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SPECIAL TOPICS

Basel II, Procyclicality and Credit Growth – First Conclusions from QIS 3	56
<i>The third Quantitative Impact Study (QIS 3) required the participating banks to apply the regulations of the New Basel Capital Accord (Basel II) to their balance sheet assets to determine the changes to their risk-weighted assets and, consequently, the change in their capital requirements. Since the conclusion of the previous three impact studies (QIS 1, QIS 2, QIS 2.5) a number of modifications have been made to the proposed New Capital Accord, not least because of macroeconomic concerns – particularly in connection with SME lending as well as potentially increased procyclicality. This paper first summarizes the debate on the potential macroeconomic impact of Basel II and, subsequently, analyzes the associated conclusions in light of the QIS 3 results for Austria.</i>	

Calibration of Rating Systems – A First Analysis 70

Within the context of the implementation of Basel II, the calibration of rating systems will increasingly gain attention in the near future. The present study was based on credit data made available by the credit information bureau Creditreform consisting of some 10,000 data sets for each of the years 1996 through 2001. In this initial attempt to explore the issue of calibration, we restricted our research to static methods. This implies that the estimates of probabilities of default are based on one-year transition rates, and the classification into rating classes relates to a single point in time in each of the years. The dynamics created by an intertemporal approach are, for the time being, taken into account only in the context of a conceptual framework. As to the results of the analyses, it is interesting to note that given the selected static framework, the capital requirement decreases as the number of classes generated using the chosen calibration methods increases. However, were an intertemporal approach to be applied, a natural limit imposed on the number of rating classes would result. Moreover, capital sensitivity to default rate changes also corroborates the need for intertemporal modeling (and sufficiently long data histories).

Overview of Austrian Banks' Internal Credit Rating Systems 82

As of the beginning of 2003, the Austrian financial institutions have to submit to the OeNB for each borrower reportable under Major Loans Register requirements, in addition to loan amounts, the value of collateral, the amount of specific loan loss provisions and the credit rating. Beside an analysis of the quality of the (major) loans portfolio, these additional reporting requirements permit a more detailed assessment of the quality of credit risk evaluation systems. This report provides an overview of the credit rating systems employed by the Austrian banks. The main focus in analyzing these systems was on their basic orientation (borrower or transaction rating), specialization and completeness, including their degree of differentiation (number of ratings classes). The methodological basis, the information content and the basis for risk measurement were also studied.

Credit Derivatives – Overview and Implications for Monetary Policy and Financial Stability 96

This nontechnical paper serves two purposes: First, we aim to provide a concise description of the credit derivatives market. Second, we attempt to analyze the aggregate effects of credit derivatives from a macroeconomic perspective. Given that credit derivatives are expected to have an impact on credit markets, we describe their implications for the financial system and the conduct of monetary policy.

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Editorial close: April 29, 2003

The climate of geopolitical uncertainty affected investor sentiment in the world's financial markets more and more from the fall of 2002 onward. Market developments were moreover influenced by continued weak economic growth amid limited inflationary pressures, as a result of which interest rates declined in the euro area and in the United States. Reflecting the higher risk aversion of investors and the ensuing preference for sound assets, the yields of long-term bonds dropped much more strongly than money market rates. The uncertainty about global economic developments also continued to take its toll on stock market prices, which have been falling for three years in a row since March 2000.

These price losses have had considerable implications for financial assets in Austria. The performance of life insurance products, mutual funds and pension funds, in which Austrian households have invested sizeable amounts since the mid-1990s, suffered perceptibly. On balance, the price losses of the past three years have knocked some EUR 7 billion off the financial assets of households alone according to preliminary calculations. Looking ahead, the role of market-based investment is going to grow nonetheless, above all as occupational pension schemes become more widespread. At the same time individual saving for retirement through institutional channels will gain importance, as state subsidies for private pensions were restructured in 2002 and are now concentrated on a scheme with a high mandatory share of investment in (domestic) stocks.

The global economic slowdown plus weak domestic demand have dampened economic growth in Austria, on account of which the banking

industry suffered a decline in domestic business revenues. By contrast, Austrian banks have been hit less hard by stock market developments, as their equity exposure is not very high. However, not least because of capital market developments, their revenues from securities-related activities as well as their net commission income contracted visibly in 2002. Despite the difficult macroeconomic conditions and the slight increase in insolvencies, Austrian banks expect the required loan loss provisions to have shrunk in 2002 compared with 2001 – which implies that the provisions made in 2001 in a forward-looking manner were adequate.

