10, No. 10.

Foreign Currency Loans in Austria –
Efficiency and Risk Considerations

1 Introduction

Walter Waschiczek

Foreign currency borrowing has been common practice in the public sector for decades. In Austria the amount of foreign currency loans taken out by businesses and households has increased at a tremendous pace since the mid-1990s. For several years, foreign currency loans even accounted for the largest share of private sector borrowing. Enterprises and households took out loans denominated in foreign currencies not to refinance currency-matched external transactions but to gain from the low short-term (nominal) interest rate levels of these currencies. Foreign currency loans have been exclusively used for domestic investments.

This study aims to analyze the development of foreign currency borrowing by businesses and households since 1995 and to assess its implications for the Austrian economy in terms of risk exposure. Since loans denominated in U.S. dollars have hardly changed in volume over the past few years and seem to have been taken out primarily for external transactions, the focus will be on loans denominated in Swiss francs and Japanese yen, which have been the most popular currencies offering favorable interest rates.

A discussion of the main features of foreign currency borrowing in Austria will be followed by an attempt to find appropriate theoretical approaches to explain the popularity of this type of financing. The key questions are whether there are economic reasons to prefer foreign currency loans to other loans and, against the backdrop of the literature on rational herd behavior (Bikhchandani, Hirshleifer and Welch, 1992), to what extent the trend can be traced to particularities in information processing. Section 4 deals with the specific risks of foreign currency financing, examining the risk exposure of both lenders and borrowers.

2 Key Features of Foreign Currency Loans in Austria

2.1 A Broadly Based Boom

According to the data available, the share of foreign currency loans in total lending to businesses and households in Austria was higher than in most other euro area countries already in the 1980s; until 1995, it remained more or less unchanged at 4% to 5%.[1]) Then, it was almost exclusively businesses that took out foreign currency loans,[2]) for instance to finance external transactions. Large enterprises, which are in general more strongly involved in foreign trade, apparently accounted for the lion's share of the overall amount of foreign currency borrowing.

1995, approximately, marked the beginning of a broadly based boom in foreign currency lending to both businesses and households; the preferred currencies were the Swiss franc and, more recently and increasingly, the Japanese yen. Foreign currency-denominated loans accounted for more than

---

1   *Data on the shares of individual currencies in total foreign currency lending (since the December 1997 reporting period) can be retrieved from the money and banking statistics, which, however, do not allow a break-down of foreign currency loans to Austrian nonbanks by borrower groups. The monthly return is the sole source of data from before December 1997; these data on lending to Austrian nonbanks can only be broken down into the two categories schilling/euro and foreign currency (from 1999 on, the latter item no longer includes the predecessor currencies of the euro, causing a break in the time series in January 1999).*

2   *With the exception of Vorarlberg. See section 2.2.*

half of the increase in Austrian banks' lending to businesses and almost two thirds of the increase in lending to households between the end of 1995 and mid-2002. In this period, the amount of foreign currency loans outstanding rose more than fivefold, which equals an average annual growth rate of 29%.[1]) In several quarters, the foreign currency share of the net change in bank lending came to more than 100%, i.e. in these periods, on balance, schilling- or euro-denominated loans were converted into foreign currency loans. By mid-2002, 19.4% of banks' loans to businesses and 24.1% of loans to households were denominated in a foreign currency, compared to 7.8% and 1.5%, respectively, at the end of 1995 (including the euro legacy currencies).

Chart 1

Foreign Currency Loans as a Share of Total Loans to Private Nonbanks


Source: OeNB.
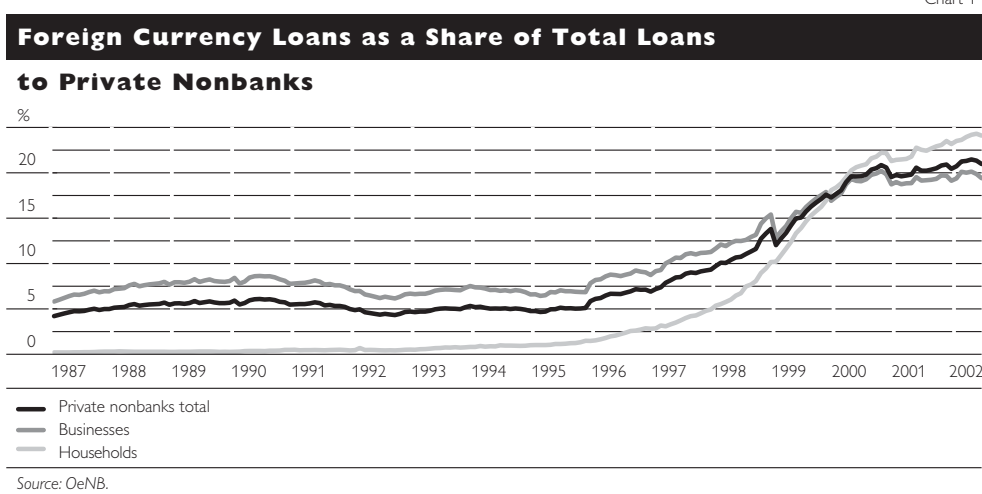
Early in the boom, the bulk of foreign currency loans was taken out in Swiss francs; from about 1999 on, the Japanese yen gained in popularity, accounting for 42% of the total amount of foreign currency loans at mid-2002. Up to end-1998, lending in Deutsche mark also played a major role. Given the close trade links between Austria and Germany, it can be assumed that loans in Deutsche mark were extended primarily to enterprises, which also seem to have been virtually the sole borrowers of U.S. dollar-denominated funds in Austria. A comparison with currency shares in foreign trade shows that, by contrast, the bulk of Swiss franc- and Japanese yen-denominated loans is not used for external transactions.[2])

Considering the typical customer structure of joint stock banks, the fact that in 1995 the foreign currency share of joint stock banks' corporate lending was significantly higher than in all other sectors also indicates that foreign currency loans used to be chiefly a financing instrument for large firms. In the meantime, these differences have clearly evened out, and banks across all sectors (with the exception of building and loan associations, which do not offer foreign currency loans, and special purpose banks) registered considerable increases in the foreign currency shares in their loans to enterprises and households.

1 Over the same period, lending in schilling/euro increased by a mere 23% (or 2.9% per annum).
2 Over the past few years, the Swiss franc served as the payment currency for less than 2% of Austria's goods imports and exports, while the Japanese yen was used in ½% of external transactions; contrary to the trend in foreign currency borrowing, their share has been on the decline recently.
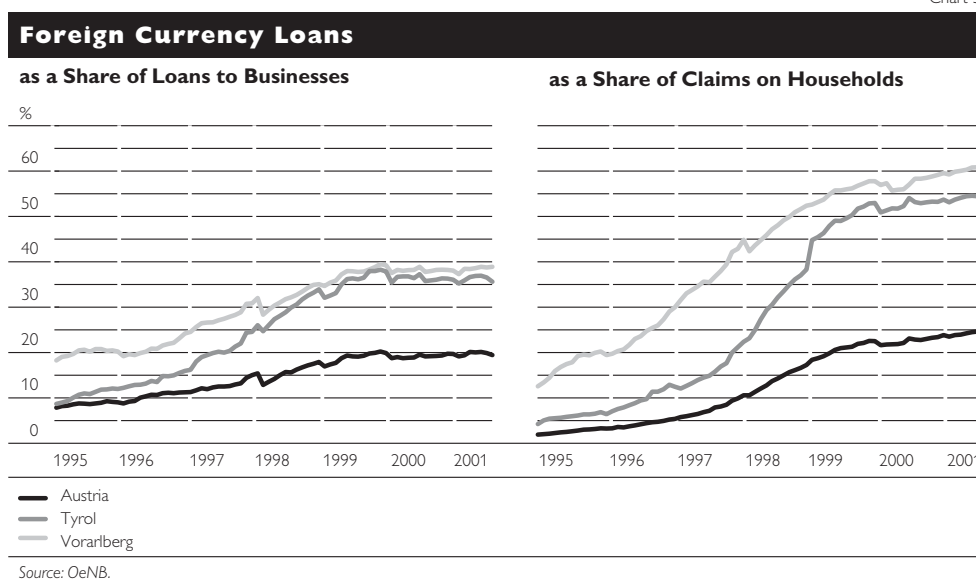
Chart 2

Currency Structure of Foreign Currency Loans 1997–2002

Source: OeNB.
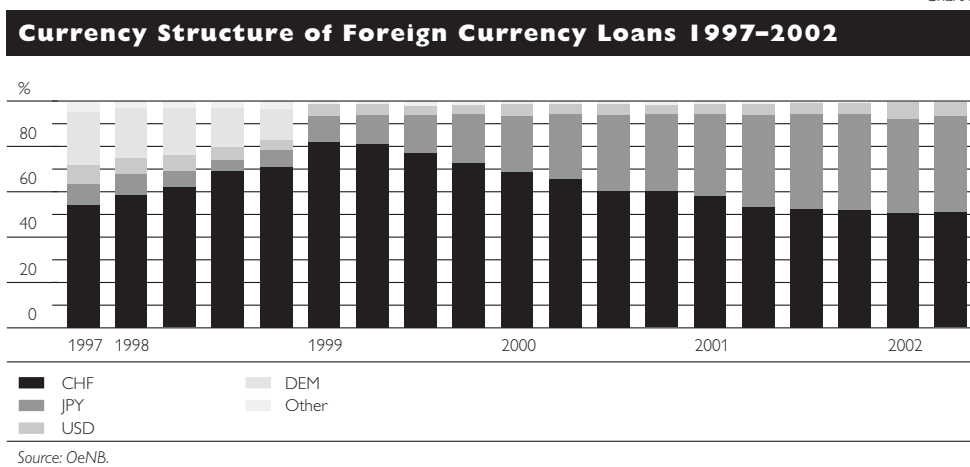
2.2 East-West Divide

The boom in foreign currency borrowing took off in Austria's westernmost province, Vorarlberg[1]), which has particularly close economic ties with Switzerland. In this region, household borrowing in foreign currency had for quite some time been markedly higher than in the other Austrian provinces. As early as by the end of the 1980s, the share of foreign currency loans in the total amount of personal loans came to 4% to 5% in Vorarlberg alone and to a mere 0.2% in Austria. As mentioned before, no data are available on the currency breakdown of foreign currency loans for this period, but the data as of 1997 suggest that there was a strong focus on Swiss francs, especially in Vorarlberg. The popularity of borrowing in Swiss francs must be seen against the backdrop of a relatively large number of Austrians working in Switzerland and Liechtenstein.[2]) At around 8%, the foreign currency share in loans to businesses was also significantly higher in Vorarlberg in the late 1980s than in all other provinces, except for Vienna.[3])

Around 1995, the boom in foreign currency borrowing started to spread from Vorarlberg to the other Austrian provinces, in particular to Tyrol. Until now, foreign currency loans have continued to be much more prevalent in the western provinces than in the rest of Austria. By mid-2002, the share of foreign currency loans in the total amount of loans to households had gone up beyond 50% in Vorarlberg and Tyrol, compared to 24.1% in all of Austria.

1   When analyzing the developments in each individual province, it must be noted that the banks are assigned to the province in which their headquarters are located. Therefore, loan contracts between customers and branches in other provinces are allocated to the province where the lending bank has its headquarters. This is particularly relevant for the large Viennese banks' branch offices in the provinces. Hence, the individual provinces' share in total foreign currency lending tends to be underestimated.

2   According to the Austrian Public Employment Service's (AMS) Vorarlberg office, some 7,000 Vorarlberg residents worked in Switzerland at the end of 2001 (in the early 1990s, some 10,000 had commuted to Switzerland) and more than 6,000 in Liechtenstein. This corresponds to a total of approximately 10% of payroll employment in Vorarlberg.

3   This can be attributed to both the allocation to the Viennese headquarters of loans extended by large banks' branch offices in the provinces and the concentration of large firms in Vienna, which account for a significant part of Austria's external trade.

Chart 3

Foreign Currency Loans

as a Share of Loans to Businesses

as a Share of Claims on Households

Austria
Tyrol
Vorarlberg

Source: OeNB.

The share of foreign currency loans in loans to nonfinancial corporations is also significantly higher in the western provinces than in the rest of Austria.

2.3 Common Characteristics of Foreign Currency Loans[1]

A foreign currency loan is a loan denominated in a currency other than that of the borrower's home country that must be repaid also in this currency. The majority of foreign currency loans are granted with a maturity of up to 25 years, but are rolled over every three or six months; the interest rate is linked to the London Interbank Offered Rate (LIBOR) of the relevant currency. The bank charges an additional 1.5% to 2%, depending on the size of the loan, the nature of customer relations, the collateral provided, etc.[2] Interest (and principal) payments are due retroactively upon maturity and have to be made in the currency in which the loan is denominated. In many cases, the borrower may repay the loan before it is due or switch to another currency (including euro) at the rollover dates.

Loans denominated in a foreign currency are usually bullet loans combined with funding plans, which may differ from bank to bank. This means that until maturity, the borrower makes only interest payments. In addition, the borrower pays into a repayment vehicle during this period, for instance a life insurance policy or a mutual fund, which is to cover the principal to be repaid at maturity.

Foreign currency loans at fixed interest rates are granted very rarely. The minimum amount required for currency swaps involving Japanese yen, for instance, would be too high; such arrangements may only be made in Swiss

---

1   For a detailed description of the characteristics of foreign currency loans, see Dlaska (2002).

2   The costs of a foreign currency loan are higher than those of an "ordinary" loan (which usually include loan taxes, a handling fee and a loan contract fee). Borrowers are charged account maintenance fees for two accounts, since usually they have one euro-denominated and one foreign currency-denominated account. Whenever the customer wishes to switch from the foreign currency to euro, a handling fee of 1% to 2% (depending on the bank) is charged. When foreign currency is bought at the maturity of interest payments or at the redemption of the loan, banks charge the borrower a foreign exchange commission.

francs by large Austrian banks which are active in the Swiss market. In this case, however, borrowers do not have the option to cancel the foreign currency loan before maturity.

3 Theoretical Explanatory Approaches

3.1 Efficiency Considerations for Foreign Currency Loans

What lies at the root of the boom in foreign currency lending in Austria? The initial questions to be answered in this context are, first, does it make economic sense for companies and households to take out foreign currency loans, and second, what are the differences between private sector and public sector foreign currency borrowing? Also, it must be ascertained why there is such a high concentration of foreign currency loans in Austria.

Funding domestic investments in foreign currency is, in a way, similar to currency substitution. Currency substitution denotes the use of a foreign currency instead of the national currency for at least one of money's three central functions – store of value, means of exchange and unit of account (Giovannini and Turtelboom, 1994). Of course, taking out a foreign currency-denominated loan is actually the opposite of using foreign currency as a store of value.[1]) While currency substitution usually takes place in an environment of high inflation (Calvo and Végh, 1992), which causes people to acquire assets denominated in currencies more stable than their own, foreign currency loans (a form of "negative currency substitution") in Austria are usually denominated in currencies which have appreciated considerably against the schilling and the euro over the past two decades. Since 1980 the Swiss franc and the Japanese yen, for instance, have notably gained in value against the schilling and the euro – both in nominal and in real terms, taking into account inflation differentials.

The underlying reason for opting for foreign currency loans, however, has primarily been the differential between the lending rates charged by Austrian banks and the Swiss (and later also the Japanese) money market rates. In order to profit from lower interest rates in a foreign currency, the extent to which the national currency depreciates must not exceed the anticipated interest rate differential; in other words, the borrower counts on a considerable degree of exchange rate stability. Up to the start of Stage Three of Economic and Monetary Union, Austria's hard currency policy had ensured that the Austrian schilling had been stable against the Deutsche mark for almost two decades.

For foreign currency loans to be rewarding for the borrower, the foreign nominal interest rate plus the anticipated appreciation (or depreciation) must be lower than the domestic nominal interest rate. Whether this is the case depends on whether the uncovered interest parity condition[2]) applies. If so, the actual cost-saving benefit of a foreign currency loan equals zero. Empirical evidence, as analyzed in a number of studies, however, suggests that the uncovered interest parity condition does not apply (see, for instance, De Vries, 1994).

1   *The foreign currency is not used in the other two functions (means of payment and unit of account); in Austria, the borrower receives the amount of the loan taken out in the foreign currency in euro. Also, the borrower will calculate whether the foreign currency loan has proved rewarding in euro and not in the respective foreign currency.*

2   *The uncovered interest parity condition asserts that domestic and foreign assets ultimately yield the same return, adjusted for the expected rate of change of the bilateral exchange rate over the period of the investment.*

Hence, converting a loan from one currency into another may in fact reduce – or raise – loan costs. Since the cost effects triggered by deviations from the uncovered interest parity vary over time, it is very difficult to accurately forecast and systematically utilize these effects.

Seeking to take advantage of this saving potential, the public sector in Austria – and in a number of other European countries – has taken out loans denominated in foreign currencies for decades. However, what is crucial is that the public sector takes out loans in a range of different currencies to spread the exchange rate risk, as portfolio theory would suggest (Pecchi and Ripa di Meana, 1998). Mooslechner (1993) shows that between 1970 and 1990 the costs of a loan denominated in Japanese yen and Swiss francs – both low-interest hard currencies – were significantly higher when the exchange rate effect is taken into account, while more "expensive" currencies in terms of nominal interest rates turned much cheaper thanks to the appreciation of the schilling. Brandner (1996) concluded ex post that in the 1980 to 1994 period, loans denominated in foreign currency (Swiss franc, Japanese yen and U.S. dollar) on balance yielded savings compared to schilling-denominated loans: Increased borrowing in Swiss francs turned out to be beneficial, while loans denominated in yen proved more expensive.[1]) Considering the large sums required, diversification is a viable option to reduce risk exposure primarily for the public sector and only to a very limited extent for households; therefore it does not help explain the boom in foreign currency borrowing in Austria.[2])

Other arguments often raised in favor of public foreign currency borrowing – especially for countries with small, little developed financial markets – are a wider range of lending terms (such as, for instance, longer maturities) and the higher liquidity of foreign markets (De Fontenay, Milesi-Ferretti and Pill, 1995).[3]) However, foreign currency loans in Austria are in fact usually offered on highly standardized, and not on more flexible terms than euro-denominated loans.

Even if the uncovered interest parity does not apply, the advantages of foreign currency loans cannot be attained systematically, and diversification is not an option in borrowing small sums denominated in a single foreign currency. On the contrary, considering that the actual costs of a loan can be ascertained only at maturity, foreign currency loans entail another element of uncertainty, i.e. incomplete information, for the (potential) borrower.

Furthermore, it must be borne in mind that these considerations apply not only to Austrian borrowers, but also to borrowers in other countries, which have not witnessed a comparable surge in foreign currency loans, such as Germany, to whose former currency – the Deutsche mark – Austria had pegged its schilling for years, or the Netherlands. Hence it is fair to assume that specifically Austrian factors have played a key role in the boom in foreign currency borrowing.

---

1   Both authors made their calculations to estimate the efficiency of foreign currency borrowing in federal debt management, but basically the results also apply to other borrowers.

2   When investing in mutual funds, households also diversify their risks, since mutual funds investing in foreign currencies usually spread their investment across several currencies.

3   Similar considerations were also taken into account when the Austrian federal government started to take out foreign currency loans (Hauth and Kocher, 2001).

3.2 The Theory of Rational Herd Behavior

The boom in foreign currency loans may have been supply- or/and demand-driven, i.e. basically, it is possible that consumers have increasingly demanded this type of loan and/or that banks have strongly promoted them. The more likely explanation seems to be that it was primarily rising demand that spurred the rapid expansion of foreign currency borrowing. The fact that efficiency considerations fail to explain enterprises' or households' decisions to take out foreign currency loans implies either that Austrians have a greater risk appetite or that they have different access to information and use this information in different ways. Given Austrians' comparatively conservative borrowing and saving behavior – by international standards, both investment in stocks and household debt (OeNB, 2001) are relatively modest in Austria – it is rather unlikely that it was heightened risk appetite that triggered the boom in foreign currency borrowing; rather, information-related factors should be looked at more closely. Austrian borrowers may have access to more or other information or handle the information they get differently.

Considering that people in a small open economy like Austria tend to be quite familiar with foreign currencies and the related exchange rate movements, it is not unlikely that Austrians are better informed on these matters. Also, Austria is a popular tourist destination, which could be another reason why Austrians feel comfortable handling foreign currencies. Payment in foreign cash – for instance in Deutsche mark – had been widely accepted in many parts of the country. Still, all this experience may not suffice to give Austrians an information lead for foreign currency borrowing. In this case, the perception, handling and choice of relevant information may make the difference.

The limited capabilities and opportunities for rational information processing and the tendency towards uniform acting are key features of the behavioral finance approach, which adds psychological findings to capital market theory and puts the focus on market participants' behavior. Below, the theory of rational herding is to help explain why foreign currency loans have become so popular in Austria.[1] To put it plainly, herding occurs when individuals disregard available relevant information in taking their decisions and imitate other individuals' decisions instead.[2] This theoretical approach has been used to explain a range of phenomena in the financial markets.[3] It is not the decision to take out a loan as such, but the choice of the currency in which the loan will be denominated (schilling/euro or foreign currency) that is to be discussed here as the action with an uncertain outcome, which may thus lead to herding.

If one is uncertain about how to act, other individuals' actions may be interpreted as evidence that they have information which one does not possess oneself. Bikhchandani, Hirshleifer and Welch (1992) formally show that it

---

1   Herd behavior can be rational or irrational. Irrational behavior occurs when agents cease to consider their own opinions and convictions and simply imitate other agents' decisions. According to rational herd behavior models, herding occurs when the information available is considered to be insufficient compared to other agents' decisions (Devenow and Welch, 1996).

2   Herd behavior must not be confused with identical decisions which are the result of identical information.

3   Welch (1992) analyzed IPOs, finding that an issue's success largely depends on whether a sufficient number of investors can be found in the early stages. Rajan (1994) showed that banks' decision to make loan loss provisions may be based on rational herding.

can be rational to act like (at least) two agents have acted before, even if the information available (signals) would suggest doing the opposite – provided that the information available is incomplete, which is usually the case in borrowing or investment decisions.

Theory assumes that all agents have the same (incomplete) information about the benefits and risks of a decision, in this case the decision to take out a foreign currency loan. While (potential) borrowers have some idea of the interest savings and the risks involved in foreign currency borrowing, they do not know what information other borrowers have; still, they realize that a rising number of people have already opted for this type of loan and that the share of foreign currency loans has been on the increase. Theory also assumes that agents act sequentially (one after the other). The fact that the steady expansion of foreign currency lending started in the second half of the 1990s and spread from the western provinces across the rest of Austria is in line with this assumption.

If two individuals make the same decision, the third individual who has witnessed this action will conclude that the two others know that their decision will be rewarding. Even if the third agent receives a signal indicating that it would be better not to make the same decision, the agent will imitate the others in their behavior, since the signal is challenged by two pieces of information pointing in the opposite direction. The third individual's private – negative – signal is thus offset by one of the other – positive – signals. Consequently, the positive signal derived from the observation of the two predecessors' behavior plays the key role in the decision-making process. In other words, the third individual follows the choices made earlier in the sequence by other agents and decides to take out a foreign currency loan as well; all agents after the third agent face the same situation and also imitate the previous decisions. This scenario is referred to as an information cascade.

An approximation of the amount of publicly available information by media reports on foreign currency loans reveals[1] that the media have paid increasing attention to the issue since the mid-1990s. This development is illustrated by chart 4, which depicts the number of reports on foreign currency lending by the Austrian news agency APA between 1994 and 2002.[2] The public signal has been constantly reinforced, obviously much more strongly than the private signal, which has also been strengthened on account of increasing media coverage. Information from banks also seems to have had a – probably much greater – impact on the public signal; however, it is very difficult to measure this impact ex post.[3]

Unlike in other countries, public signals in connection with foreign currency loans seem to have steadily intensified in Austria in the second half of the 1990s. What is more, cascades hinge very much on the initial conditions,

---

1   Reports in the regular (financial) press rather than news agency reports provide relevant information for the public. However, it is difficult to track past press reports, while APA reports can be accessed in a database.

2   Loan brokers are likely to have also played an important part in promoting foreign currency lending in Austria. Their advertising campaigns can be regarded as contributions to the public signal.

3   Information from banks is considered public and not private information because it is assumed that the quality of customer service is the same for every customer.

i.e. the decisions of the individuals acting first. Therefore this model also helps explain why herding takes place in geographically limited areas. As mentioned before, foreign currency lending used to be more prevalent in Vorarlberg than in the other Austrian provinces. This fact can be viewed as the initial condition for the emergence of an information cascade which did not exist in other countries. Moreover, media reporting on the issue, just as the role of loan brokers, has apparently also been unique in Austria.

Chart 4

Number of APA News Agency Reports

on Foreign Currency Loans

Number
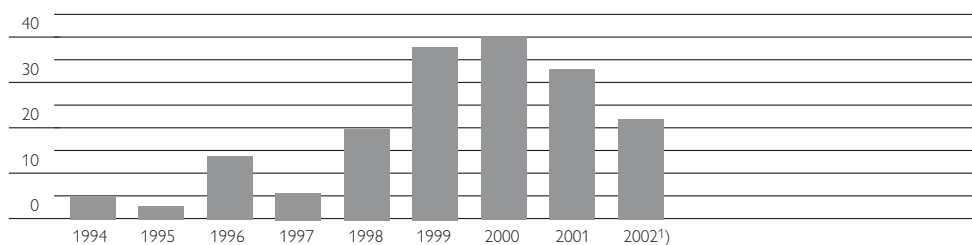
Source: APA.
1) January 1 to August 23.

The existence of an information cascade does not allow a conclusion about whether the decisions made in its course are right or wrong. Hence the theory of rational herd behavior does not indicate whether the substantial expansion of foreign currency borrowing in Austria has been economically beneficial or not. Basically, an information cascade can exist for an indefinite period of time, provided that there is no interference from exogenous factors. However, since information cascades are based on a small amount of publicly available information and can easily be interrupted by the release of additional public information, they are typically fragile.

Also, the theory of information cascades presumes that decisions are – at least partly – irrevocable, which rules out a broad application of the theory. Foreign currency loans can, in most cases, be converted into euro at any rollover date, i.e. borrowers can revoke their decision in terms of currency. Even though borrowers in fact tend to stick to one borrowing currency for a longer period, this aspect notably limits the universal applicability of the theory of information cascades to the boom in foreign currency lending in Austria.

4 Risks in Foreign Currency Borrowing

4.1 Exchange Rate Risk

Foreign currency borrowers are directly exposed to foreign exchange risk. Valuation changes triggered by shifts in exchange rate relationships increase or decrease the euro-denominated value of the foreign currency liabilities. Therefore, interest to be paid on the foreign currency loans outstanding also changes. Exchange rate movements feed through to interest expenses in every interest payment period, while (in bullet loans) the amount of capital outstanding is affected only by unrealized valuation changes until the end of maturity.

Given the volatility of exchange rates, the actual amount of exchange gains or losses depends critically on the length of the period under review. The following section takes a closer look at the exchange rate effects on loans denominated in Swiss francs and Japanese yen taken out in Austria since end-1997 (the start of the available time series). Since foreign currency lending statistics broken down by currency are only available on a quarterly basis (as part of the Austrian contribution to euro area money and banking statistics), the exchange rate effect on foreign currency loans can be approximated only very crudely. As a – very rough – approximation of the contribution of exchange rate movements to the quarterly growth of foreign currency lending, the level at the end of the respective previous quarter was multiplied by the change in the exchange rate in the current quarter. As borrowers continuously take out new loans and redeem existing loans (with the former happening more often, given the high demand), the contribution of exchange rate fluctuations to foreign currency loan growth thus tends to be underestimated.

The above calculation yields an increase in the volume of foreign currency loans since end-1997 by EUR 2 billion, which equals 9.3% of the total growth of Swiss franc-denominated loans. The Swiss franc has gained in value against the euro especially since 1999, much to the disadvantage of borrowers of Swiss franc-denominated loans. Volatility, by contrast, has been fairly moderate;

Table 1

Impact of Exchange Rate Movements
on Foreign Currency Loans

	CHF			JPY		
	Exchange rate	Quarterly change in the volume of loans outstanding		Exchange rate	Quarterly change in the volume of loans outstanding	
		Total	Exchange rate-induced		Total	Exchange rate-induced
	CHF/EUR	EUR million		JPY/EUR	EUR million	
1998						
1st quarter	1.6369	+1,438	−169	142.94	+ 50	+ 8
2nd quarter	1.6641	+1,391	−167	152.24	− 257	− 99
3rd quarter	1.6238	+2,218	+278	158.66	− 238	− 53
4th quarter	1.6078	+2,760	+135	132.80	+ 632	+ 166
1999						
1st quarter	1.5981	+2,226	+ 99	127.81	+ 987	+ 62
2nd quarter	1.6034	+1,963	− 62	124.82	+ 654	+ 62
3rd quarter	1.5967	+1,758	+ 86	112.67	+1,489	+ 321
4th quarter	1.6051	+ 51	−118	102.73	+1,875	+ 422
2000						
1st quarter	1.5907	+1,072	+201	98.53	+1,927	+ 272
2nd quarter	1.5576	+ 197	+489	100.57	+1,754	− 178
3rd quarter	1.5240	+ 24	+511	94.94	+2,700	+ 579
4th quarter	1.5232	− 953	+ 12	106.92	− 316	−1,645
2001						
1st quarter	1.5271	− 907	− 58	110.74	+ 803	− 455
2nd quarter	1.5228	− 907	+ 62	105.37	+2,497	+ 656
3rd quarter	1.4761	+ 107	+643	109.02	+ 941	− 555
4th quarter	1.4829	− 118	− 97	115.33	+ 35	− 982
2002						
1st quarter	1.4670	+ 326	+225	115.51	+ 706	− 27
2nd quarter	1.4721	+ 168	− 74	118.20	− 73	− 412

Source: OeNB.

exchange rate-induced fluctuations in the volume of credit outstanding (in Swiss francs) came to an average 1% per quarter. By contrast, exchange rate changes resulted in a decline in yen-denominated lending to domestic nonbanks by some EUR 2 billion, i.e. almost by the same rate as Swiss franc-denominated loans expanded. Exchange losses up to mid-2000 were contrasted by gains in the following few quarters. However, it must also be noted that owing to the large volume of loans outstanding, the declining exchange rate of the yen from 2000 on has had a greater impact than the previous exchange rate-induced rise. More-over, volatility was much higher: The fluctuations of exchange rate-induced changes came to 5% per quarter, on average, reaching record highs of up to 16.3% (in the fourth quarter of 1998).

From a macroeconomic perspective, the foreign currency loan portfolio between end-1997 and mid-2002 could be considered to be well-diversified in terms of currency. Owing to exchange rate movements, yen-denominated loans shrank in value and Swiss franc-denominated loans increased; conse-quently, the share of yen and Swiss franc exchange rate fluctuations in foreign currency loan growth has been virtually zero since 1997. It must be noted, how-ever, that for bullet loans, the exchange rate gains (or losses) posted in the past few years were merely unrealized gains and that gains from favorable exchange rate movements materialized solely in interest payments. Also, lending in foreign currency increased the volatility of the amount of loans outstanding. Furthermore it must be borne in mind that the developments described above do not affect the individual foreign currency debtor, whose liabilities are denominated in one single currency. From a risk perspective, more than half of the total amount of foreign currency loans outstanding has suffered exchange rate losses since 1997.

It must also be noted that over a prolonged period of time, exchange rates can move into completely different directions. The exchange rate movements of the two main borrowing currencies in the past 20 years illustrate this point: since 1980, the value of the yen has more than doubled against the schilling/ euro, and the Swiss franc has appreciated by almost a cumulative 20%.

4.2 Interest Rate Risk
Foreign currency loans are exposed not only to exchange rate risk, but, since they are usually extended on a rollover basis, also to considerable interest rate risk. Between 1980 and June 2002, i.e. over a period of approximately 20 years, which corresponds to the average maturity of a foreign currency loan, the volatility of Swiss franc and yen short-term money market rates, as meas-ured by the standard deviation, was notably higher than the volatility of these currencies' exchange rates against the schilling/euro. Over this period, Swiss franc and yen money market rates fluctuated by around 9.5 percentage points and 12.5 percentage points, respectively. The standard deviation of the Swiss and the Japanese money market rates was also higher than the corresponding rates for euro or schilling, which, in turn, were more volatile than the long-term secondary market yield.

Table 2

CHF and JPY Exchange Rate and Interest Rate Volatility

between 1980 and June 2002

	Exchange rates		Three-month rates			By comparison
	CHF/EUR[1])	JPY/EUR[1])	EUR[1])	CHF	JPY	Secondary market yield on federal government bonds[1])
%						
High	8.85	14.86	12.50	9.92	12.67	11.44
Low	7.51	5.13	2.58	0.38	0.00	3.40
Average	8.39	9.44	6.28	3.91	3.84	7.02
Standard deviation	0.42	1.60	2.38	2.68	2.53	1.61

Source: Datastream, OeNB, own calculations.
[1]) Up to end-1998: ATS.

Switching from foreign currency to euro helps avert the interest rate risk only to a limited extent. Over the past few years, the schilling/euro money market rates have been comparatively highly correlated with the analogous interest rates in Switzerland and in Japan. High money market rates in the main borrowing currencies Swiss franc and yen typically went hand in hand with high short-term interest rates in Austria.

Focusing on short-term interest rates proves disadvantageous especially in an inverted yield curve market. The changes in the differential between long- and short-term interest rates over the past 20 years – the typical maturity of foreign currency loans – shows that in somewhat more than 25% of all months under review, an inverted yield curve occurred in Austria, Germany and Switzerland, and in approximately 14% of all months under review in Japan.

Chart 5

Share of Months with an Observed Inverted Yield Curve

January 1980 to June 2002

Source: Datastream.
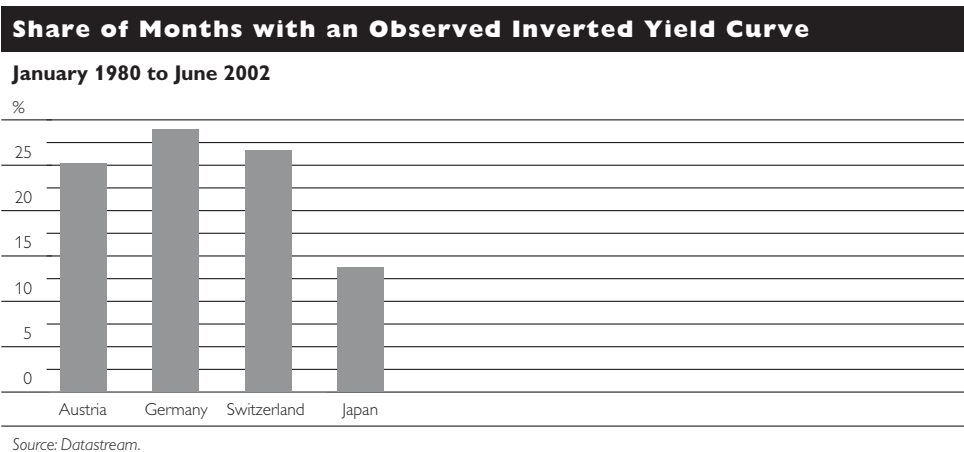
4.3 Performance Risk of the Repayment Vehicle

Bullet loans with funding plans are also exposed to the performance risk of the repayment vehicle (typically a life insurance policy or a mutual fund). During the life of a bullet loan, the borrower only makes interest payments, while monthly installments (the repayment rate) are paid into a life insurance plan or a mutual fund, whose yield is used to pay off the principal at the end of the loan.

These repayment vehicles usually do not serve to hedge against exchange rate or interest rate risk; rather, they add risk to the entire borrowing scheme. Depending on the chosen scheme, the repayment of principal in foreign currency loans is exposed to additional exchange rate, interest rate, and market risk, for which no collateral must be provided. Furthermore, these risks can often only be averted at high additional costs, if at all, for instance by switching from one investment vehicle to another. Canceling a life insurance policy in the first few years, for example, always involves considerable costs, which must also be taken into account when the borrower wishes to switch to an entirely different borrowing arrangement.

If the performance of these repayment vehicles cannot keep up with the assumptions used in the provider's model calculations, the borrower, who is already exposed to high exchange rate and interest rate risk, becomes exposed to even greater risk. The development of expected gains from life insurance policies and mutual funds performance reports indicate that there may have been some changes compared to schemes sold a few years ago.

Problems resulting from these developments may be particularly severe in an inverted yield curve market, when borrowers are charged high short-term interest rates and earn low long-term yields or face exchange rate losses even though the yields on their long-term investments rise. Also, the stock price developments in the international markets witnessed over the past few years further increased the risk performance of equity funds as repayment vehicles.

Since these funding plans have been on the market for only a few years and in most cases have very long maturity periods – 20 years or more – the risks they involve are not acute, but considerably affect the risk profile of foreign currency loans.