The sluggish economic developments also fed through to banks' lending business. The volume of loans outstanding to the corporate sector contracted in the course of 2002. On the one hand the financing requirements of businesses were lower in 2002 given their lower cyclical propensity to invest, which implies sagging loan demand. On the other hand, in times of weak economic growth, many businesses apparently represented a higher credit risk, which evidently prompted banks to adopt more cautious lending policies.

While bank loans declined, the role of other financing instruments – such as corporate bonds – has increased, above all for larger businesses.

The fact that developments in bank profitability were not that unfavorable in the end from a consolidated perspective can essentially be attributed to the good results achieved in Central and Eastern European countries (CEECs). At the major Austrian banking groups, the subsidiaries established in CEECs meanwhile contribute between 30% and 60% to group

income. The continual expansion of business in Central and Eastern Europe does, of course, imply that banks have become increasingly dependent on the contributions to profit earned in those countries. Yet, this is put in perspective by the fact that their activities are dispersed fairly broadly across countries in this region, which makes banks less dependent on their performance in a single country and reduces the potential impact of regional profit setbacks on the overall profitability performance.

The forthcoming accession of the CEECs to the EU and the growth advantage they can be expected to enjoy over the euro area in the longer run should further enhance conditions for doing business in the region. At any rate, the decline of bond spreads is evidence of positive investor attitude. Moreover, the banking offices established by Austrian banks have been expanding their retail business, which has a more stable income outlook than investment banking, in which a host of foreign banks are active in the region. The exceptionally high margins achieved in some countries even a few years ago are, however, a thing of the past.

The capital ratio of Austrian banks did not change markedly in 2002, and their risk-bearing capacity continues to be satisfactory. Also with a view to capital requirements to be established under the New Basel Capital Accord (Basel II), the capital ratio of Austrian banks is adequate. This is

the result of the third Quantitative Impact Study (QIS 3), a field test conducted at the beginning of 2003 in which international banks were able to test the impact of the new capital requirements on their current loan portfolios. The assessment of Austrian banks by international markets does not imply any loss of confidence, as is also evident from the gradings of rating agencies.

Judging from the available data, banks apparently did not try to compensate for the profit setback by adopting riskier policies in their trading and securities business. The exposure to market risk has remained broadly unchanged, and also regarding interest rate and stock market risk, no new risk positions have been incurred.

In contrast, the high volume of foreign currency loans has remained a risk factor that is all but negligible. Foreign currency loans accounted for nearly two thirds of the growth of loans taken out by households in 2002. Foreign currency financing is highly concentrated in particular regions, above all in the western provinces of Austria; at a number of small banks foreign currency loans even correspond to up to half of their total assets. While the risks underlying foreign currency borrowing have not materialized to date, from a financial stability perspective the high share of foreign currency loans at a number of Austrian banks does constitute a risk potential that needs to be monitored carefully.

R E P O R T S

Economic Developments and Financial Markets

Growth Remains Restrained in the Euro Area

In the euro area, the trend of weak economic growth clearly trailing the long-term average, which had commenced at the beginning of 2001, continued into the final quarter of 2002 and the first quarter of 2003. Hopes for a vigorous revival were thus again dashed, which is primarily attributable to the unusually high uncertainty economic agents faced in the past few quarters amid geopolitical tensions, culminating in the war in Iraq. The resulting negative confidence effects dampened investment activity and consumption. Against this background, domestic demand increased only at a slow pace. Exports did not continue to expand in the fourth quarter of 2002, chiefly owing to the break in the economic recovery in many parts of the industrialized world and the ensuing reduced demand for euro area goods.

For the remainder of 2003 the major international institutions had, still ahead of the war in Iraq, forecast a moderate revival in the second half of the year. A key assumption underlying these forecasts – that the war in Iraq would come to a quick end – has since panned out. However, certain risks remain in place which could prolong the subdued growth in the euro area into the coming quarters. If the financing structures in the U.S.A. (current account, corporate balance sheets) rooted in the investment and stock market boom of the late 1990s are essentially the result of an unbalanced development, U.S. growth is likely to remain weak, in which case demand for euro area exports will edge up only slightly. With fiscal developments signaling the emergence of a twin deficit,

this risk increases, given possible effects on the exchange rate of the U.S. dollar against the euro. On the other hand, domestic demand may likewise weigh on growth, as private consumption might remain tepid following mounting unemployment triggered by comprehensive corporate restructuring aimed at raising profitability. The fall in equity prices, reduced corporate profits and weakened corporate balance sheets combined with tighter financing conditions for corporates with lower credit ratings could keep a lid on investment activity.

Euro area HICP inflation did not edge below 2% as had been predicted for the end of 2002/beginning of 2003. This can be attributed to a renewed uptick in oil prices prior to the war in Iraq and the base effects of increased administered prices and indirect taxes as well as to the stubbornly high core inflation. However, in the light of the pronounced nominal effective appreciation of the euro observable since the second quarter of 2002 and weak demand-driven inflation pressure, the HICP is likely to dip below 2% in the course of 2003. This will, granted, depend largely on a sustained decline in oil prices anticipated on crude oil markets.

Fear of War Makes Casualties of International Financial Markets

In the euro area and the United States, in the fourth quarter of 2002 and the first quarter of 2003, short-term interest rates were influenced by anticipated and actual key rate cuts by the Governing Council of the ECB and the U.S. Federal Open Market Committee. This was ascribable chiefly to the slowing or unexpectedly weak cyclical developments in the two regions amid a limited inflationary threat. Real short-term interest rates (central

bank-controlled interest rate minus current rate of inflation) have reached a historically low level.

Following a short-lived increase in interest rates in the second half of October 2002, yields on government paper plunged, in particular in the euro area, until the end of March 2003 – the dive came to a halt only shortly before military action began in Iraq. On balance, euro area yields shrank by some 80 basis points from October 2002 to the end of March 2003. As a result, the interest rate spread against the U.S.A. contracted markedly, while the term spread in the euro area largely remained constant because money market rates decreased by about the same extent. The lower bond yields are attributable, on the one hand, to investors' heightened risk aversion and, on the other hand, to the deteriorating growth prospects for the euro area, which is also reflected by the notable slide of inflation-indexed bond yields. Once the war in Iraq was over, yields did not rebound substantially. In the past few months, the interest rate advantage of German government bonds against government paper issued by other euro area countries was steadily eroded. Market participants associated this development with Germany's comparatively poor fiscal situation. The risk premium for corporate bonds, which is determined by the interest rate differential between euro area government bonds and BBB-rated corporate bonds, decreased pronouncedly in the course of the fourth quarter of 2002 after having registered historic highs, which may be traced in part to a strengthening deleveraging process (see box "Are There Signs of a Change in Investors' Risk Appetite?").

On equity markets, prices continued their sharp fall, above all in the euro area, given the uncertainty (not

least because of the war in Iraq) about the further path of the global economy; the rally in the second half of October 2002 had been only short-lived. By mid-March 2003 the DAX, for instance, took a dive, sinking below the nadir registered in October 2002 and reaching a 6.5-year trough, while U.S. equity prices continued to hover above their long-term low of October 2002. The relatively poor performance of the DAX was, among other things, due to investors' increasingly negative assessment of the European banking and insurance sector. A fundamental evaluation of the price/earnings ratio shows that the equity price level in the euro area has returned to the long-term average, while in the U.S.A. this ratio is still clearly above the respective long-term average.

During the first few weeks after the onset of military action in Iraq, large price swings were observable, on bond as well as stock and foreign exchange markets. When the war ended rather quickly, the strong positive effects for the stock market expected by some did not materialize, which suggests that the relative brevity of the war had already been priced in. Prices picked up only modestly in the wake of the war in Iraq owing to, inter alia, a number of unfavorable economic indicators for the U.S.A. and the euro area, while investors' lower risk aversion and the lower oil price buoyed prices. The stocks of European, in particular German banks and insurance companies, represented an exception, as investors' confidence was again on the rise after sharp setbacks during the previous quarters.

From November 2002 to end-January 2003, the euro gained on the U.S. dollar from 0.98 USD/EUR to 1.08 USD/EUR. The 1.10 USD/EUR

threshold, which is of significance in the technical analysis, was not permanently surpassed in the first quarter of 2003. The euro's gain was primarily related to the uncertainty caused by the Iraq conflict, which weakened the U.S. dollar. Against the backdrop of the Japanese government intervening on the foreign exchange market with a view to preventing the Japanese yen from appreciating against the U.S. dollar, the euro also strengthened against the yen. By contrast, the exchange rate of the Swiss franc to the euro remained relatively stable at around 1.46 SFR/EUR during the final quarter of 2002

and the first quarter of 2003. The 50 basis point interest rate cut by the Swiss National Bank of March 6, 2003 (when euro area key rates were cut by 25 basis points) was aimed at stabilizing the economy as well as at preventing the Swiss franc from becoming overly strong at a time of international crisis. Subsequent to the end of the war in Iraq, the euro gained further on the U.S. dollar, Japanese yen and Swiss franc. The interest rate level, which is higher in the euro area compared to these three economic regions, seems to have played a part in the euro's strengthening.