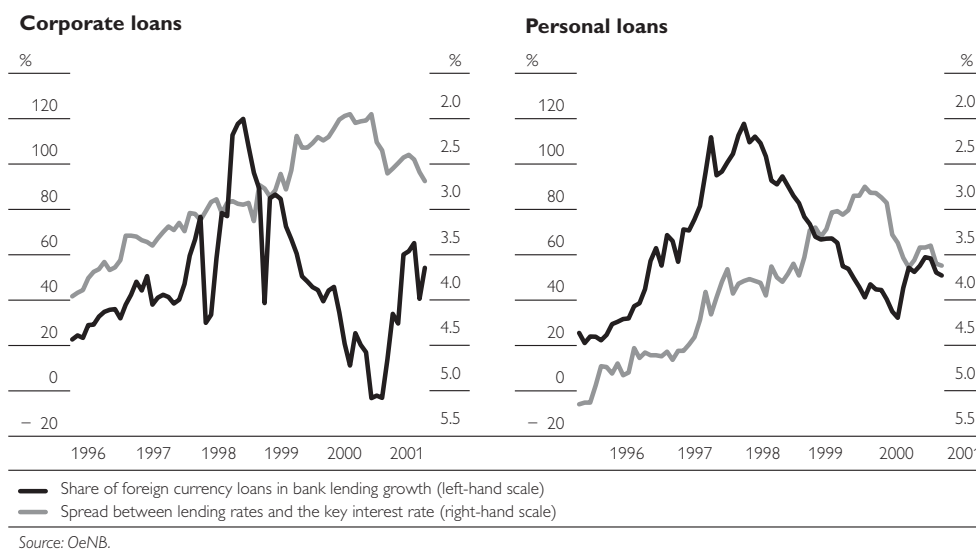### 4.4 Economic Risks and Financial Stability

Since foreign currency loans denominated in Swiss francs and yen are usually taken out for exclusively domestic purposes and borrowers primarily use income earned at home to service their loans, additional risks may arise if the domestic economy and the borrowing currency's interest and exchange rates evolve in different directions, as a country's monetary policy is normally geared to suit domestic economic conditions. Accordingly, for Austrian border workers in Switzerland or Liechtenstein, who earn their income in Swiss francs, it is perfectly rational to take out a loan denominated in Swiss francs. By borrowing in Swiss francs, they basically close out an open foreign exchange position, which may even reduce their risk exposure.

In a macroeconomic context, another issue to be examined is whether or to what extent foreign currency lending is a (constitutive) element of banking and currency crises. Even though in the run-up to the Nordic banking crisis and the Asian crisis, foreign currency lending to domestic nonbanks saw a sharp rise, foreign currency borrowing alone has apparently not played a key role in the emergence of banking crises. Studies on the subject only briefly touch on the issue of foreign currency lending. Papers on the causes of banking crises (e.g. Kaminsky, 1998) show that a rise in foreign currency lending (alone) is not an indicator for the sector's heightened vulnerability.

However, a marked increase in loan growth is often a leading indicator for instabilities. In Scandinavia, for instance, both foreign currency lending and household debt expanded notably (Drees and Pazarbasioglu, 1995). The question arises whether the increase in "cheap" foreign currency loans pushed up loan demand. What can be said is that increased competition through foreign currency loans obviously had a dampening effect on interest rates on loans to households in Austria. The relationship between the rising share of foreign currency loans in total loan growth and the shrinking spread between the lending and the tender rates used to be very close, at least until approximately 1999. After that, the spread between banks' lending rates and the key interest rate continued to narrow, although the foreign currency share in total loan growth was on the decline. On the one hand, other factors (such as the yield curve, but also the integration into the euro area-wide financial market) may also have caused the spread between the lending rates and the key interest rate to contract, on the other hand, foreign currency lending may have already reached a level high enough to exert a dampening effect.

Chart 6

**Foreign Currency Loans as a Share of Bank Lending Growth
and the Spread between Lending Rates and the Key Interest Rate**

Corporate loans

Personal loans

—— Share of foreign currency loans in bank lending growth (left-hand scale)
—— Spread between lending rates and the key interest rate (right-hand scale)

Source: OeNB.

To the extent that the data available allow such conclusions, foreign currency loans were not taken out to satisfy additional loan demand; rather, borrowers increasingly opted for foreign currency-denominated instead of schilling- or euro-denominated loans. Compared to the previous years, the growth of loans to enterprises and households had notably decelerated between 1995 and 2001. Furthermore, foreign currency lending did not encourage the emergence of an asset price bubble. Price developments in the Austrian stock markets were extremely weak in the past decade, and real estate prices had also been stagnating or declining since the mid-1990s (OeNB, 2001). The boom in foreign currency lending seems not to have triggered a boom in the entire lending business or in asset prices.

4.5 Who Bears the Risks?

Even though the risks foreign currency directly entail are borne by the borrowers, who in most cases do not hedge against these risks, banks' risk positions may also be affected, if indirectly. Austrian banks refinance foreign currency loans primarily through international interbank deposits. Other refinancing instruments include securities denominated in foreign currency and foreign currency swaps with foreign banks, in which the lending bank enters simultaneously with the foreign currency loan contract (Dlaska, 2002). When the maturities of the loans and of the refinancing instruments differ, maturity mismatches may arise, just like in other cases. In those cases where refinancing is based on maturity-matched interbank deposits (or corresponding swaps), however, thanks to the identical interest rate lock-in period valid for both the loan and the refinancing instrument, the fee charged to borrowers does not involve interest rate or maturity transformation risks for the banks; these risks must be entirely borne by the borrower.

Since foreign currency loans taken out by domestic borrowers must be refinanced in the international financial markets (OeNB, 2001), it has become less common that bank lending is funded through domestic saving. At the same time, bank lending has been increasingly influenced by domestic banks' refinancing power in the international financial markets. Usually, banks are unable to pass on changes in funding costs triggered by changes in their refinancing power to the borrower, since in most cases a fixed spread to the international money market rate has been agreed upon. Thus, these changes put a strain on banks' operating performance. As an increase in refinancing requirements in the international financial markets is often caused by a bank's deteriorating profitability, this relationship has the potential to pose a threat to financial stability.

At the same time, owing to the rising share of foreign currency loans, exchange rate developments have an increasingly large impact on companies' and households' debt service capacity. Thus in a growing number of cases, Austrian banks' credit risk also involves foreign exchange risk. If a foreign currency borrower defaults, the bank immediately has an open foreign exchange position, since it continues to be obliged to refinance this loan. The same applies when borrowers convert their liabilities outstanding from foreign currency into euro and the bank has not refunded this loan with exactly matching maturities and as long as the maturity mismatches persist. In other words, for banks, foreign currency loans are fairly similar to options. The value of this option to a large extent depends on the borrower's liquidity and the changes in the relevant currency's exchange rate.

Having called attention to the higher risk of foreign currency loans, banks seem to have successfully introduced higher collateral requirements.[1]) This implies that in the case of defaults, banks have additional profit potential, which is often lacking in schilling/euro lending, as collateral requirements have become an increasingly decisive factor in competition in the Austrian lending

---

1   Most loan contracts even stipulate that the borrower is obliged to provide additional collateral if the value of
    the loan outstanding increases because of exchange rate changes (Dlaska, 2002).

business.[1]) However, the collateral provided by households seems to be fairly homogeneous, which means that if an exchange rate shock triggers a larger number of defaults, banks may find it difficult to sell these assets, let alone achieve a good price for them. Banks are thus exposed to some concentration risk, in particular in the western provinces, given the high share of foreign currency loans in this area.

5 Summary

This study aimed to identify reasons for the boom in foreign currency borrowing in Austria witnessed in the past few years and to shed some light on the risks associated with this development. Efficiency considerations fail to explain the pronounced increase in foreign currency loans, but taking into account a range of particularities in the Austrian financial market, the theory of rational herd behavior may offer some plausible insights into the causes.

Foreign currency loans may offer low interest rates in nominal terms, but the risks involved are substantial. Foreign currency borrowers are exposed to significant exchange rate and interest rate risk, and maturity mismatches may arise. The notion that these risks are covered by interest savings is applicable only to the aggregate number of borrowers but not to individual borrowers, who (can) usually opt for only one borrowing currency. In light of the large share of foreign currency loans in total lending in certain regions and of the particularly high homogeneity of collateral provided by households, substantial concentration risks may emerge. However, since Austria represents only a small part of the euro area, there would be no monetary policy implications if these risks materialized.

Furthermore, additional exchange rate, interest rate, and market risks emerge in schemes with repayment vehicles which are not collateralized and from which the borrower cannot easily switch to another repayment vehicle, as the developments in the international stock markets over the past few years have shown. Since these borrowing schemes emerged only a few years ago but have maturities of twenty years or more, the risks they are exposed to do not materialize immediately; however, they already affect the risk profile of both borrowers and lenders now.

If the explanation patterns offered by the theory of rational herd behavior for the boom in foreign currency borrowing are correct, it may be possible that borrowers who took out Swiss franc- or yen-denominated loans did not consider all the risks involved in their decisions. Therefore, the trends in foreign currency borrowing deserve to be closely monitored.

---

1   See, for instance, Rauchenwald (1992), who states that personal liability has increasingly been replaced by liability taken on by a corporation that more or less lacks assets (usually a limited liability company with only the minimum amount of own capital). The practice of entering loans into the land register has been replaced by mere hypothecation agreements or even uncollateralized loans.

References

Banerjee, A. V. (1992). A Simple Model of Herd Behavior. In: Quarterly Journal of Economics, 107(3), 797–817.

Bikhchandani, S., Hirshleifer, D. and Welch, I. (1992). A Theory of Fads, Fashion, Custom, and Cultural Change in Informational Cascades. In: Journal of Political Economy, 100(5), 992–1026.

Brandner, P. (1996). Fremdwährungsfinanzierung der Bundesschuld. In: Schriftenreihe Volkswirtschaft der Österreichischen Postsparkasse, 13, 5–25.

Calvo, G. A. and Végh, C. A. (1992). Currency Substitution in Developing Countries: An Introduction. IMF Working Paper 92/40.

Cassard, M. and Folkerts-Landau, D. (1997). Risk Management of Sovereign Assets and Liabilities. IMF Working Paper 97/166.

De Fontenay, P., Milesi-Ferretti, G.-M. and Pill, H. (1995). The Role of Foreign Currency Debt in Public Debt Management. IMF Working Paper 95/21.

De Vries, C. G. (1994). Stylized Facts of Nominal Exchange Rate Returns. In: Van der Ploeg, F. (ed.), The Handbook of International Macroeconomics. Cambridge (Mass.), Blackwell, 348–389.

Devenow, A. and Welch, I. (1996). Rational Herding in Financial Economics. In: European Economic Review, 40(3-5), 603–615.

Dlaska, K. (2002). Fremdwährungs-Ausleihungen des österreichischen Bankensektors an Nichtbanken im Euroraum. In: Österreichisches Bank Archiv, 50 (11).

Drees, B. and Pazarbasioglu, C. (1995). The Nordic Banking Crises: Pitfalls in Financial Liberalization? IMF Working Paper 95/61.

Giovannini, A. and Turtelboom, B. (1994). Currency Substitution. In: Van der Ploeg, F. (ed.), The Handbook of International Macroeconomics. Cambridge (Mass.), Blackwell, 390–436.

Hauth, E. and Kocher, P. (2001). Austria's Sovereign Debt Management Against the Background of Euro Area Financial Markets. In: OeNB Focus on Austria 2, 208–227.

Kaminsky, G. (1998). Currency and Banking Crises: The Early Warnings of Distress. Board of Governors of the Federal Reserve System. International Finance Discussion Papers, 629.

Mooslechner, P. (1993). Effizienz des Debt Management: Fiskalische Kriterien und stabilitätspolitische Strukturmerkmale am Beispiel der österreichischen Bundesfinanzschuld. In: Holzmann, R. and Neck, R. (ed.). Konjunktureffekte der österreichischen Budgetpolitik. Vienna, Manz, 123–176.

OeNB (2001). Financial Market Stability Report I. June.

Pecchi, L. and Ripa di Meana, A. (1998). Public Foreign Currency Debt: A Cross-Country Evaluation of Competing Theories. In: Giornale degli Economisti e Annali di Economia, 57(2), 251–88.

Rajan, R. G. (1994). Why Bank Credit Policies Fluctuate: A Theory and Some Evidence. In: Quarterly Journal of Economics, 109 (2), 399–441.

Rauchenwald, W. (1992). Die Rolle der Banken für die regionale Wirtschaft. In: Österreichische Sparkassenzeitung, 79(5), 126–129.

Welch, I. (1992). Sequential Sales, Learning, and Cascades. In: Journal of Finance 47(2), June, 695–732.

Financial Liberalization in Austria: Why so Smooth?

Benedikt Braumann[1]

1 Introduction

A series of financial crises over the last decades has provided valuable lessons on the behavior of banks. It has become evident that financial liberalization, which has occurred in many parts of the world, is especially fraught with risks. The crises have also led to a worldwide overhaul of prudential supervision, giving it a defensive bent and ever more detailed regulation. This paper seeks to complement the literature, which is naturally focused on crisis episodes. It analyzes the case of an apparently successful and smooth financial liberalization. Austria's comprehensive program of deregulation between 1977 and 2000 did not result in a financial crisis, but yielded large and tangible benefits. Although the Austrian experience has so far not attracted much attention in the literature, it may provide important lessons on international best practices.

Three clear policy implications emerge from the study: First, in comprehensive reforms, gradualism works well. The slicing of reforms into manageable pieces helped avoid a cumulation of risk factors and the emergence of financial bubbles. It was possible to isolate the remaining symptoms of distress and deal with them one at a time. Second, the cyclical potential of financial reforms should be handled with care. In Austria, financial reform was timed in a countercyclical manner, as liberalization coincided with episodes of weak demand and regulations were tightened during upswings. Finally, certain designs of financial systems seem to be more stable than others. Banks that are allowed to follow a long-term business perspective are able to smooth over economic fluctuations. This reduces the need for corrective action on the part of the authorities. In contrast, banks that focus on maximizing short-term profits seem to produce procyclical lending patterns and possibly destabilize the rest of the economy.

This paper attempts a first evaluation of financial liberalization in Austria. Section 2 gives a brief overview of the main reform steps. Section 3 examines whether the Austrian experience was indeed successful compared to other countries. Then, section 4 discusses four possible reasons for success. Like other papers dealing with this issue, this paper follows a case-study approach without relying much on technical methods. The author seeks to raise some broad economic issues and hopes to encourage further research.

2 Financial Liberalization in Austria – A Summary

Compared to other countries, financial reform in Austria was late, lenghty and comprehensive. Austria's financial markets ranked among the most repressed in Europe until the late 1970s. The degree and nature of regulation were comparable to Scandinavia and many developing countries. In particular, the financial sector had to cope with entry barriers, branching restrictions, credit ceilings, interest controls, pervasive state ownership and tight controls of international capital movements. Table 1 gives an overview of the most important restrictions.

Table 1

The Most Important Financial Restrictions

- Opening new branches is subject to government approval.
- Savings banks and credit cooperatives are subject to regional constraints.
- Savings banks are not allowed to perform certain investment banking activities.
- Entry is subject to approval by bankers' association and government.
- Minimum deposit rates are set by government. Detailed structure of deposit and lending interest rates is fixed by banking cartel.
- Credit ceilings apply relative to deposit and credit growth.
- Capital flows are subject to approval by central bank.
- Public ownership of 60% of banking assets.
- Prohibition of advertising consumer loans.

Financial liberalization began in Austria with the abolition of branching restrictions in 1977 and ended with the privatization of the last major state-owned bank in 2000. A detailed survey of the events and the changes in regulation is given by Braumann (2002), to be referenced frequently by this paper. The following section gives a brief summary of the liberalization process and its effects. Table 2 presents a timetable of the main regulatory reforms. Without undue simplification, the process of financial liberalization in Austria can be divided into nine distinct stages:

Stage 1: 1977–1978. The liberalization of branching set off a branching boom. It was accompanied by a lending boom that resulted in overheating and a sharp deterioration of the current account.

Stage 2: 1979–1981. High inflation led to a collapse of the inflexible interest rate cartel and to a de facto liberalization of interest rates.

Stage 3: 1980–1986. Loan quality progressively deteriorated during the last stages of the lending boom. With government support, uncompetitive state-owned industries stepped up distress borrowing. A serious banking crisis was averted when the government bailed out the insolvent public enterprises in 1986 and assumed their debt service.

Stage 4: 1985–1987. That time saw a reversal in the process of financial liberalization: In order to strengthen bank finances after the distress of the early 1980s, the government temporarily re-established the interest rate cartel.

Stage 5: 1987–1993. To ensure sound banking on a long-term basis, the authorities tightened prudential standards. Higher regulatory capital requirements dampened credit supply significantly.

Stage 6: 1988–1991. The capital account was liberalized in anticipation of future EU membership. This led to significant capital inflows and an asset price boom, but not to exuberant lending.

Table 2

Main Liberalization Measures

1977	Abolition of branching restrictions
1980	Liberalization of interest rates
1981	Abolition of credit controls
1985	Re-establishment of interest controls through interest rate cartel
1987	Prudential reforms; Capital requirements tightened; Comprehensive data reporting
1988–1991	Liberalization of the capital account
1993 approx.	Interest rate cartel expires
1994	Free entry
1992–2000	Privatization of state-owned banks

Source: Braumann (2002).

Stage 7: 1995–2000. EU accession removed the last financial restrictions. Entry was freed, and the government privatized most state-owned banks. This set off a process of mergers and concentration.
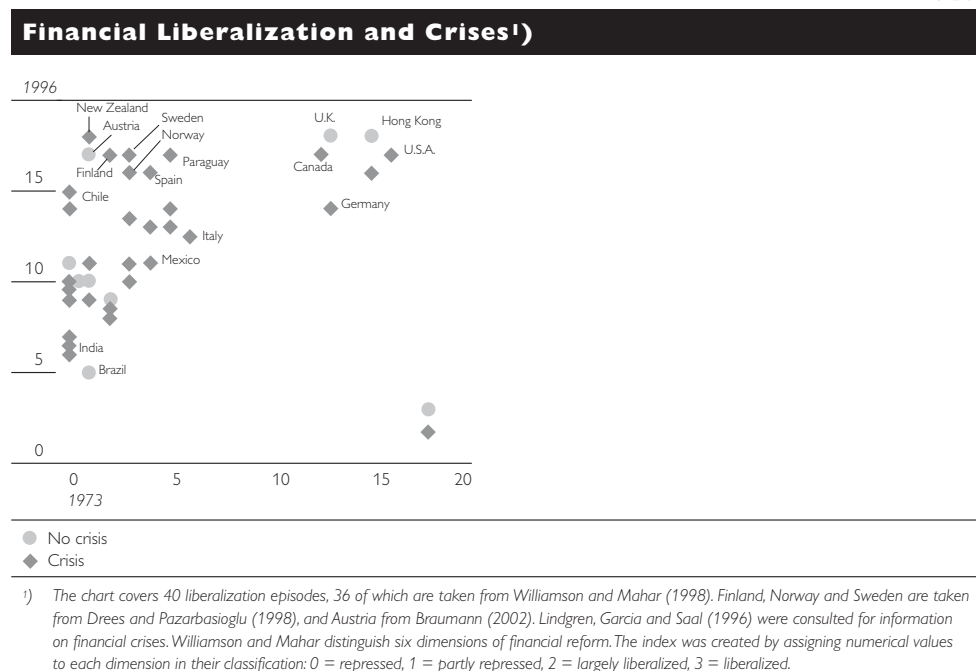
Stage 8: 1995–2001. Privatizations and mergers upset the competitive equilibrium in the credit market. As a consequence, competition intensified as banks scrambled to reposition themselves. Fiscal adjustment allowed for a rapid expansion of private sector credit and crowding-in of private demand.