Are There Signs of a Change in Investor's Risk Appetite?

Theoretically, stock prices are determined first and foremost by the development of corporate earnings and fluctuations of the risk-free interest rates and of the risk premia. Corporate bond spreads are, in contrast, determined chiefly by the credit rating of the given corporation because they have already been adjusted for general interest rate developments through deducting the yield on the government benchmark bond. Chart 1 illustrates the credit spread defined as the yield of bonds rated BBB minus the yield on AAA bonds in the euro area and the United States. The segment of AAA bonds has been chosen as the benchmark given the relatively low liquidity of corporate bonds. The size of these spreads can be interpreted as the market opinion on credit risk. Chart 1 shows the particularly pronounced long-term uptrend in the U.S.A. since 1998. Compared to March 2002, the risk premia have, however, decreased again noticeably.

The implied volatility, calculated by means of an option pricing model using index options, reflects investors' current expectations about the future movement of the stock market index. Since derivative financial instruments represent forward-looking contracts, market participants have to anticipate the variances for the period until the instruments expire. Changes in the implied volatility may be interpreted as changes in traders' risk assessment. Chart 2 shows the implied volatilities of the DAX and the S&P 500 together with the indices. Compared to March 2002, dispersion has increased substantially. In Germany, for instance, volatility equaled 20 percentage points in March 2002 and stands at 45 percentage points at the time of writing. This pronounced increase indicates that from the perspective of stock market operators risks have mounted.

In sum, risk assessment has been diverging on credit markets and equity markets over the past 12 months. This development may also be due to the different risk profiles. The global drive of companies to strengthen their balance sheets has reduced the default risk faced by bond holders, while equity prices have benefited to a lesser degree from this process of deleveraging.

Chart 1

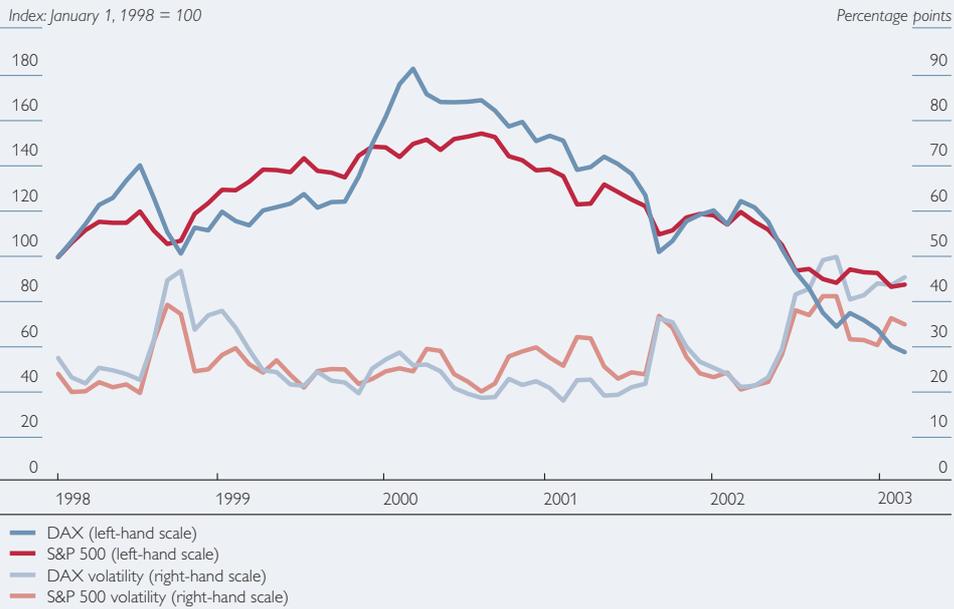
Interest Rate Spreads of BBB over AAA Corporate Bonds



Source: Datastream, OeNB

Chart 2

Stock Market Indices and Volatility



Source: Datastream, OeNB.