Stage 9: 1995–2001. Banks discovered foreign currency loans as a device of competition. The market share of these low-interest loans rapidly increased to 20%; Austria thus became the economy with the highest degree of currency substitution in western Europe. The speculative element of foreign currency loans carries significant prudential risks.

3 How Successful was Austrian Financial Reform?

In their survey of financial liberalization and financial crises, Lindgren, Garcia and Saal (1996) draw a map of the world and color in gray the countries that experienced financial crises over the last 20 years. Only few white spots remain, and most of them are due to a lack of data. Austria, however, emerges as a true exception to the worldwide pattern, an island of stability amid an ocean of financial crises. This section examines the first of two related questions: 1) Was Austria's financial liberalization really a success? The next section tackles another question: 2) If liberalization was a success, what were the reasons for that? In brief, question (1) is answered in the affirmative. The answer to (2) is given in four propositions below. In part, the government followed a sensible sequencing of reforms, timing reforms in a gradual and countercyclical manner. On the other hand, Austria was fortunate to count on a competitive and agile private banking sector, which had a long-term business perspective. This financial sector developed internal buffers against shocks that tended to smooth fluctuations, even without government interference.

Chart 1

Financial Liberalization and Crises¹⁾

1⁾ The chart covers 40 liberalization episodes, 36 of which are taken from Williamson and Mahar (1998). Finland, Norway and Sweden are taken from Drees and Pazarbasioglu (1998), and Austria from Braumann (2002). Lindgren, Garcia and Saal (1996) were consulted for information on financial crises. Williamson and Mahar distinguish six dimensions of financial reform. The index was created by assigning numerical values to each dimension in their classification: 0 = repressed, 1 = partly repressed, 2 = largely liberalized, 3 = liberalized.

Proposition: In contrast to many other countries, Austria accomplished financial liberalization at low cost and reaped high benefits.

Financial liberalization has somewhat of a bad reputation. It has too often been associated with disruptive financial crises, especially when liberalization was profound. Chart 1 illustrates this observation. It combines the results of two large cross-county studies, a survey of financial liberalization by Williamson and Mahar (1998) and a survey of financial crises by Lindgren, Garcia and Saal (1996). The chart shows the change in liberalization between 1973 (horizontal axis), and 1996 (vertical axis). The index of liberalization ranges from 0 (financially most repressed) to 18 (most liberal). Liberalization is a movement up from the diagonal and was most profound in countries clustering the northwestern corner of the diagram. Diamonds denote financial crises, while circles denote smooth transitions. It is evident that financial liberalization is a risky business. Of 40 liberalizing countries in the sample, ¾ (29) experienced financial crises. Most of the remaining ¼ deregulated little, either because they already had liberal financial systems (upper right) or because they chose to retain controls (lower left).

Austria thus represents the rare case of a country with sweeping financial reforms but no financial crisis. All other sweeping reformers in the upper left corner of chart 1 experienced a financial crisis during 1973–96. Spain suffered a crisis during the early 1980s, when banks holding 20% of deposits had to be rescued. New Zealand experienced serious difficulties in the late 1980s, as ¼ of deposits were in danger. Norway, Finland and Sweden went through a classical boom-bust cycle around 1990, which has become a textbook example of financial crisis. Many more crises happened in emerging markets. The banking busts in Chile and Argentina in the early 1980s cost over ⅓ of GDP. Paraguay and Mexico underwent systemic crises in the mid-1990s. The late 1990s saw crashes in Russia, Turkey and East Asia, which are not included in the chart.
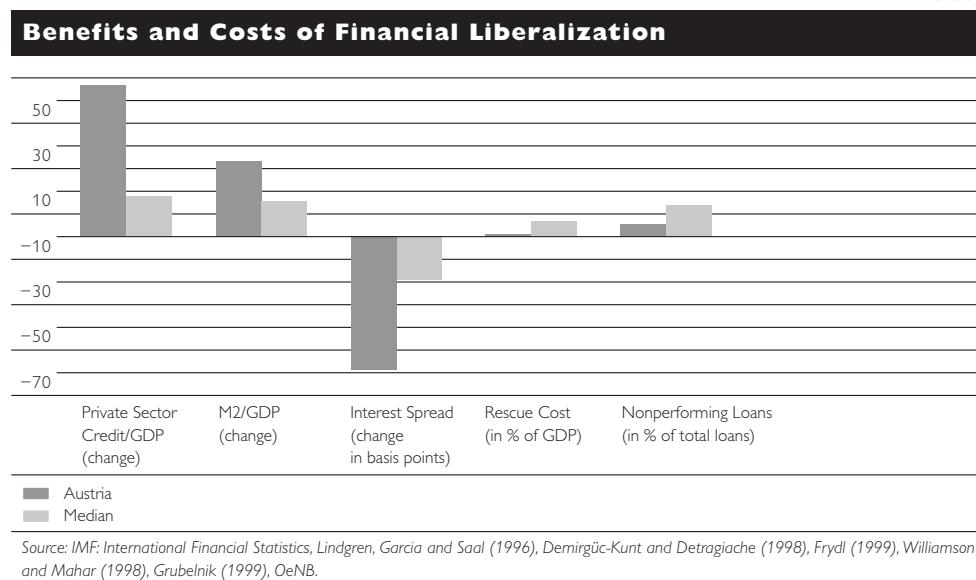
Chart 2

Private Sector Credit over GDP

Source: IMF: International Financial Statistics.
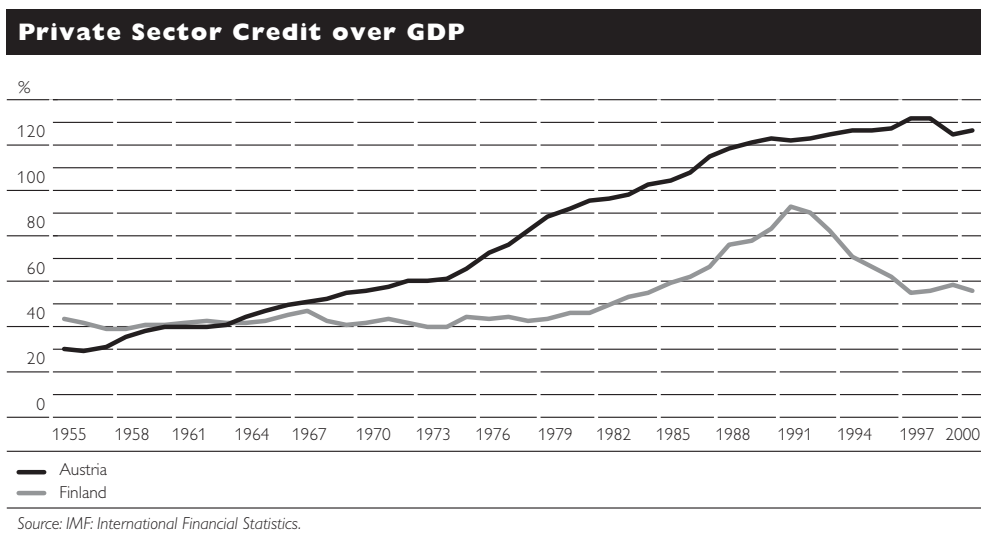
Austria could thus have fared much worse. And apart from being spared a systemic financial crisis, Austria reaped tangible economic gains from financial liberalization. Financial markets have become deeper, more sophisticated and mature. Chart 2 shows a measure of financial deepening, the ratio of credit to the private sector to GDP. This ratio more than doubled from 60% to 126% between 1973 and 2001, which represents one of the largest increases worldwide. Only Malaysia had its ratio increase by more. Finland also experienced fast financial deepening after deregulation, but this was reversed in the crisis of the early 1990s. There, private sector credit rose from 45% of GDP in 1973 to 94% in 1991, but fell back to 56% in 2000.

Chart 3 summarizes some key variables of financial health. It contrasts median values of all 40 sample countries to Austria. Between 1973 and 2000, the ratio of private sector credit to GDP grew 3.7 times faster in Austria than in the sample average. The ratio of M2 to GDP, another indicator of financial depth, expanded twice as fast as the average. The interest margin, a gauge of the cost of intermediation, has always been relatively low in Austria, and financial liberalization reduced it further still. It declined by 0.6 percentage point in Austria, three times more than the sample average. Thus, Austria boasts a rather efficient banking system today. The absence of a crisis also meant that Austria had a low ratio of nonperforming loans and low fiscal rescue costs. Nonperforming loans peaked at 4.7% of total loans, compared to 13% on average. And bailouts were exceedingly rare. The government injected 0.8% of GDP of fresh capital into banks, compared to a sample average of 6.4% of GDP. These were tangible savings for the taxpayer.

Chart 3

Benefits and Costs of Financial Liberalization

Source: IMF: International Financial Statistics, Lindgren, Garcia and Saal (1996), Demirgüc-Kunt and Detragiache (1998), Frydl (1999), Williamson and Mahar (1998), Grubelnik (1999), OeNB.

4 Four Propositions on Austrian Financial Reform

Proposition 1: Austria largely followed the recommended sequencing of financial reforms. However, the fiscal sector lagged behind.

Much has been written about the proper sequencing of reforms.[1]) Sequencing errors are often blamed for precipitating financial crises, as they may create incentives for excessive risk taking and moral hazard. According to conventional wisdom, macroeconomic stabilization, trade liberalization, privatization and prudential regulations should be in place before financial reform is tackled. Once this groundwork has been laid, the authorities should first deregulate interest rates and credit controls, allow free entry and then liberalize the capital account (see table 3). Austria followed the conventional wisdom for an important part of reforms. However, the weakest link proved to be the fiscal sector. Fiscal adjustment and privatization were postponed for a long time and represented the very last steps in the process. Nevertheless, the sequencing of trade reforms, internal and external deregulation was correct and contributed importantly to the success of the project.

Table 3

Sequencing of Financial Liberalization

Conventional Wisdom	Austria
1. Fiscal adjustment	1. Trade reforms
2. Trade reforms	2. Domestic financial liberalization
3. Prudential supervision	3. Prudential supervision
4. Privatization	4. External financial liberalization
5. Domestic financial liberalization	5. Privatization
6. External financial liberalization	6. Fiscal adjustment

Austria's government incurred considerable risk when it widened the fiscal deficit in the years prior to reform. Adjustment was postponed until the late 1990s, and fiscal deficits exceeded 5% of GDP in 14 out of 20 years from 1975 to 1995. This led to a rapid buildup of public debt, which rose from 17% of GDP in 1975 to 68% in 1995. Eventually, tax increases brought the deficit back under control, and the budget recorded a slight surplus in 2001. Large fiscal deficits carry the risk of triggering a debt spiral or high inflation, which may lead to political unrest. This was the case in Chile, Argentina and Turkey, where financial reforms were aborted after an unsustainable fiscal stance had thrown the economy in disarray. Fortunately for Austria, high private savings absorbed public debt without causing inflationary pressures.

Also against the conventional wisdom, privatization started late and remains incomplete. Large banks were privatized in the late 1990s, and the government retains a considerable stake in industry today. The Asian crisis and many other experiences worldwide warn against political influence in banking. The managers of Austrian public banks were similarly subject to political pressure, especially during the late 1970s and early 1980s. Large bank loans propped up loss-making state industries. A systemic crisis was, however, averted when the government assumed the industrial debt in the mid-1980s and ensured that obligations were met on time.
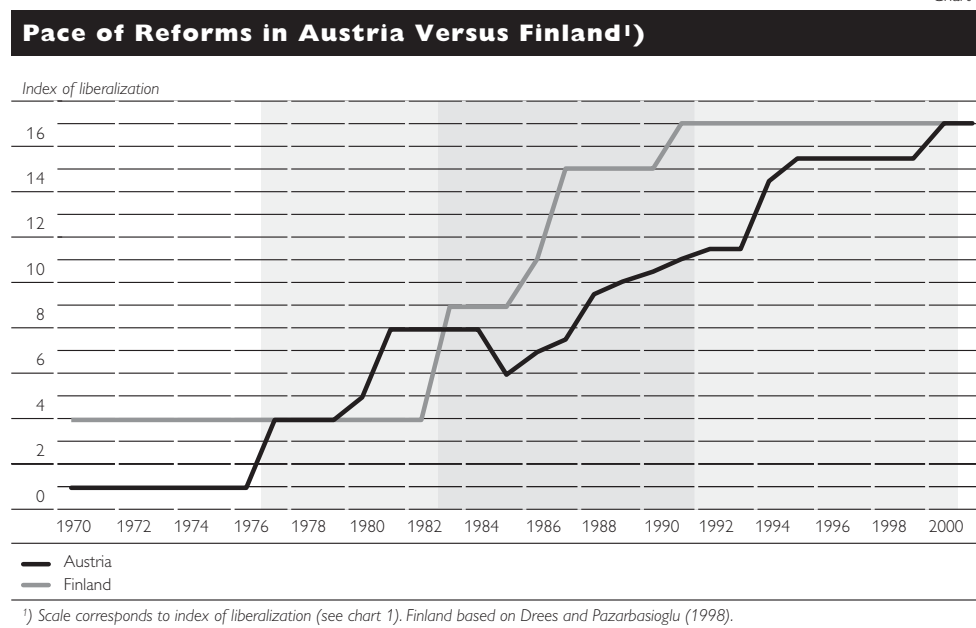
1   For a recent survey, see Caprio et al. (2001).

Overall, however, Austria followed textbook sequencing for an important part of reforms. This has certainly helped avoid perverse incentives and allowed agents to adapt to a more market-oriented environment over time. Large banks in particular were well-prepared for capital account liberalization thanks to their privileged access to trading permits. Weak public finances and slow privatization were the soft spots of the reform process.

Proposition 2: Gradualism impeded the accumulation of distress symptoms and averted a general financial bubble. However, it also made reforms vulnerable to reversals.

It is apparent from chart 1 that Austria undertook comprehensive reforms. However, Austrian financial liberalization was exceedingly slow. Chart 4 compares the speed of reforms in Austria and Finland[1]). The slope of the line indicates the speed of reforms, a dark shade denotes their duration in Finland, a light shade their duration in Austria. Reforms in Finland were completed after 9 years. In contrast, financial liberalization in Austria took a total of 23 years (from 1977 to 2000). This is slow even in a wider international context. For instance, Williamson and Mahar (1998) find that a group of "gradual reformers" took between 10 and 15 years to complete full liberalization.[2]) "Fast reformers" which include Latin American and Scandinavian countries, Turkey and South Africa, took between 3 and 10 years.

Chart 4

Pace of Reforms in Austria Versus Finland[1])

Index of liberalization

Austria
Finland

[1]) Scale corresponds to index of liberalization (see chart 1). Finland based on Drees and Pazarbasioglu (1998).

Gradualism can reduce the risk of systemic financial crises. Braumann (2002) shows that all common symptoms of financial distress were present in Austria at one time or another: lending booms, asset price bubbles, politically

1   Information on Finland is based on Drees and Pazarbasioglu (1998). The numerical interpretation corresponds to the classification of Williamson and Mahar (see chart 1).
2   Japan, Israel and Sri Lanka took 15 years, France, Thailand, Indonesia, Malaysia and the Philippines around 10 years.

directed lending, decapitalization of banks, foreign currency exposure and excessive competition. However, none of these symptoms got completely out of control. The gradualist and finely sequenced approach of reforms kept the disruptions sufficiently far apart so that they could not combine into a full-blown crisis.

Chart 5 illustrates the experience of Finland, which is quite typical of the pitfalls of financial liberalization. A lending boom got underway shortly after restrictions on the domestic market were removed in years from 1982 to 1986. The capital account was opened in 1986, and capital inflows inflated asset prices. This accelerated the lending boom, as collateral increased in value, making credit less expensive to the borrower. The credit and asset price bubble burst from 1990 to 1992 and triggered a sharp recession.

Chart 6 illustrates the Austrian case. The same imbalances as in Finland were present, a lending boom, an asset price bubble and a large exposure in foreign currency. However, these phenomena were separated in time and could not combine into a vicious circle and a general financial bubble. Domestic reforms set off a lending boom in the late 1970s, but no capital inflows occurred since capital controls remained in place. The lending boom was starved of substance and brought under control by high real interest rates and the imposition of credit ceilings. When the capital account was liberalized in the late 1980s, capital inflows led to a surge in asset prices. Credit growth remained modest, however, because (1) prudential regulations were tightened at the same time, forcing banks to restrict lending, (2) diversified collateral with a low share of real estate weakened the effect of asset prices on credit supply, and (3) high real interest rates dampened credit demand. Finally, a boom in foreign currency lending was balanced by a large fiscal adjustment in the late 1990s. The three episodes were separated by almost ten years each.
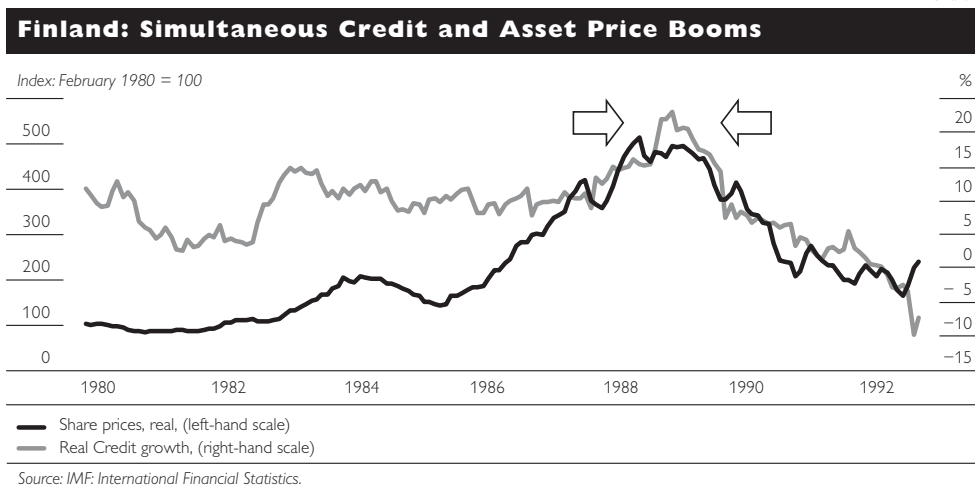
Chart 5

Finland: Simultaneous Credit and Asset Price Booms

Index: February 1980 = 100   %

Share prices, real, (left-hand scale)
Real Credit growth, (right-hand scale)

Source: IMF: International Financial Statistics.

Chart 6

Austria: Disconnected Credit and Asset Price Booms

■ Foreign currency loans, real growth in % (left-hand scale)
■ Share prices, real, 1980 = 10 (left-hand scale)
— Real credit growth (right-hand scale)

Source: IMF: International Financial Statistics, OeNB.

Chart 7

Interest Margin; Reversal in Reforms[1])

as a percentage of interest bearing assets

Source: Austrian Bankers' Association, own calculations.
[1]) The cartel period is shaded.
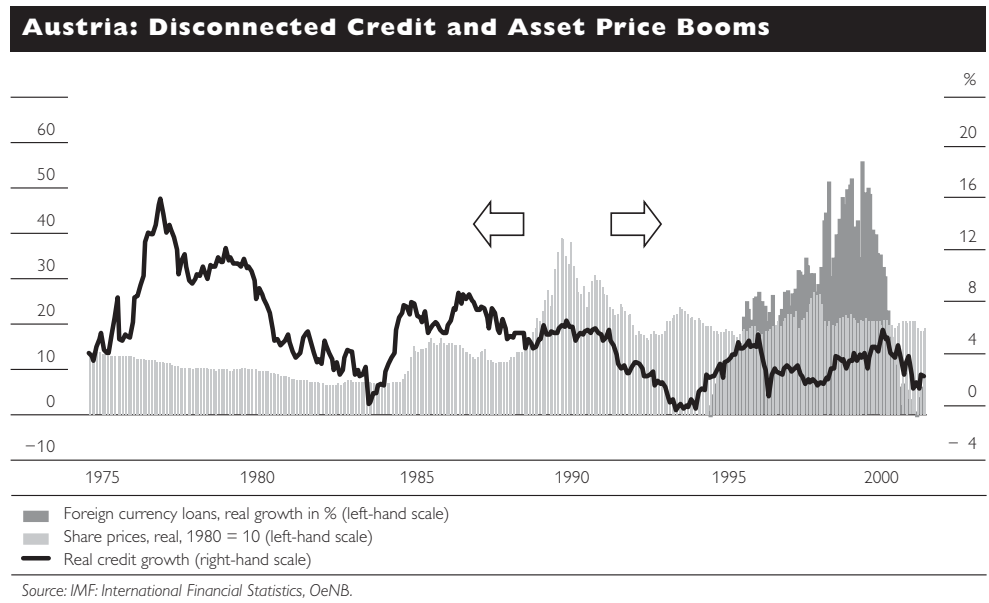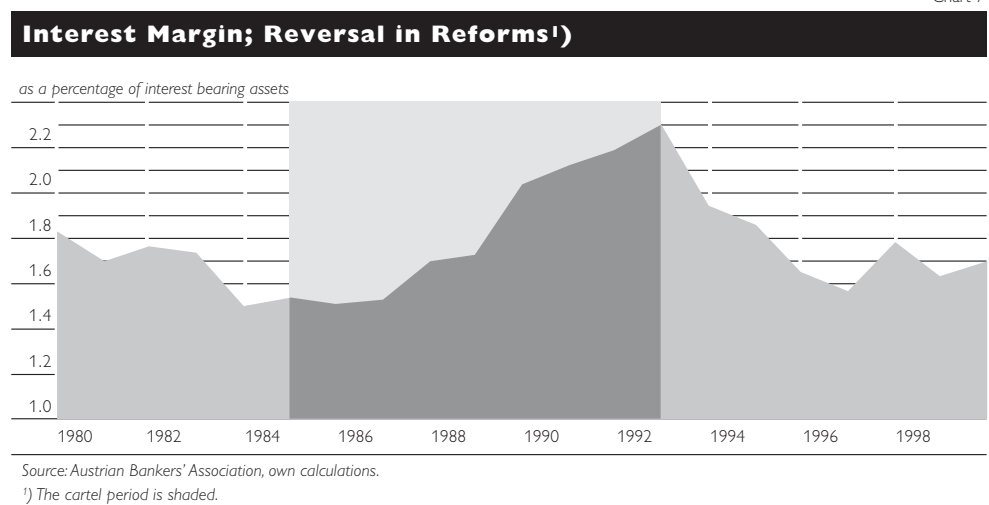
The downside of gradualism was a vulnerability to reversals, which became manifest during the mid-1980s, when the poor financial health of the banking sector alarmed government and banks alike. As a reaction, the authorities resuscitated the cartel on interest rates in order to quell "exaggerated and ruinous" competition and restore profits. The collusive arrangement resulted in an immediate improvement of interest margins, profits and capital ratios. As chart 7 shows, interest margins increased from 1.5% to 2.5% between 1985 and 1993, suggesting that competition was in fact curbed. The capital-asset ratio began to recover rapidly, increasing by 8% in 1986 and 18% in 1987. The recapitalization of banks was thus primarily financed by borrowers, who had to pay higher lending rates. The recovery of the banking sector was thus bought at the

expense of a temporary reversal in the process of financial liberalization. This was the price that Austria paid for gradualism.

Proposition 3: The cyclical effects of financial liberalization were balanced by tightening monetary, fiscal and prudential policies. The timing of this tightening was highly fortunate, if not always intentional.

Monetary policy, fiscal policy and financial reform can all be regarded as cyclical tools of the government. In Austria, these tools frequently canceled out each other's cyclical effects. Financial liberalization has effects that are similar to expansionary monetary policy, while prudential tightening resembles contractionary monetary policy. The main difference is that monetary changes take place in the private part of money supply (i.e. money created by commercial banks) and not in the monetary base. Thus, financial liberalization and prudential regulation often translate into changes of the money multiplier. This relation is illustrated nicely by Paraguay's financial liberalization during the 1990s. By contrast, Austria's M2 multiplier increased continuously throughout time, without any visible turning points. This is remarkable, because it was not due to the absence of destabilizing financial shocks. A combination of economic policy and internal buffers of the banking system helped offset the shocks. We first turn to economic policy.
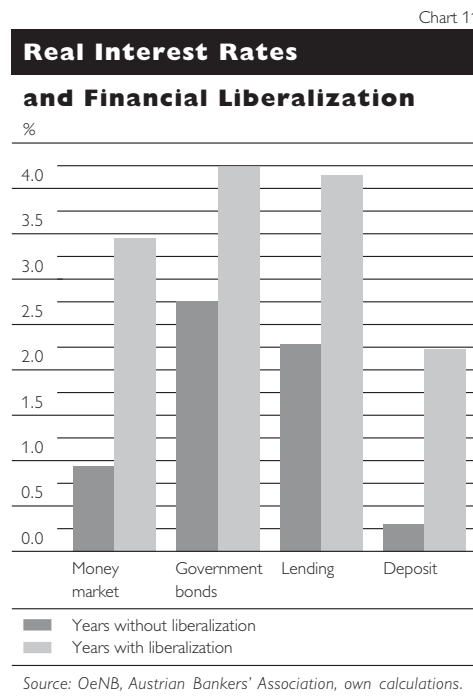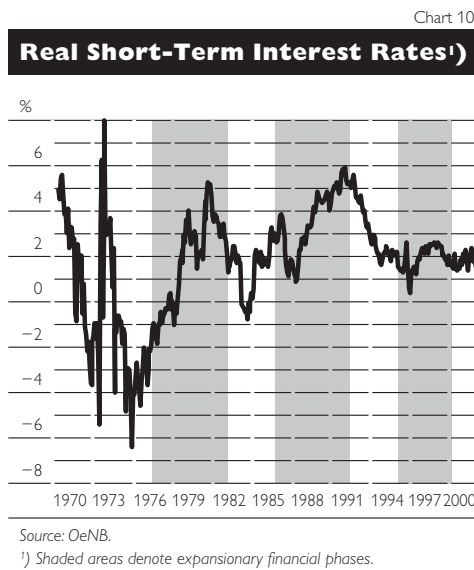

Chart 8
M2 Multiplier in Paraguay¹)
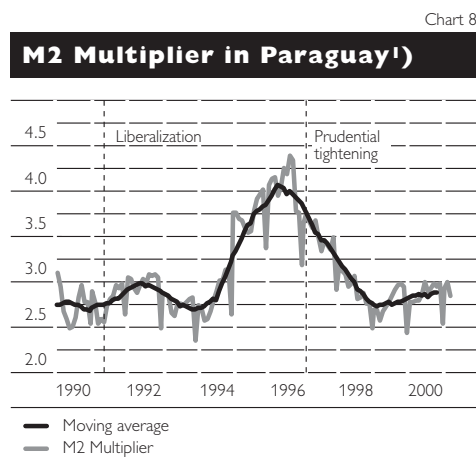
Source: Central Bank of Paraguay.
¹) The multiplier is defined here as the ratio of M2 or M3 to currency (M0). The banking crisis has led to a significant reduction of the multiplier in Guarani money, as measured by M2. The M3 multiplier remained constant because of an increasing dollarization. More recently, the M2 multiplier resumed a modest growth, while the M3 multiplier grew vigorously.

Chart 9
M2 Multiplier in Austria

Source: OeNB.
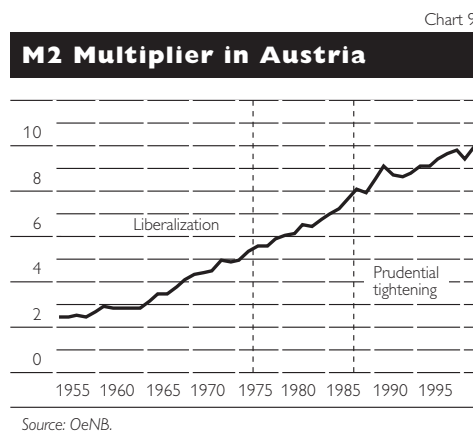
Monetary policy was used actively to offset the expansionary impulses of financial reform. Charts 10 and 11 show that real interest rates were higher on average during years of financial reform (1977–1981, 1986–1992, 1994, 2000) than at other times after 1970. Real money market rates, which the central bank controls most directly, increased by 250 basis points during periods of reform. This propagated to other parts of the financial system, e.g. to government bond yields, lending and deposit rates. To some extent, monetary policy was imposed from abroad, as Austria followed German policies due to its peg to the Deutsche mark. However, the timing of international monetary restrictions was quite fortunate as well.

Chart 10

Real Short-Term Interest Rates[1])

Source: OeNB.
[1]) Shaded areas denote expansionary financial phases.

Chart 11

Real Interest Rates

and Financial Liberalization

■ Years without liberalization
□ Years with liberalization

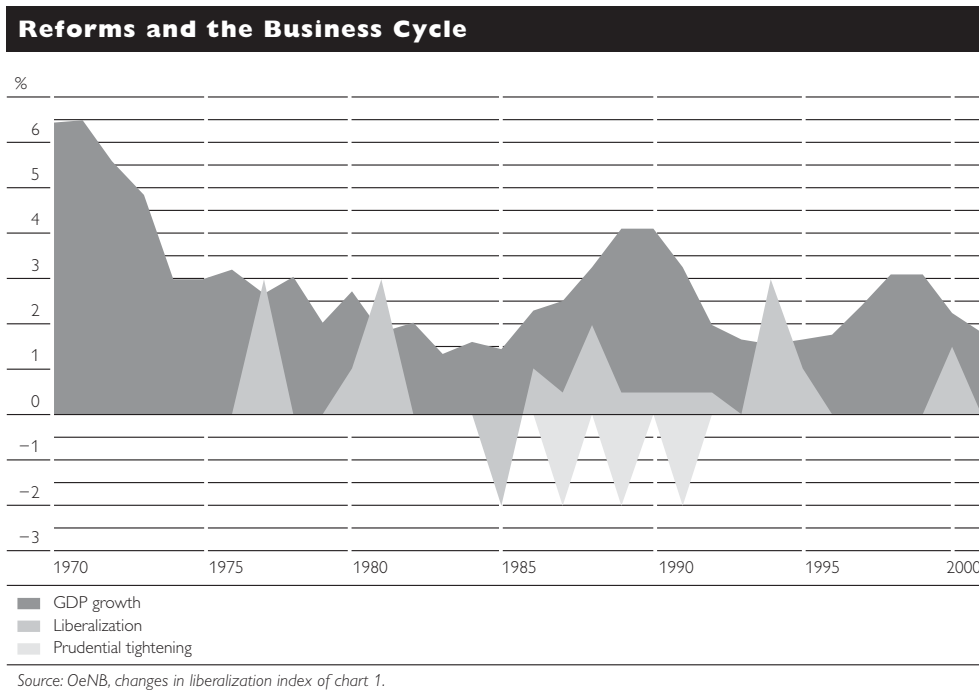*Source: OeNB, Austrian Bankers' Association, own calculations.*

The final expansionary phase of financial liberalization was marked by a boom in foreign currency lending during the late 1990s. During this period, restrictive fiscal policy kept the banking sector in check. In order to fulfill the criteria of the Stability and Growth Pact, the government carried out a fiscal adjustment of 6½% of GDP between 1995 and 2001 and reduced bank lending by almost 30% in real terms. This created room to increase private lending without destabilizing overall credit growth.

Finally, prudential reform exerted important countercyclical effects. The first wave of financial reforms had led to intense competition and a dangerous decline in bank profitability and capital endowments. The government tried to arrest the deterioration in the mid-1980s first by re-establishing the interest rate cartel, then by tightening prudential standards, in particular by raising regulatory capital requirements. Both measures had a restrictive effect on bank lending, making credit more expensive and interest margins wider. This reduced the expansionary impulse stemming from opening the capital account and surging capital inflows.

Intentionally or not, shocks to economic policy often canceled out or were tuned appropriately to economic growth. Chart 12 shows that liberalization episodes mostly occurred in times of economic weakness. The chart combines GDP growth rates (three-year moving averages) with changes in the liberalization index described above. Domestic financial liberalization was carried out when the economic environment was weakened by OPEC oil price shocks, an international recession. Privatization and the surge in foreign currency loans took place in a period of fiscal adjustment and sluggish growth during the late 1990s. Capital flows were liberalized during an economic upswing, but their effect was offset by a parallel tightening of prudential standards. In sum, Austria
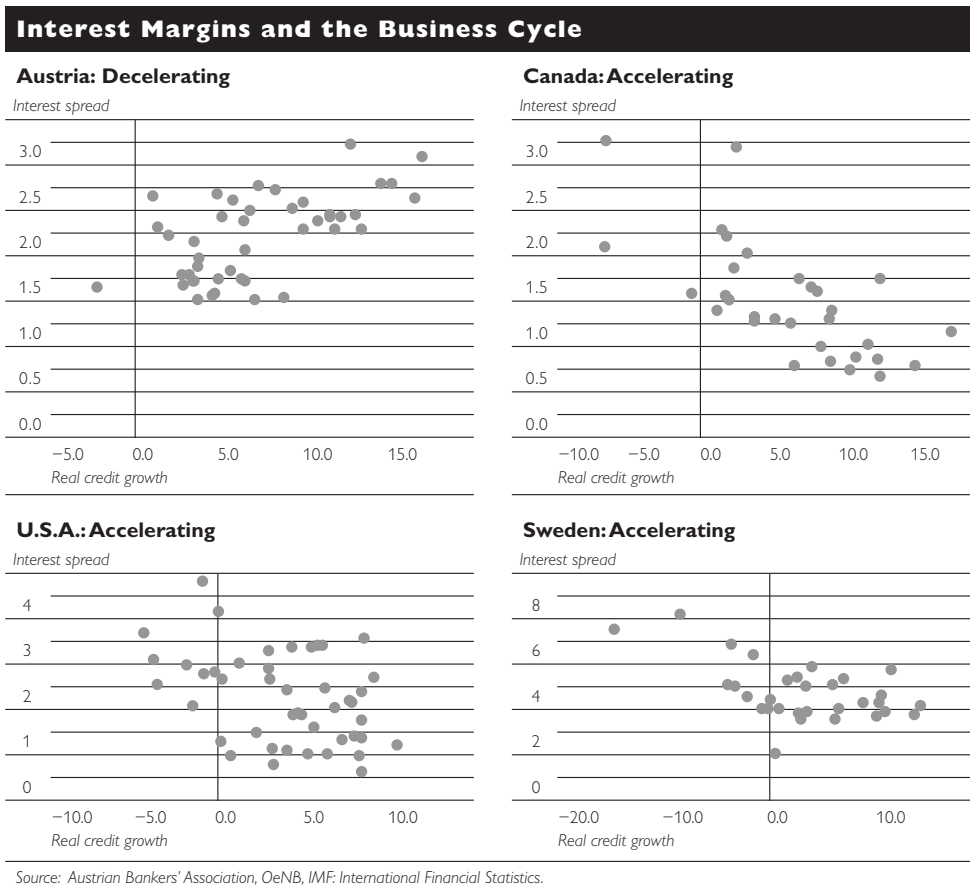
Chart 12

Reforms and the Business Cycle

%

6
5
4
3
2
1
0
−1
−2
−3

1970   1975   1980   1985   1990   1995   2000

■ GDP growth
■ Liberalization
■ Prudential tightening

Source: OeNB, changes in liberalization index of chart 1.

was fortunate to liberalize at the right time and to contain the effects of liberalization with the right cyclical policies.

Proposition 4: Many Austrian banks have a long time horizon and buffer cyclical shocks. Their "financial decelerator" smoothes over economic fluctuations. This is unusual in the international context.

The large number of financial crises worldwide has led to a re-examination of the transmission channels of monetary policy. In many countries, it was found that the financial sector magnifies monetary shocks and business cycles in general. This behavior has been termed *financial accelerator*. This is mainly the result of the so-called bank lending channel which prompts banks to aggravate interest rate shocks through parallel credit supply shocks. A priori, Austria would seem to be an ideal candidate for a *bank lending channel,* as its financial sector is completely dominated by banks. However, empirical studies[1] have so far failed to detect one, and there is even evidence for a *financial decelerator.*

Empirically, the financial accelerator manifests itself in ample credit during upturns and a shortage of credit during downturns. Alternatively, it shows up in narrow interest margins during upturns and wide interest margins during downturns. A financial accelerator would imply a negative relationship between credit growth and interest margins.