Central and Eastern Europe Spreads of Euro-Denominated Bonds Have Been on the Decline Since Fall 2002

The Brazilian financial crisis of mid-2002 caused the spreads of euro-denominated government bonds to rise against benchmark bonds with the same maturities (basically, German Bunds) in most transition and emerging market countries, with Hungary as a notable exception. Once the Brazilian financial market had calmed down in the fourth quarter, spreads narrowed again. In the case of Russia, falling oil prices reinforced the contraction of spreads; in the case of the acceding countries, progress with EU accession and higher ratings in its wake supported the (further) narrowing of spreads. In this process, Slovak spreads even declined to the Hungarian level, a development reflecting, among other things, the EU- and reform-oriented election outcome.

Risks to the further narrowing of spreads of euro-denominated government bonds issued in Central and Eastern European countries (CEECs) include the general international eco-

nomical environment, possible contagion caused by emerging markets crises, an unanticipatedly sharp drop in petroleum prices in the Russian case and unexpected delays in EU accession if referendums are not held in due time in the EU accession countries. The probability of a correction is somewhat larger for Slovakia, where spreads are already quite narrow.

Economic Growth, the External Economic Environment and Exchange Rate Developments

With real output growing by 0.8% in the euro area in 2002, real GDP growth was some 1.2 percentage points higher in the Central European accession countries, and even about 3.5 percentage points higher in Croatia and Russia. As a rule, growth in the CEECs is directly influenced to a great degree by EU demand and only to a minor degree by demand by other CEECs. Despite the large role EU demand plays in the region, the individual countries have displayed divergent GDP growth rates in 2001 and 2002, which is a result of pronounced differences in domestic demand. These dif-

Chart 3a

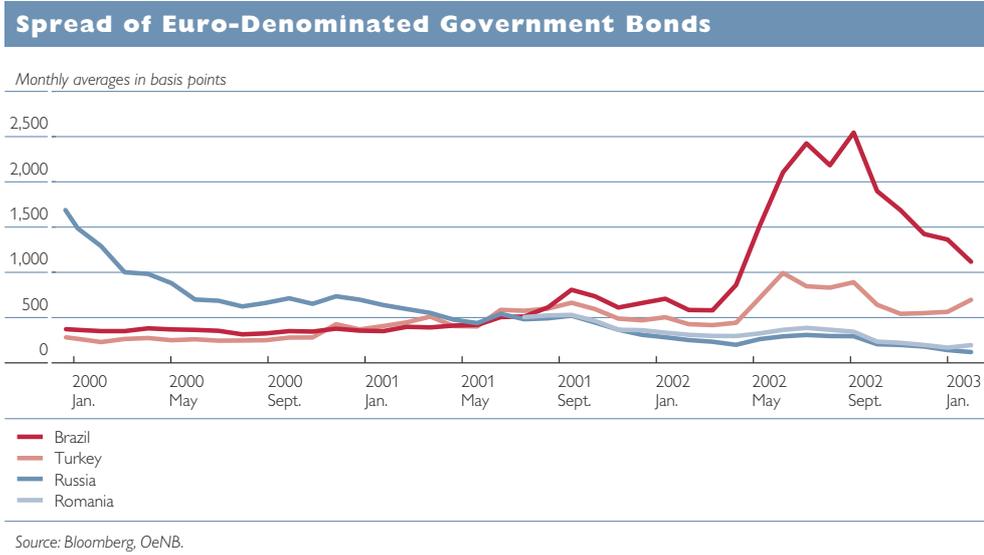
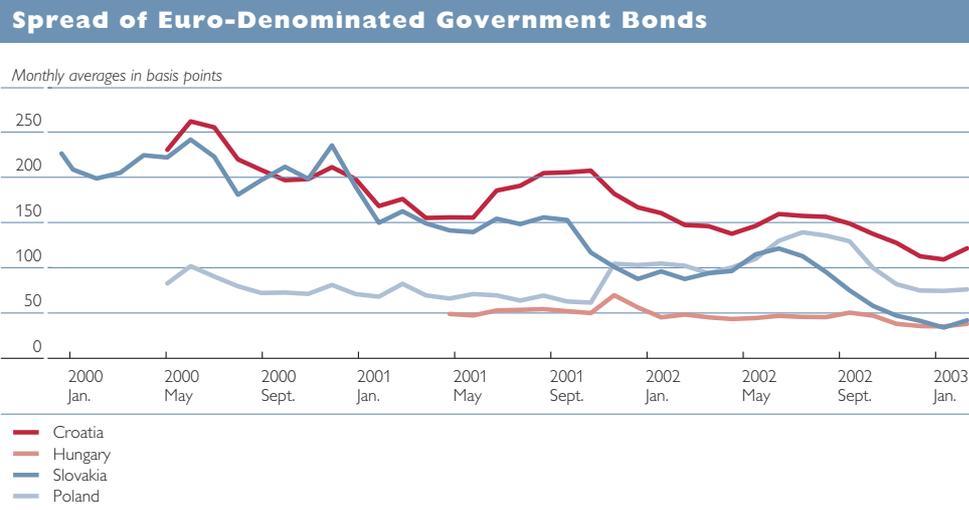