---

1   *Kaufmann (2001), Valderrama (2001).*

Chart 13

Interest Margins and the Business Cycle

Austria: Decelerating

Interest spread

Real credit growth

Canada: Accelerating

Interest spread

Real credit growth

U.S.A.: Accelerating

Interest spread

Real credit growth

Sweden: Accelerating

Interest spread

Real credit growth

Source: Austrian Bankers' Association, OeNB, IMF: International Financial Statistics.
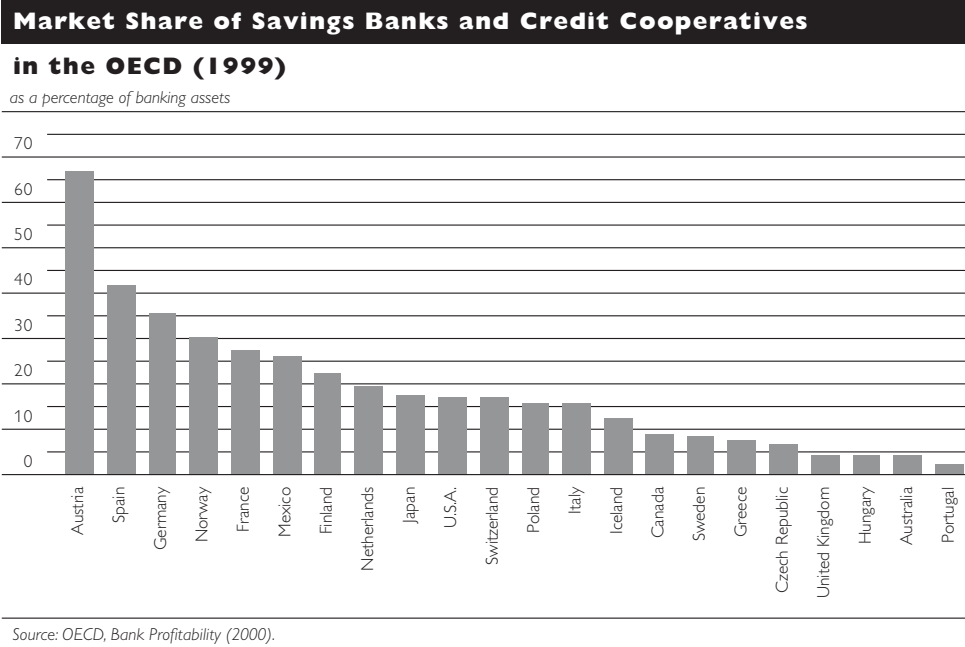
This pattern is explained by the risk-taking behavior of banks and by a need to maximize profits over the short term.[1]) Upturns generate optimistic expectations about future returns, and banks eagerly extend loans. As competition heats up, interest margins narrow, which enhances credit demand. Real estate collateral and its procyclical prices may inflate the credit boom further. During downturns, in contrast, banks lose interest income, as loans become nonperforming. They are forced to increase loan-loss provisions, raising costs and squeezing profits. Thus, banks widen interest margins and ration credit supply, as they shift their portfolio towards low-risk assets. Overall, this behavior starves households and firms of credit just when they need it most. Short-term profit maximization thus tends to amplify the business cycle.

Austrian banks seem to behave in an intrinsically countercyclical fashion. Chart 13 shows the relation between real credit growth and the interest margin for several countries. Interest margins are caculated as the difference between lending and deposit rates in annual International Financial Statistics (IFS) data for 1955 to 2000. Canada, the U.S.A. and Sweden represent the general case of a financial accelerator. The plots show a negative correlation between credit growth and interest margins. In contrast, Austria shows a positive correlation:

1   See Bank for International Settlements (2001), 139–160.

Chart 14

Market Share of Savings Banks and Credit Cooperatives

in the OECD (1999)

as a percentage of banking assets

Source: OECD, Bank Profitability (2000).

the interest margin widens when credit growth is high. This is rare evidence for a financial *decelerator,* i.e. for bank behavior that dampens the business cycle.

The cyclical behavior of Austrian banks can be related to their ownership structure and its incentives for bank managers. Austria is the country with the highest share of credit cooperatives and savings banks in the OECD. Savings banks and credit cooperatives comprise ⅔ of the Austrian banking sector. These banks are not primarily interested in short-term profits. Their goal is to ensure a stable value of their assets over the long run and to provide constant credit to their clients. Close relationship banking has the additional advantage of reducing asymmetric information. Managers have an incentive to pursue a strategy of intertemporal smoothing, as described by Allen and Gale (2000): they accumulate reserves during good times and liquidate them during bad times. When credit demand is high, interest margins widen. When the economy is in a downturn, banks relax credit conditions and help borrowers stay afloat. By pursuing intertemporal smoothing, banks provide an implicit insurance to borrowers and help dampen the business cycle.

References

Allen, F. and Gale, D. (2000). Comparing Financial Systems. Cambridge, MIT Press.

Berger, A., Hunter, W. and Timme, S. (1993). The Efficiency of Financial Institutions: A Review and Preview of Research Past, Present and Future. In: Journal of Banking and Finance 17, (2–3) 221–249.

Bank for International Settlements (2001). Annual Report, Section VII: Cycles and the Financial System. Basel.

Brandner, P. (1991). Liberalisierung der österreichischen Devisenbestimmungen. In: WIFO Monatsberichte 11/91.

Braumann, B. (2002). Financial Liberalization in Austria. Mimeo, OeNB.

Caprio, G., Honohan, P. and Stiglitz, J. (eds.), (2001). Financial Liberalization: How Far, How Fast? Cambridge University Press.

Demirgüc-Kunt, A. and Detragiache, E. (1998). Financial Liberalization and Financial Fragility. IMF Working Paper WP/98/83.

Drees, B. and Pazarbasioglu, C. (1998). The Nordic Banking Crisis. IMF Occasional Paper 161.

Frydl, E. (1999). The Length and Cost of Banking Crises. IMF Working Paper WP/99/30.

Glauninger, V., Magerl, Ch. und Mooslechner, P. (2001). Österreichs Bankensystem im Umbruch: Neue Fragen auf alte Antworten? In: Fuchs, W. and Horvath, O. (eds.). Wirtschaftsstandort Österreich. Von der Theorie zur Praxis. Vienna, Bundesministerium für Wirtschaft.

Grubelnik, K. (1998). Die Rote Krake. Vienna, Molden.

Hviding, K. (2000). Challenges of European Financial Integration: The Case of Austria. IMF Staff Country Report 00/124.

Kaufmann, S. (2001). Asymmetries in Bank Lending Behavior. Austria During the 1990s. ECB Working Paper 97.

Kernbauer, H. (1991). Währungspolitik in der Zwischenkriegszeit. Vienna.

Lindgren, C.-J., Garcia, G. and Saal, M. (1996). Bank Soundness and Macroeconomic Policy. Washington, D.C., IMF.

Mishkin, F. (2000). The Economics of Money, Banking and Financial Markets. Boston, Adison, Wesley, Longman.

Schulz, G. (1997). Entwicklungen und Perspektiven des österreichischen Devisenrechts. Vienna, Peter Lang Verlag.

Shy, O. (1997). Industrial Organization. Boston, MIT Press.

Valderrama, M. (2001). Credit Channel and Investment Behavior in Austria. A Micro-Econometric Approach. ECB Working Paper 108.

Williamson, J. and Mahar, M. (1998). A Survey of Financial Liberalization. Princeton, Princeton University Press.

Wyplosz, C. (2001). Financial Restraints in Postwar Europe. In: Caprio, G. et al. (eds.) (2001): Financial Liberalization. Cambridge, U.K., Cambridge University Press.

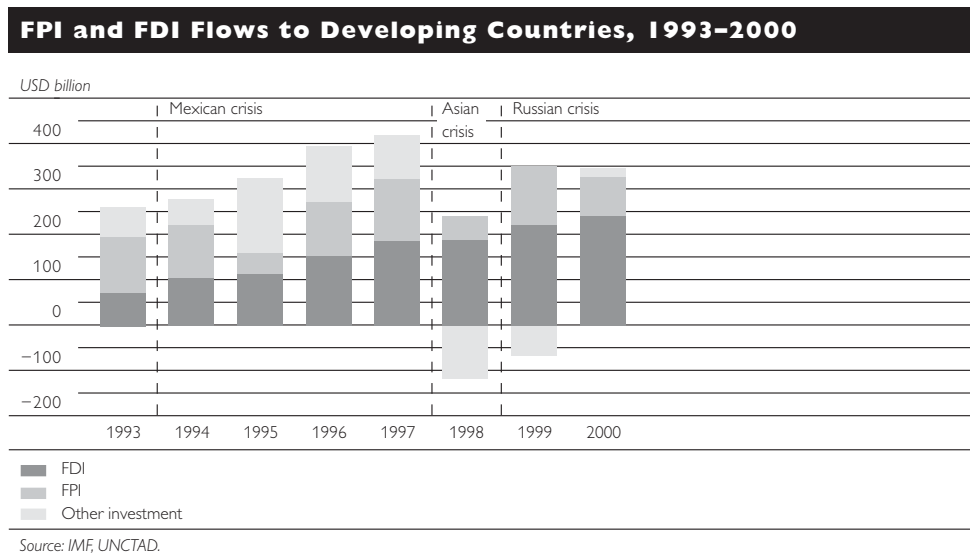# Private Capital Flows to Emerging Markets in the 1990s and Their Impact on Financial Markets

1 Introduction

The 1990s were marked by a global increase in private capital flows. Foreign portfolio investment (FPI) flows, which totaled roughly USD 749 billion worldwide in 1993, jumped to approximately USD 1,600 billion in 2000, with temporary setbacks during the Mexican and Asian crises. The story is similar for foreign direct investment (FDI) flows, which soared from about USD 218 billion in 1993 to approximately USD 1,300 billion in 2000. Amid the global economic downturn and a slowdown in cross-border mergers and acquisitions, private capital flows slumped in 2001 but appear to have rebounded in 2002.

Specifically, the relative importance of private capital flows to emerging markets has risen in recent years. The process of globalization and the ensuing deregulation of capital markets have accelerated the international financial integration of the emerging Asian and Latin American economies as well as of the Central and Eastern European Countries in transition (CEECs). Both multinational corporations and institutional investors have been investing more heavily in emerging economies as they rate these countries as attractive investment locations that warrant high profit expectations.

Ulrike Ditlbacher,
Jarko Fidrmuc,
Patricia Walter

Chart 1

FPI and FDI Flows to Developing Countries, 1993–2000
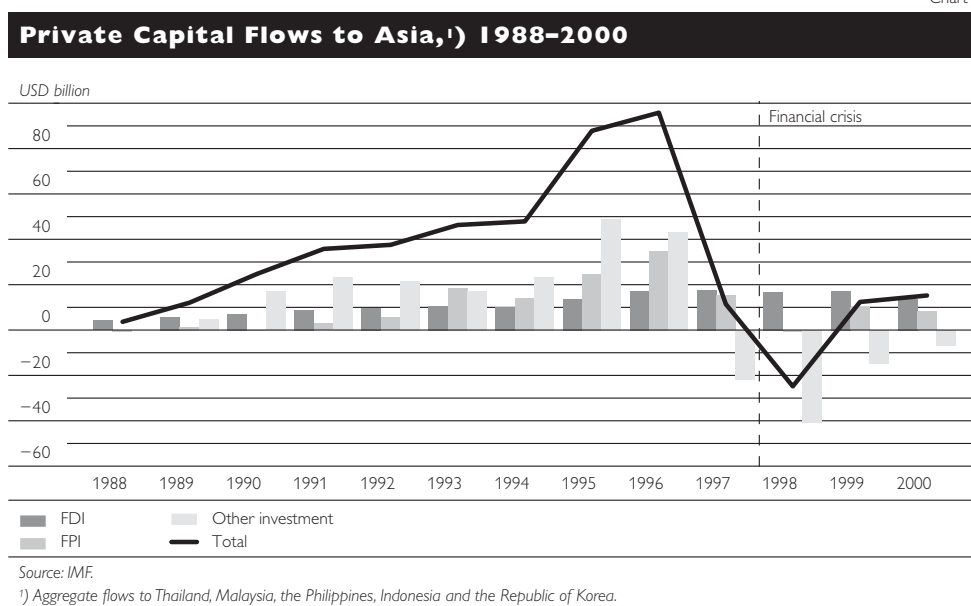

Source: IMF, UNCTAD.

2 Developments in Private Capital Flows to Emerging Markets in the 1990s

In the 1990s, emerging markets attracted increasing amounts of private capital. The two major capital components – portfolio and direct investment – developed along different lines, as is evident from chart 1. While FDI flows mounted gradually from 1993 onward, with funds pouring in steadily even during the Mexican and Asian crises, FPI flows and other investment (in essence loans extended by banks and nonbanks) were visibly dented by the financial crises of the mid- and end-1990s.

Both the Mexican crisis of 1993–94 and the Asian crisis of 1997–98 were preceded by a boom of capital inflows. In the case of Mexico, most of the external capital was raised through portfolio investment rather than external

loans, as in the case of the Asian countries. The heavy reliance of Asia on external loans reflects the many constraints and market entry barriers that foreign investors faced in Asian countries, which were largely dismantled only after the crisis was over. In addition, numerous multinational corporations headquartered in Asia and investing in Asian regions were borrowing in U.S. dollars. This was sensible enough, considering that the national currencies were pegged to the U.S. dollar and interest rates were high in the Asian host countries. The inability of some Asian countries to maintain the dollar peg caught many investors unawares. As currencies depreciated, it became more expensive to repay outstanding loans, which in turn caused the financial condition of the companies concerned (particularly highly leveraged firms) to deteriorate. Regarding those Asian countries that were affected most by the crisis,[1]) foreign banks consequently adopted a cautious lending policy, which contributed strongly to reducing private capital flows (see chart 2). In the process, combined inflows of USD 100 billion received by those countries in 1996 reversed to outflows of approximately USD 30 billion in 1998.

Chart 2

Private Capital Flows to Asia,[1]) 1988–2000

USD billion

Source: IMF.
1) Aggregate flows to Thailand, Malaysia, the Philippines, Indonesia and the Republic of Korea.

In contrast to the Asian countries, Mexico attracted above all portfolio investment. As the Mexican economy picked up amid the reform programs launched toward the end of the 1980s, so did foreign investor confidence. The stronger economic activity as well as privatizations, also in the banking sector, generated a flood of private capital, mostly in the form of portfolio investment. However, these portfolio investments were the first funds to be withdrawn when the financial crisis hit, as reflected in massive FPI outflows of approximately USD 10 billion in 1995 – compared with FPI inflows of about USD 29 billion in 1993 (see chart 3).

---

1   Thailand, Malaysia, the Philippines, Indonesia and the Republic of Korea.

Chart 3

Private Capital Flows to Mexico, 1988–2000

Source: IMF.
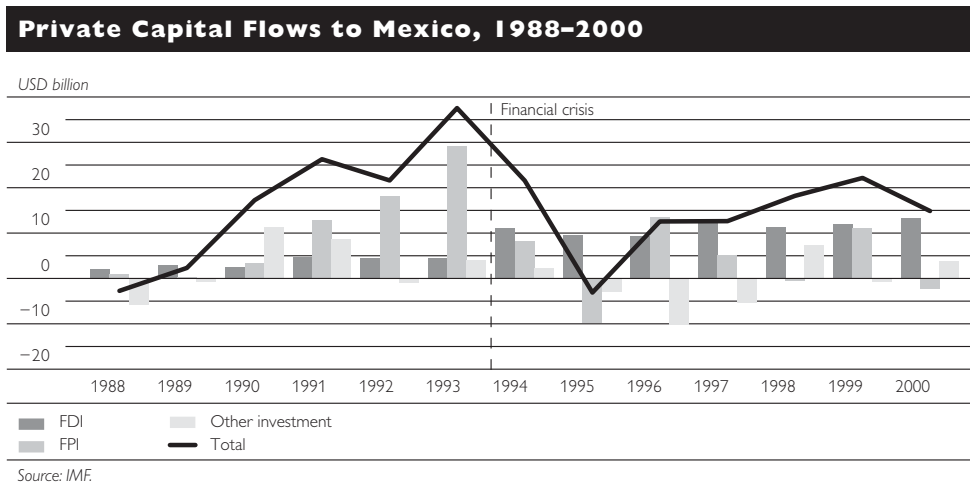
Developments in the Central and Eastern European (CEE) area in the 1990s were marked by the Russian crisis. The Russian market differs from both the aforementioned emerging markets and the other CEE economies insofar as Russia did not attract significant foreign investment until the second half of the 1990s. At the same time, Russia stands out through the increasing amounts it has invested abroad itself, benefiting from its high trade surplus (USD 49.4 billion or about 15% of GDP in 2001). These favorable framework conditions notwithstanding, in August 1998 Russia was hit by a financial crisis, which had lasting repercussions on private capital flows (see chart 4).

Chart 4

Private Capital Flows to Russia (Net), 1994–2001

Source: IMF.
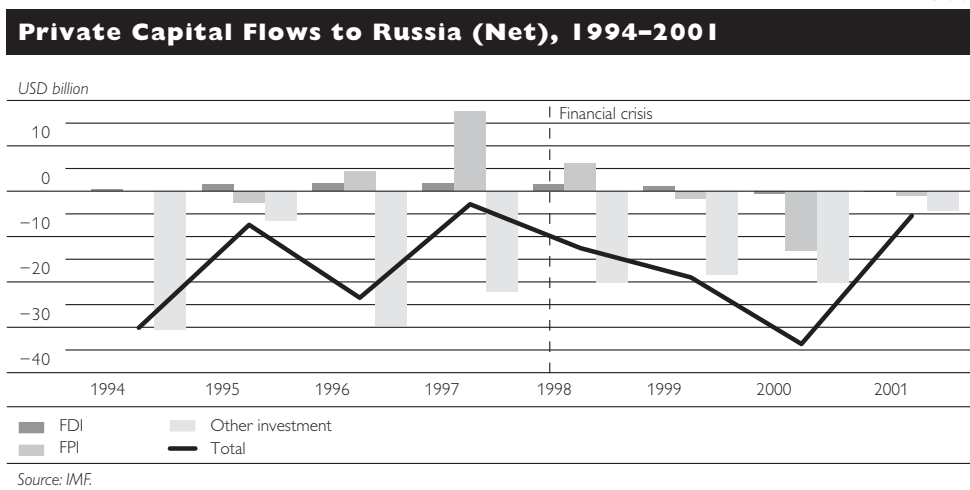
Throughout the second half of the 1990s, Russia invested abroad more heavily than foreigners did in Russia. However, the development of the individual investment components shows that the Russian economy has become somewhat more interesting as an investment location in recent years.

Net private capital flows to/from Russia broadly track the component "other investment" which comprises above all repayments of earlier loans (Koch and Korhonen, 2000) but also the flight of capital from Russia. In the latter half

of the 1990s, net other investment flows considerably surpassed net FDI and net FPI flows.

Furthermore, the level of net other investment flows remained comparatively stable even during the Russian crisis. The decrease observed in this aggregate in 2001 largely reflects a drop in the external loan subcomponent, which contracted – mostly in the second half of the year – from USD 17 billion in 2000 to some USD 0.9 billion in 2001.

By contrast, the pattern of Russian portfolio investment was heavily influenced by the crisis that broke in August 1998. In 1997, FPI flows reached a historic high of USD 17.8 billion (net), a level that has remained unsurpassed. The deceleration of FPI flows that started toward the end of 1997 eventually turned into full-blown capital flight in the course of the Russian crisis. In 2001, finally, FPI broadly stabilized, reflecting two conflicting forces – the drag of the uncertainty weighing on investors' minds in international capital markets, and the pull of Russia's solid macroeconomic fundamentals (Havrylyshyn and Beddies, 2002). While investors may not view Russia as a safe haven yet, they have come to see it as a "cozy cove in the storm."

Foreign direct investment plays a lesser role than foreign portfolio investment in Russia despite the big market potential. In 2001, net FDI flows totaled a mere USD 0.1 billion. What is striking, though, is that Russian companies have been investing abroad more heavily themselves. Russian outward FDI flows came to USD 2.7 billion in 2001. The lion's share of this sum was invested by oil companies, particularly in the CIS states, but also in the Slovak Republic.