Chart 3b



ferences started to shrink in 2002, however. Above all, fairly animated consumer demand, and in particular in Hungary, Slovenia and Croatia demand for capital goods, stopped growth from decelerating as much as in the euro area and in fact gave an impetus to growth in Slovakia, Croatia and – to a smaller degree and starting from a lower level – Poland.

But the combination of a powerful or relatively robust rise in domestic demand and a less pronounced increase in external demand triggered a rise in the current account deficit in Hungary (from 3.4% of GDP in 2001 to 4.0% of GDP in 2002) and above all in Croatia (from 3.2% of GDP in 2001 to 6.8% of GDP in 2002), whereas the current account shortfall was decreased in the Czech Republic (from 5.8% of GDP in 2001 to 5.4% of GDP in 2002). The Slovak current account deficit also recovered somewhat (from 8.6% of GDP in 2001 to 8.2% of GDP in 2002), but remained at the top of the list of countries reviewed in this report.

However, net FDI inflows, mostly in the wake of privatization, exceeded

the high current account deficit in Slovakia and in the Czech Republic at 16.9% and 11.9% of GDP, respectively, in 2002. Conversely, lower net FDI inflows in Hungary (down from 4.3% of GDP in 2001 to 0.9% of GDP in 2002) and Croatia (down from 8.0% of GDP in 2001 to 4.4% of GDP in 2002) covered only 25% and 65%, respectively, of the risen current account deficits.

The robust FDI inflows explained the revaluation pressure on the Czech and Slovak koruna in 2002. Decisive action by the Czech central bank and finance ministry (deposits of foreign currency-denominated privatization revenues with the ČNB, interventions, interest rate reductions) taken mid-2002 brought the appreciation to a halt. The Slovak koruna and the Polish zloty even began to depreciate from mid-2002 in parallel to an expansion of eurobond spreads; the depreciation was triggered by uncertainty about emerging markets' performance following the Brazil crisis. Whereas this decrease in the Slovak koruna was fully offset by animated FDI inflows in the second half of 2002, the offset was comparatively

Chart 4a

Exchange Rates in Hungary, in the Czech Republic and in Poland

Monthly averages (Index: first Quarter 1999=100)



Source: Bloomberg, Datastream, JP Morgan, OeNB.

small in the case of the Polish zloty. This indicates that the depreciation of the zloty in mid-2002 may to some extent also be a correction of too strong appreciation in the past and of restrictive monetary conditions during a period of weak real economic growth. After the speculation that the Hungarian forint would appreciate – though such conjectures were not based on fundamentals justified by trade developments – did not materialize at the end of 2002 and the beginning of 2003, the forint became one of the currencies to depreciate mar-

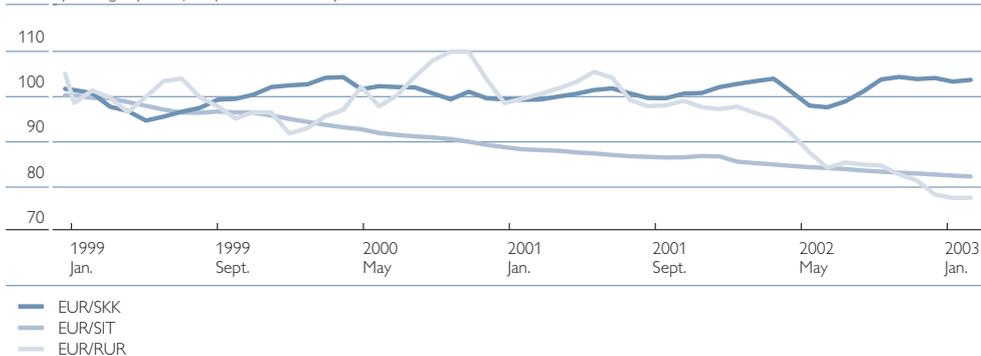
ginally. It was joined by the zloty, where the correction trend continued with the market exercising downward pressure on the currency.

The appreciation of the Czech koruna came to an end, the revaluation of the Hungarian forint was prevented, and the Polish zloty was corrected downward: these developments reduced the risk of a major devaluation of these currencies in the near future. The outlook for the Slovak koruna, which was stable most recently, and the Croatian kuna, which has been stable against the euro for years, depends

Chart 4b

Exchange Rates in Slovakia, in Slovenia and in Russia

Monthly averages (Index: first quarter 1999=100)



Source: Bloomberg, Datastream, JP Morgan, OeNB.

on whether the two countries can rein in their current account deficits (in Croatia, the figure was on the rise most recently). In addition, the extent of privatization proceeds and the approach to using them will be decisive parameters that determine the development of the currency.

The Slovene tolar again depreciated in nominal terms in 2002 within the managed float framework, which largely offset the inflation differential to the euro area and thus safeguarded competitiveness. The pronounced depreciation of the Russian ruble against the euro reflects mainly the slippage of the U.S. dollar's value against the euro and to a lesser extent the devaluation of the ruble against the U.S. dollar within the managed float regime.

Local Currency Bonds Issued by Poland, the Czech Republic and Hungary

In Poland, the Czech Republic and Hungary, the yield curve shifted farther down from September 2002 to March 2003. As between September 2001 and 2002, the shift was a parallel one in the Czech Republic, whereas in Poland and Hungary the short end dropped significantly more than the long end of the yield curve did, reflecting the cut in key interest rates.

The extent of the shift was much smaller in Poland and the Czech Republic from September 2002 to March 2003 than from September 2001 to September 2002; the opposite was true in Hungary. This development is all the more remarkable because Hungary experienced no further disinflation in the past six months. Although inflation declined by some 4 percentage points from September 2001 to September 2002, the nominal long-term yield barely changed in this period. As a conse-

quence, the real long-term yield (in terms of current inflation) rose markedly in Hungary, though in September 2002 it still stood below the respective Polish and Czech yields. Not until investors began to reckon with a revaluation the forint, triggering capital inflows at the end of 2002 and at the beginning of 2003, and not until interest rates were slashed as anticipated to prevent speculative inflows did long-term yields begin to ease perceptibly. Unlike in Hungary, nominal long-term yields in the Czech Republic and Poland fell continuously and on the whole substantially from September 2001 to March 2003. At first, yields on Czech koruna-denominated bonds decreased in parallel with disinflation, but from the beginning of 2002 (when inflation sank below the 4% mark), yields declined more slowly than the pace at which inflation decelerated, so that real long-term yields started to edge up again, though less than in Hungary. Overall, disinflation reduced the rate of price increase in the Czech Republic by roughly 5 percentage points. All in all, the yields of Polish zloty-denominated bonds diminished by roughly 2.5 percentage points more than inflation, which fell by 4 percentage points, with real long-term yields temporarily augmenting somewhat in the first half of 2002.

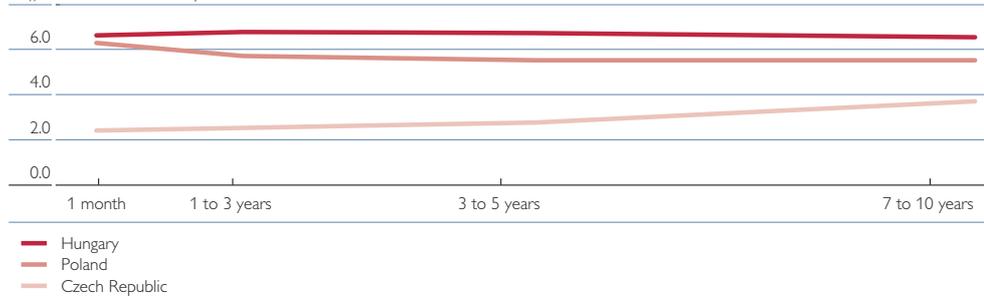
In March 2003 the real long-term yield was still highest in Poland (in terms of the rate of inflation), followed by that in the Czech Republic, whereas nominal yields were highest in Hungary. The interest curve was still slightly inverted at the short end in Poland, whereas it was already flat in Hungary and on the rise in the Czech Republic.