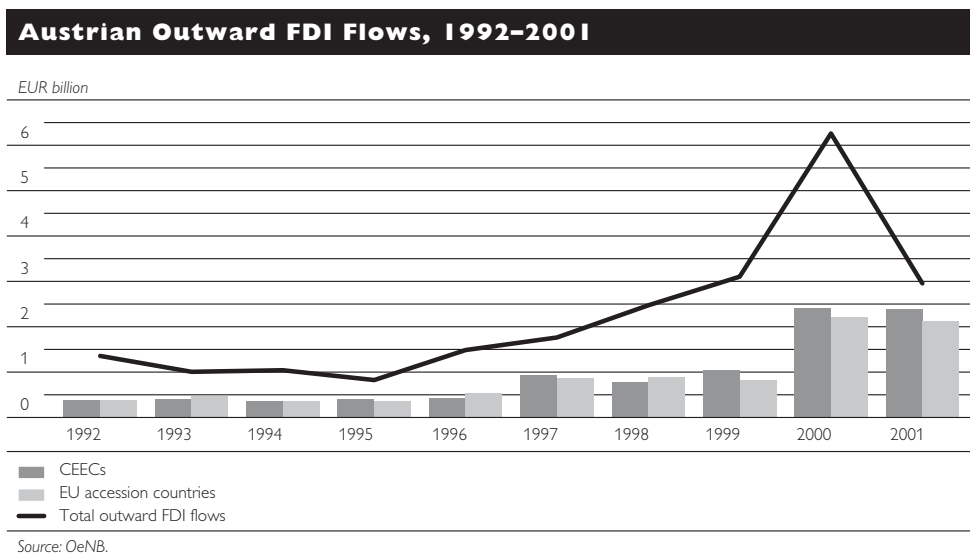## 3 Austrian Capital Flows to Emerging Markets

Since the mid-1990s, the amounts of capital that Austrians invest abroad have soared (at an annual growth rate of 30% on average). The emerging markets in Central and Eastern Europe in general and the accession countries in particular have been key targets of those flows. Austrian private capital flows to the CEECs jumped from more than EUR 1 billion in 1995 to EUR 6.3 billion in 2001 (average annual growth rate: 36%). In terms of asset allocation, purchases of CEEC securities have gained more weight in the investment portfolios of Austrian investors in recent years, but their share is dwarfed by that of euro area securities. By contrast, more FDI has been flowing from Austria to the CEECs/ the accession countries than to other euro area countries. Similarly, CEEC borrowers account for the bulk of external loans (in essence, long-term bank loans) extended by Austrian intermediaries. Broadly speaking, with respect to capital flows in Europe Austria has become a borrower vis-à-vis the euro area and a lender vis-à-vis the 12 EU accession countries, thus evidently serving as a European gateway.

The overall positive trend of Austrian capital flows to the Central and Eastern European emerging markets has been interrupted by occasional setbacks. For instance, the drop in capital investment in this area in 1998 and 1999 reflected the Russian crisis. Amid the unfavorable external conditions of 2001 – technology stocks suffered worldwide, the U.S. economy slowed down after a decade of uninterrupted growth, the events of September 11 shocked the world, regional diversification effects stemming from the introduction of the euro dissipated – the volumes of cross-border capital transactions by Austrian

investors contracted by nearly half in line with international trends. The striking fact is that the flow of Austrian capital to Central and Eastern Europe in general, and to the accession countries in particular, was sustained at the levels of 2000, counteracting the global trend. Austrian investors apparently honored the fact that the growth setback was comparatively smaller in the accession countries by international standards.
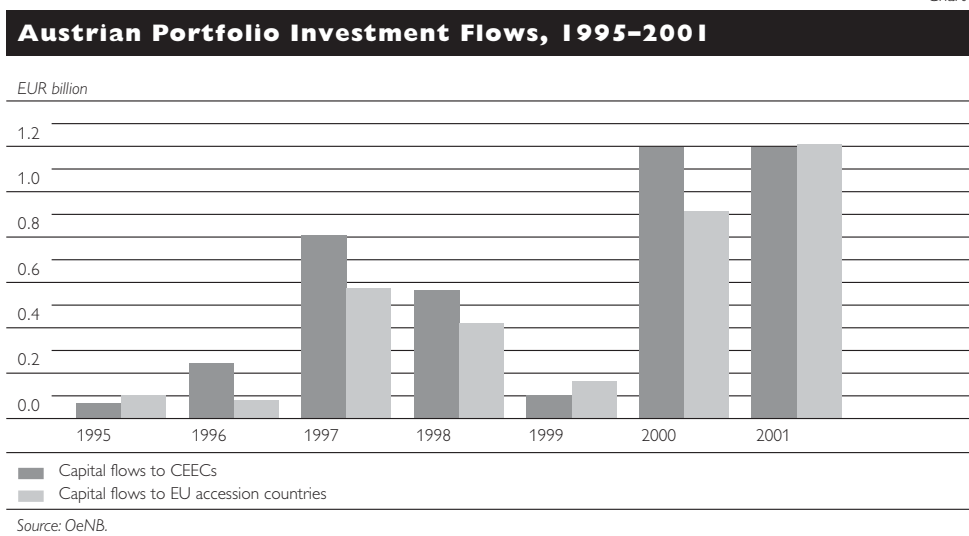
As is evident from chart 5, except for a few long-standing linkages with foreign firms, outward FDI was not really an issue for Austrian companies until the beginning of the 1990s. In essence, this pattern reflects the predominance of small and medium-sized businesses in the Austrian economy, the high degree of state-owned enterprises and the geographical location of Austria at the former Iron Curtain. With the opening up of Eastern Europe, conditions changed fundamentally, landing Austria with a strategic market entry position vis-à-vis the new transition economies of Central and Eastern Europe. While Austria chiefly attracts FDI capital from EU-based companies, Austrian companies invest mainly in Central and Eastern European countries. Compared with highs of 0.3% of GDP in the 1980s, Austria's outward FDI flows (net) have risen to approximately 1% on average since 1990. At the same time, Austrian FDI flows to Central and Eastern Europe as well as the accession countries respectively rose from EUR 400 million at the beginning of the 1990s to more than EUR 2 billion in 2001, with the latter corresponding to 75% of all outward Austrian FDI flows. Despite the adverse international climate for FDI in 2001, reflected by a decrease in Austria's net capital exports arising from outward FDI (to EUR 3 billion or roughly half the record level of 2000), the flow of Austrian capital to Central and Eastern Europe was sustained at a record level exceeding EUR 2 billion. In other words, in 2000 and 2001 taken together Austria invested more in this region than from 1992 to 1999. In 2001, the Slovak Republic topped the list of targets for Austrian FDI flows (EUR 650 million), followed by Hungary (EUR 430 million), Slovenia (EUR 320 million) and Croatia (EUR 200 million).

Chart 5

Austrian Outward FDI Flows, 1992–2001

EUR billion

Legend:
- CEECs
- EU accession countries
- Total outward FDI flows

Source: OeNB.

At the beginning of 2000, Austrian direct investors held stakes in more than 1,000 direct investment enterprises in the accession countries, with the stock of Austrian direct investment capital totaling EUR 5.3 billion. This corresponds to almost half of Austrian FDI enterprises abroad and to more than a quarter of Austrian FDI capital invested abroad. The major host countries of Austrian direct investment are Hungary (404 direct investment enterprises), the Czech Republic (257), Poland (105) and the Slovak Republic (101), which between them account for 85% of all Austrian FDI enterprises and for 78% of Austrian FDI capital invested in accession countries. The number of Austrian FDI enterprises in Hungary and the Czech Republic, incidentally, is almost as high as the number of Austrian FDI enterprises in all EU countries taken together. As a result of its investment efforts in the emerging markets of Central and Eastern Europe, Austria has become a predominant foreign investor in large parts of this area. In Slovenia and Croatia, for example, Austrians own some 45% and 30%, respectively, of the national FDI capital stock, making Austria the single largest foreign investor by far in those two countries (based on data compiled by The Vienna Institute for International Economic Studies – WIIW). In Hungary, the Czech Republic and Slovakia, Austria holds about 10% to 20% of the total FDI capital stock and thus ranks third behind Germany and the Netherlands.

Chart 6

Austrian Portfolio Investment Flows, 1995–2001

EUR billion

Legend:
Capital flows to CEECs
Capital flows to EU accession countries

Source: OeNB.

Portfolio investment – investment in equity and debt securities which is more short-term in nature than FDI – is the chief component of Austrian cross-border private capital flows. Austrian investors have shown a strong preference for euro area securities and have also opted for U.S. securities, but on a much smaller scale. Whereas purchases of securities from other emerging markets have remained all but negligible, Austrian demand for securities issued by CEE and by accession countries has increased in recent years. After a hesitant start (see chart 6), Austrian portfolio investment flows to the region surpassed the EUR 1 billion threshold in 2000 and 2001, thus accounting for 9% of all portfolio holdings acquired by Austrians in 2001. While total FPI outflows from Austria in 2001, in line with international trends, fell visibly short of the 2000 level (i.e. more than halved from EUR 29 billion to EUR 13 billion), the flow of

Austrian investment in CEEC securities was sustained at the level of 2000. Within Central and Eastern Europe, the accession countries had attracted the lion's share of Austrian FPI flows even in previous years, but in 2001 they were virtually the sole focus. The pattern of asset allocation reflects the widening of the economic gap among the individual CEECs amid the EU accession process in line with (divergent) progress made on the road to EU membership. Against this background, investors build expectations about the macroeconomic performance of the individual countries, about growth and inflation prospects, the convergence of interest rates towards the European level as well as exchange rate appreciation. In this respect, Hungary appeared to be a particularly good buy for Austrian investors in 2000 and 2001, and likewise Poland in 2001. Polish securities had been sold off in 1999 in the face of growing external imbalances that threatened to endanger exchange rate stability.

Bonds and notes have typically accounted for the better part of Austrian FPI and attracted broadly similar amounts in both 2000 and 2001. In recent years, with the exception of 1999, demand by Austrian portfolio investors for debt securities issued by the emerging markets of Central and Eastern Europe was comparatively stable and growing. In 2001, Austrians investing in CEEC debt securities chiefly bought EU accession country securities; overall, the latter accounted for 6% (EUR 740 million) of all bonds and notes purchased by Austrians in that year. Interestingly, accession country issues have often been denominated already in the local currency. Unlike Austrian investment in CEEC debt securities, investment in CEEC equity securities[1]) has been subject to sharp fluctuations: The year 1999 saw net inflows, in 2000 investment in CEEC equities was roughly in balance, and only in 2001 did volumes rebound to a pre-Russian crisis level of EUR 330 million. This is in fact remarkable, because in 2001 Austrian cross-border capital flows broadly reflected international investment behavior, i.e. investors were not very keen on stocks and sharply reduced their holdings. In 2001, the share in new Austrian equity investments rose to 26% for CEEC instruments and to 28% for accession country securities. Investors sold above all Russian securities; however, this was an industry-specific rather than a country-specific phenomenon, reflecting the decline in oil prices following a two-year rise and oil price-related valuation losses. At the beginning of 2002, international portfolio investment by Austrians was on the rise. Purchases of CEEC securities remained at the year-earlier level on balance, while within the aggregate, funds were reallocated further to accession countries. It should also be noted that the share of equities of Eastern European emerging markets has risen considerably and is now on a par with the corresponding – shrunken – volume of debt securities.

In the category "other investment" – loans, currency and deposits – Austrian external claims have strongly increased in recent years, above all claims on the emerging markets of Central and Eastern Europe. The increase in external claims was, however, interrupted in 2001. While in 1999 and 2000, the increase in external claims was in the double-digit billion euro range, the respective capital transactions totaled a mere EUR 7 billon in 2001 (which, in part, mirrors the deceleration of FDI and FPI flows). In this respect, the

---

1   *Mostly stocks, because mutual fund shares are insignificant in this area.*

Private Capital Flows to Emerging Markets
in the 1990s
and Their Impact on Financial Markets

slowdown in claims growth was disproportionately weak for the CEECs as a whole, while it was disproportionately strong for the EU accession countries. More specifically, the share of the accession countries in total other investment dropped (to 9% in 2001 from 12% in 2000) while the share of the region as a whole grew (from 14% in 2000 to 19% in 2001); in other words, the share of the other CEECs has been increasing. Just like other investment as a whole, claims arising from bank loans reached a record high in 2000, both overall (EUR 9 million) and in the CEE region (EUR 2.1 billion). By contrast, in 2001, mirroring global lending developments, the claims growth rate dropped in the CEECs and in the accession countries; their shares remained broadly stable (at 23% and at 15%, respectively). The slowdown of other investment flows from Austria to the CEECs to a certain extent reflects the stronger presence of Austrian banks in the area following the establishment of subsidiaries. To date, Austrian banks have established subsidiaries in as many as 12 Eastern European countries, with Slovakia (market share of Austrian subsidiaries: 40%), the Czech Republic (21%), Hungary (16%), Croatia (14%) and Poland (7%) topping the list.

4 FDI and FPI Determinants

As the above analysis has shown, portfolio investment flows and other investment flows are highly volatile whereas direct investment flows are broadly stable even in times of crisis. Apparently, the rationale for direct investment decisions, made with the intention of gaining longer-term control of assets, differs from the determinants of portfolio investment transactions, which tend to be short-term in nature. As portfolio and direct investment together form the main components of private cross-border capital flows, they consequently have a major impact on capital markets – an impact which is in essence determined by the motives driving investment transactions.

4.1 FDI Determinants

Given the buoyancy of direct investment activity in recent years, there has been extensive research on the motives that prompt multinational corporations (MNCs) to invest abroad. John H. Dunning's eclectic paradigm of FDI (also known as the OLI paradigm, 1993) suggests that the decision of an MNC to take direct control of foreign assets depends on its ability to combine ownership (i.e. firm-specific) advantages with location advantages (country-specific factors that favor production in the foreign country, rather than exporting from the home market) and internalization advantages (meaning that the firm is better advised to run the foreign operation itself than to license its technology to a local producer or that there is a business case for taking on the additional organizational costs). Markusen and Venables (1998, 2000) underline, in addition, the importance of scale economies, horizontal and vertical product differentiation, incomplete competition and the relationship between trade and production costs.

In other words, the channels of market entry open to investors (greenfield investment, mergers & acquisitions, etc.) together with the policies of host countries and their economic characteristics, i.e. location factors, make or break FDI projects.

Both theoretical and empirical research[1]) shows that investment behavior is influenced, first and foremost, by market-seeking motives. The need to open up new markets or to optimize the positioning on existing markets has been found to be an important determinant particularly in the financial services industry. Here, exporting from the home country is apparently seen as being inadequate. Especially in the industrial sector, the growing flexibilization and the emergence of more efficient forms of production (such as just-in-time production) has prompted providers of intermediate goods and ancillary services to follow large industrial corporations abroad. Moreover, owing to intensified competition, many companies find it imperative to be present in their major markets alongside their direct competitors. Finally, under certain conditions (e.g. a saturated domestic market), moving abroad may be the only avenue for expanding. The wave of privatization and deregulation that swept the CEECs opened up a huge market from which Austrian service sector companies (particularly in the field of financial services and in trade) benefited at the beginning of the 1990s. Likewise, the pronounced rise of FDI in China in recent years implies that the search for new markets is playing a major role in Asia as well.

Originally, cost factors (above all low wage and payroll costs) were considered to be of secondary importance. In recent years, however, cost has become a more crucial determinant of MNCs' investment and location decisions. A number of empirical studies have confirmed that exchange rate-adjusted changes in relative employee compensation significantly affect direct investment flows. This holds true chiefly for production outsourced to the CEECs or Southeast Asia and, more generally, when the host country is a developing country. Regarding industrialized host countries, factors such as research and development (R&D) expenditure and strategic considerations tend to be the key determinants, since differences between wage levels are small.

Next, transaction costs need to be considered. Here, MNCs have the advantage of being able to internalize expensive transactions, thus sidestepping market deficiencies or underdeveloped markets. MNCs also have a competitive edge when it comes to planning and controlling as well as access to information. Moreover, infrastructure costs, such as energy and – particularly in the financial services industry – telecommunications costs, play a certain role. After all, the attractiveness of a location does not hinge on efficient financial market structures alone, but on cost efficiency as well.

Apart from cost aspects, the tax environment influences the attractiveness of a business location. Thus, the tax reliefs that Benelux countries used to grant expatriates[2]) at the end of the 1990s were instrumental in raising FDI flows to those countries. Beyond tax breaks for MNCs, tax rates and tax regimes may tip the scales in favor of an FDI project, even more so in emerging markets.

---

1   *See e.g. OeNB (1996, 1997, 1998).*
2   *These rules offered tax advantages to international holding companies and coordination centers. Moreover, foreign employees and high-level employees of multinational corporations in those countries were granted income tax exemptions of up to 35%.*

The Corporate Tax Rate Survey[1]) conducted annually by KPMG indicates that tax rates have been converging in recent years. The corporate tax rate averaged 31.39% in the 30 OECD countries covered by the 2002 survey. Following tax cuts in a number of EU Member States, the average rate of corporate tax in the EU could be brought down to 32.58% from 33.68% in 2001. Thus, the gap to the emerging markets narrowed further. While the Latin American countries covered had an average rate of 30.2% for 2002 (representing a slight increase from 30.14% in 2001), the countries in the Asia-Pacific region managed to bring their average rate down further to 31.05% from 31.28% in 2001. It should be remembered, however, that an international comparison of tax rates is a complex issue and that the results should consequently be interpreted with caution.

Apart from granting fiscal incentives, governments take proactive measures to facilitate and promote investment through nonfiscal incentives, e.g. by providing physical infrastructure, sometimes free of charge, offering special market entry rights or waiving competition provisions.

Among the individual location factors, a country's R&D spending is playing an ever bigger role, as reflected, among other things, by the many cross-border mergers and acquisitions in the pharmaceutical, telecommunications and financial services industries in recent years. Empirical observations in fact show FDI enterprises to be an important link between a given MNC and economic agents of its host country when it comes to international spillover effects from R&D spending. Thus, the presence of skilled labor and an R&D-friendly infrastructure is going to be among the key location factors of the future.

4.2 FPI Determinants

Very much like direct investment, portfolio investment transactions may be made in a variety of forms (minority interests, debt securities, venture capital, etc.). Here, too, a variety of motives drive such investment. By and large, however, the decision boils down to two factors: economic determinants and policy/regulatory determinants.

4.2.1 Economic Determinants

Macroeconomic factors, such as GDP growth, exchange rate stability, interest rate developments and capital market liquidity, are key criteria in the decision-making process. In selecting a host country, an equity investor will take into account above all the liquidity of the stock market and the level of economic growth rates. By contrast, the degree of bond market liquidity and the level of interest rates is something fixed-income investors will look at.

Indeed, portfolio investment in the emerging markets in recent years mirrors external economic conditions. Those countries which posted above-average growth rates also reported an increase of portfolio investment flows. Thus, Thailand, Indonesia, the Philippines and the Republic of Korea attracted the highest FPI flows to the Asian economies until financial turbulences struck. At the time, those countries boasted annual GDP growth rates in the range of 5% to 9%. The story is similar for Latin American countries. The economies of

---

1   See the website of KPMG: www.kpmg.com.

the major FPI recipients[1]) grew at an average rate of between 2.7% (Mexico) and 7.2% (Chile). This compares with an average growth rate of 2.2% registered in the Sub-Saharan African countries between 1990 and 1999, which was duly reflected by a low rate of portfolio investment inflows. Investors apparently associate economic growth with a potentially higher return on investment.

4.2.2 Policy/Regulatory Determinants

As evidenced by the Asian crisis, the macroeconomic factors are but one side of the coin: investors are equally sensitive to the regulatory/policy frameworks. The latter may be directly influenced by the national governments and may be adjusted accordingly to increase the attractiveness of a country as a business location for foreign investors. Conversely, weak regulatory frameworks may even trigger a financial crisis and make a country susceptible to contagion. As a case in point, the weaknesses of the Asian financial markets, including too little technical know-how and too many linkages between banks, were largely responsible for the currency turbulences and the capital flight that ensued and manifested the need for sweeping reforms, which were duly taken, and for more stringent stability requirements for international capital markets.

According to an investor survey conducted in 1999 by the United Nations Conference on Trade and Development (UNCTAD) the following factors drive the process of host country selection:
— ease of repatriating dividends and capital
— domestic capital gains tax
— stock and bond market regulation
— quality of domestic accounting and disclosure standards
— speed and reliability of the settlement system
— availability of domestic custodians and brokers
— degree of investor rights protection

Fixed-income investors, moreover, tend to base their decisions above all on exchange rate and interest rate expectations as well as on assessments of the financial health of borrowers, notably credit ratings. International investors go by these ratings when planning investments, particularly in emerging markets. This puts a country in a vicious circle when a crisis is looming, because any downgrading will add to financial instability. In turn, risk premia will be raised, and the image of the business location will be tarnished, which will take its toll on capital flows. All this goes to underline the stabilizing role of international institutions (especially the International Monetary Fund – IMF; and the World Bank), which step in in a crisis to enhance the success potential of the national stabilization packages.

---

1   Mexico, Argentina, Chile and Brazil.

5 Impact on Financial Markets

Given the surge in private capital flows above all to the emerging markets in recent years, this paper looks into not only the determinants of financial flows but also the implications of those flows for local and international financial markets.

5.1 Role of FDI

The rise in direct investment flows to emerging markets in the 1990s reflects, among other things, the disproportionately high growth of financial services. The latter can, in turn, be traced mainly to extensive privatization measures and comprehensive measures to dismantle obstacles and barriers for international investors through a number of multilateral and bilateral agreements.[1]

Foreign financial services providers, banks in particular, considered some areas more attractive than others. The CEECs, notably Hungary and Poland, proved to have the highest locational attractiveness. As reported by the IMF, in those two countries the FDI share rose to about 70% by 2001 amid sweeping privatization projects following the opening up of Eastern Europe. In the Latin American countries, foreign banks increased their presence above all in the late 1990s. In Argentina and Chile, foreign banks control around 50% of the banking industry following a series of mergers and acquisitions, while in Mexico the share of foreign banks even rose to approximately 60% in 2001. By contrast, foreign banks tended to have a limited presence in Asian countries even in recent years, reflecting restrictive market entry policies; what little investment occurred was limited to a handful of countries, such as Malaysia, the Republic of Korea and Thailand.

The mounting share of direct investment in the area of financial services indicates that the national governments have come to appreciate more highly the potential positive impact of foreign investments. After all, the financial crises that swept Asian and Latin American countries all too clearly evidenced the fragility of the respective national financial sectors and the need for foreign investment. It is a fact that multinational corporations, given their global networks, are less susceptible to such shocks, because they can spread the risks more broadly among the individual subsidiaries and the parent company (Peek and Rosengren, 2000). In the crisis regions, the national banking industry was too weak to compensate adverse effects.
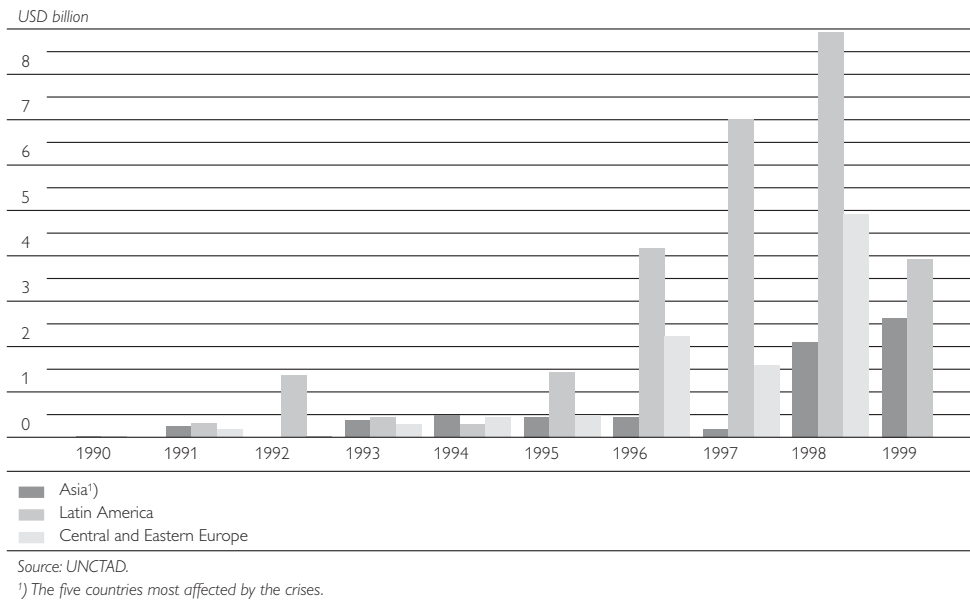
Having seen that foreign investors can provide technical know-how on top of new funds to clean up the battered banking industry, the host countries made an effort to attract more financial investors. Thus, in the aftermath of the financial crises, flexible investors had the opportunity to enter the markets at a low cost and, moreover, benefited from programs launched by the national governments to promote mergers and acquisitions.[2]

---

1 *The Uruguay round, in the course of which the General Agreement on Trade in Services (GATS) was negotiated and which entered into force in 1995, played a key role in this respect.*

2 *For instance, the government of the Republic of Korea lifted all provisions restricting portfolio investment in stock markets, M&A activities and land purchases by foreigners in May 1998.*

Chart 7

Cross-Border M&As in the Financial Sector, 1990–1999

USD billion

Source: UNCTAD.
¹) The five countries most affected by the crises.

Asia¹)
Latin America
Central and Eastern Europe

As chart 7 shows, the number of mergers and acquisitions in Asian countries rose during and after the financial crisis of 1997–98. The same holds true for Latin American and CEECs. The rise in mergers and acquisitions in the financial sector in fact mirrors a general trend apparent in the 1990s. As reported by UNCTAD[1] , the developing countries saw their share in global mergers and acquisitions rise from some 5% in the late 1980s to close to 20% at the end of the 1990s. This trend was spurred by sweeping deregulation and privatization measures as well as alternative methods of financing. While bank loans continue to be the primary financing vehicle, direct financing instruments, such as the issuance of common shares or corporate bonds, have been gaining importance. As venture capital has become more readily available, more and more smaller companies are in a position to engage in mergers and acquisitions, causing cross-border M&A activities with a transaction value below USD 100 million to rise steadily. According to UNCTAD, M&A transactions in this range in fact accounted for one third of all mergers and acquisitions in 1999. Big-ticket mergers and acquisitions, by contrast, tend to be executed increasingly through stock swaps.

As empirically observable, foreign investors contribute to raising the efficiency of the financial services sector. With most of the investors established in industrialized countries, their technical know-how is state of the art. Thus, a direct investment relationship involves not only the transfer of capital to the foreign market, but also the transfer of management expertise, efficient pricing structures, qualitative risk management and a broad range of financial products as well as the underlying legal framework conditions. The domestic banking industry, in turn, benefits from the more stringent supervisory standards, based

1   *See UNCTAD (2000).*

on international guidelines, that foreign banks incorporated in industrialized countries must observe. The ensuing efficiency gains promote competition, which adds to the stability of the local banking industry.

5.2 The Role of FPI

Similar to direct investment, portfolio investment, be it in the form of venture capital, corporate bonds, government bonds or derivatives, may have a direct bearing on economic output through the injection of capital. The higher capital flows have the added benefit of prompting the host countries to make their financial market structures more efficient amid tighter competition and to tap international financial markets more strongly.

As beneficial as rising capital flows may be, they also have their pitfalls, basically because of the volatility of capital flows, above all of portfolio investment and external loans. Direct investments, by contrast, are less volatile. A direct investment project typically evolves from a long decision-making process and is laid out for a longer-term relationship with the economy of the host country. Moving plants or closing down subsidiaries after a short time would come at a high cost for the parent company (involving, for example, sunk costs). Portfolio investment, by contrast, is highly sensitive to changes in the determinants mentioned above and may be withdrawn from the markets at short notice. Naturally, this volatility of capital flows does not leave financial markets and national economies unscathed. Sudden withdrawals of capital reversing massive inflows will lead to unexpected changes in the availability of assets and consequential changes in asset prices. This, in turn, influences corporate stocks and profit expectations and depresses investment that is in the pipeline. At the same time, national governments adopt counteracting economic policy measures, which is what happened for instance in the Asian countries. Next, rating agencies react to these developments by downgrading the countries in question, which shapes the market expectations of investors and prompts them to withdraw their capital – this is when a financial crisis is deemed to have erupted.

As we learned from the Mexican crisis and even more so from the Asian crisis, financial crises tend to spill over national borders and may spread to other countries through economic links – such as trade links – or, above all, through financial linkages. If several countries have borrowed from one and the same bank, the increase in loans that become irrecoverable from one country amid a financial crisis will require the bank to call outstanding loans more rapidly, which may entail financial difficulties for other countries (Sbracia and Zaghini, 2001).

Apart from economic and financial linkages, contagion also plays a role in the transmission of financial crises, particularly in emerging markets. To use a simile, it takes a susceptible host, i.e. a weakened body, for an infection to develop – in other words, it takes an inefficient financial system and close regional financial interdependence for a crisis to spread to other markets (Chan, Chao and Chou, 2001). Capital rapidly fleeing one crisis-ridden country may, by flooding surrounding regions, overly strain the financial market structures of the latter and, in a domino effect, cause those markets to become instable as well.

Fluctuations in capital flows may, among other things, result from incomplete information on markets (Portes and Rey, 2000). Institutional investors tend to select markets that promise high returns, so-called growth markets, which include many emerging markets. In addition, they tend to imitate the behavior of other investors and go for the same markets. Such herding behavior leads to a regional accumulation of capital inflows, so-called financial bubbles. As shock waves are transmitted, market expectations change, causing investors to quickly withdraw their funds. Typically, capital is siphoned off not just from the country actually hit by a crisis, because investors tend to see different countries as a homogenous group. Consequently, they anticipate that similar financial problems will occur in other countries in which they have invested, which is why they will withdraw that capital as well (Bacchetta and van Wincoop, 1998). The international capital markets, finally, respond to such portfolio reallocations with currency turbulences, which may develop into full-fledged currency crises that will affect the industrialized countries as well.

5.3 Financial Market Intermediaries

To a large extent, portfolio investment growth in the emerging markets can be traced to the rapid expansion of institutional investors in recent years. Thus, amid demographic change and the ensuing rise in private pension provision, investors such as insurance companies, mutual funds and pension funds have asserted themselves more strongly in capital markets in recent years. This is clearly evident from recent changes in assets under management by mutual funds: on a European scale, they almost tripled from about EUR 1,200 billion in 1995 to more than EUR 3,500 billion in 2000. Assets managed by Austrian mutual funds even soared from some EUR 24 billion in 1995 to more than EUR 90 billion in 2000. Part of this capital has been invested in emerging markets, as they have high capital needs and investors hope to benefit from the high growth rates there.

Banks have also jumped on the bandwagon and have extended their mutual fund business. With a view to market positioning, they can rely on the global networks established by their subsidiaries and foreign branches. As banks invest more heavily in this field, stock and bond market developments and their underlying risks play an increasingly bigger role for the stability of banks and thus of financial markets. The underlying risks are not restricted to market risks alone. Of course, a fall in securities prices has repercussions on the creditworthiness of bank customers which have invested in a given market, which causes the credit risk of banks to rise.

Conversely, conservative investment behavior tends to have a stabilizing effect on financial markets – the investments of insurance companies (particularly in the strongly expanding life insurance sector) are a case in point, as they are long-term and profit-maximizing. Furthermore, institutional investors tend to diversify their portfolios in order to keep their risks as low as possible and to generate high returns. Through the placement of higher private pension savings, capital markets can be expected to gain in market breadth and liquidity, which reduces volatility and reinforces stability.

As mentioned before, however, institutional investors tend to react in concert ("herding behavior") to incomplete information on the markets in

which they invest (Bikhchandani and Sharma, 2000; Kim and Wei, 1999). This is particularly true for emerging markets, on which institutional investors tend to crowd, often, however, with false expectations due to incomplete information. This behavior causes markets to be overrated and may lead to a crisis situation when market expectations are not met and investors pull out capital.

Finally, demographic change, above all in the OECD countries, is another potentially destabilizing factor. As people build up retirement savings, the net flow of capital to emerging markets rises. But once baby boomers in the industrialized countries stop contributing and start to draw benefits, the emerging markets will be confronted not only with a depletion of the capital stock owing to a shrinking demand for securities; they will also have to substitute new capital for current flows from OECD countries. Local capital markets may not be able to adequately cope with this situation, and this may send ripples through international capital markets.

References

Bacchetta, P. and van Wincoop, E. (1998). Capital Flows to Emerging Markets: Liberalization, Overshooting and Volatility. NBER Working 6530.

Backé, P. and Fidrmuc, J. (2000). The Impact of the Russian Crisis on Selected Central and Eastern European Countries. In: Komulainen, T. and Korhonen, I. (Eds.). Russian Crisis and Its Effects. Kikimora, Helsinki.

Bikhchandani, S. and Sharma, S. (2000). Herd Behaviour in Financial Markets: A Review. IMF Working Paper 00/48.

Chan, K. S., Chao, C.-C. and Chou, W.-L. (2001). Financial Linkages Among the Asian Crisis Economies. In: The World Economy, 24, (8).

Dell'mour, R. et. al. (2002). Balance of Payments in the Year 2001. In: OeNB Focus on Austria, No. 2, 50–68.

Dell'mour, R. (2002). Austria's Direct Investment and EU Enlargement. In: OeNB Focus on Transition, No. 1, 44–70.

Dunning, J. H. (1993). Multinational Enterprises and the Global Economy. Addison-Wesley.

Havrylyshyn, O. and Beddies, C. H. (2002). Capital Reflows to Central Europe and CIS Since the Russian Crisis: Safe Haven Effects or Rebalancing Risks? 8th Dubrovnik Economic Conference, Hrvatska narodna banka/Croatian National Bank, Dubrovnik.

International Monetary Fund (2001). International Capital Markets.

Kim, W. and Wei, S.-J. (1999). Foreign Portfolio Investors Before and During a Crisis. OECD Working Paper 210.

Koch, E. and Korhonen, I. (2000). The Aftermath of the Russian Debt Crisis. In: Komulainen, T. and Korhonen, I. (Eds.). Russian Crisis and Its Effects. Kikimora, Helsinki.

Lipsey, R. E. (2001). Foreign Direct Investors in Three Financial Crises. NBER Working Paper 8084.

Markusen, J. R. and Venables, A. J. (1998). Multinational Firms and the New Trade Theory. In: Journal of International Economics 46 (2).

Markusen, J. R. and Venables, A. J. (2000). The Theory of Endowment, Intra-Industry and Multi-National Trade. In: Journal of International Economics 52 (2).

Oesterreichische Nationalbank (1996, 1997, 1998). Austrian Outward and Inward Direct Investment.

Peek, J. and Rosengren, E. S. (2000). Implications of the Globalization of the Banking Sector: The Latin American Experience. Federal Reserve Bank of Boston, Conference Series No. 44.

Portes, R. and Rey, H. (2000). The Determinants of Cross-Border Equity Flows: The Geography of
Information. CEPR, Working Paper C 00-111.

Sbracia, M. and Zaghini, A. (2001). Crises and Contagion: The Role of the Banking System. BIS Paper
No. 1.

UNCTAD (1999). Comprehensive Study of the Interrelationship Between Foreign Direct Investment
(FDI) and Foreign Portfolio Investment (FPI). UNCTAD/GDS/DFSB/5.

UNCTAD (2000). World Investment Report.

The Vienna Institute for International Economic Studies (2001, 2002). Monthly Report.

Legend, Abbreviations

Conventions used in the tables

— = 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

Discrepancies may arise from rounding.

Abbreviations

ARTIS	Austrian Real-Time Interbank Settlement	IAS	International Accounting Standards
A-SIT	Secure Information Technology Center – Austria	IATX	Immobilien-Austrian-Traded-Index (real estate Austrian Traded Index)
ATX	Austrian Traded Index		
BIS	Bank for International Settlements	IFS	International Financial Statistics
BWG	Bankwesengesetz (Banking Act)	IHS	Institut für Höhere Studien
CEECs	Central and Eastern European Countries		(Institute for Advanced Studies)
CPA	Certified Public Accountant	IMF	International Monetary Fund
CPI	consumer price index	IPO	initial public offerings
DAX	Deutscher Aktienindex	LLP	loan loss provision
	(German Stock Index)	LTCM	Long-Term Capital Management
DJIA	Dow Jones Industrial Average	NASDAQ	National Association of Securities Dealers
EBRD	European Bank for Reconstruction		Automated Quotation System
	and Development	NEMAX	stock price index
EC	European Community		on Frankfurt's Neuer Markt
ECB	European Central Bank	OECD	Organisation for Economic Co-operation
EEC	European Economic Community		and Development
EMU	Economic and Monetary Union	OeKB	Oesterreichische Kontrollbank
EONIA	Euro OverNight Index Average		(specialized bank for export financing,
ESCB	European System of Central Banks		central depository for securities)
EU	European Union	OeNB	Oesterreichische Nationalbank
EURIBOR	European Interbank Offered Rate	OLS	Ordinary Least Squares
Eurostat	Statistical Office	P/E ratio	price/earnings ratio
	of the European Communities	ROA	return on assets
FMA	Finanzmarktaufsichtsbehörde	ROE	return on equity
	(Financial Market Supervisory Authority)	TARGET	Trans-European Automated Real-time
FOMC	Federal Open Market Committee		Gross settlement Express Transfer
FRAs	forward rate agreements	VAG	Versicherungsaufsichtsgesetz
FSLIC	Federal Savings and Loan Corporation		(Insurance Supervision Act)
GDP	gross domestic product	VaR	value at risk
GNP	gross national product	ViDX	Vienna Dynamic Index
GFCF	gross fixed capital formation	WIFO	Österreichisches Institut für Wirtschafts-
HGB	Handelsgesetzbuch (Commercial Code)		forschung (Austrian Institute
HICP	Harmonized Index of Consumer Prices		of Economic Research)