The narrowing of the spreads of local currency-denominated long-term

Chart 5

The Yield Curve in the Czech Republic, in Hungary and in Poland in March 2003 (Monthly Averages)

Effective interest rate in % p. a.



Source: Bloomberg, OeNB.

government bonds against German government bonds from September 2002 to March 2003 is a consequence first of all of the decline in sovereign risk premia, which euro-denominated government bonds also reflected. Second, this shrinkage of spreads also mirrors the drop in nominal yields fueled by disinflation (e.g. in the Czech Republic and Poland). Third, this development also signals expectations

about the further course of exchange rates (e.g. in Hungary). Above all the correction of the Polish zloty and the end of the uptrend of the Czech koruna in mid-2002 mitigated the risk of any impending depreciation and even imply a risen appreciation potential for the future. The fact that Czech bonds posted a negative spread to German government bonds indicates that the market expects a apprecia-

Chart 6

Spreads of Local Currency-Denominated Long-Term Government Bonds to German Bunds

Monthly averages in percentage points



Source: Bloomberg, OeNB.

Table 1

Nominal Return on Equity							
	1999	2000	2001	2001 June	Sept.	2002 June	Sept.
	%						
Croatia	4.8	10.7	6.6	15.9	..	20.4	18.6
Poland	12.9	14.5	12.8	15.3	13.9	9.0	8.4
Slovak Republic	- 36.5	25.2	22.7	..	..	..	..
Slovenia	7.8	11.3	4.8	12.5	..	18.4	..
Czech Republic	- 4.3	13.1	14.4	15.1	..	25.4	27.6
Hungary	4.0	12.5	16.2	20.8	..	17.3	..

Real Return on Equity ¹⁾							
	1999	2000	2001	2001 June	Sept.	2002 June	Sept.
	%						
Croatia	0.7	4.2	1.5	8.9	..	17.3	15.9
Poland	5.2	4.0	6.9	8.0	7.4	6.0	5.9
Slovak Republic	- 42.6	11.7	14.5	..	..	..	..
Slovenia	1.5	2.2	- 3.3	3.1	9.8	..	..
Czech Republic	- 6.3	8.8	9.3	10.1	..	21.8	24.9
Hungary	- 5.5	2.5	6.4	9.4	..	10.8	..

Source: National central banks, OeNB.

¹⁾ Nominal yield adjusted for consumer price inflation (period average).

tion. The narrowing of spreads may also signal that the market is expecting these countries to join the euro area fairly quickly. However, if developments the market is not anticipating occur in the course of EU accession, such as a pronounced deterioration of external imbalances, the market may react with depreciation expectations and spreads may widen.

The Banking Sector in Central Europe¹⁾

Operating Performance and Profit Developments

In the subperiods of 2002 for which data have become available, the banking sector in all Central European countries (CECs, defined here as the acceding CECs plus Croatia) posted a higher nominal as well as real return

on equity (ROE) adjusted for consumer price inflation. Real returns were highest in the Czech Republic and Croatia by an ample margin. However, no ROE data for subperiods of 2002 have become available yet for Slovakia, which posted the highest result in 2001. Compared to the respective subperiods of 2001,²⁾ nominal and real ROE surged in the Czech Republic, Croatia and Slovenia, whereas nominal ROE declined in Hungary and even more in Poland, and real ROE sank in Poland only.

In Poland the real ROE declined despite substantial disinflation. The decline and the very low level are first and foremost a consequence of the real economic weakness of the past few years, which has led to a continuous rise of classified loans (watch loans and nonperforming loans) in to-

1 This chapter reviews the development of the banking industry in Central Europe, whereas the section "Financial Intermediaries in Austria" analyzes the development of all subsidiaries of Austrian banks established in Central Europe.

2 For methodological reasons, a comparison of the subperiod values with annual values does not provide very useful results wherever aggregates are not solely based on stocks.

tal banking liabilities from 13.3% at the end of 1999 to 20.8% at the end of September 2002. As a result, the expenses for loan loss provisions in percent of operating income rose even further from a very high level compared to the same period of 2001. Moreover, the cost/income ratio augmented whereas net interest income (as a percentage of average assets) declined further. Unlike in the preceding years, a lower cost/income ratio no longer sufficed to offset higher loan loss provisions (required *inter alia* to cover the bankruptcy of Szczecin Shipyard), entailing a considerable drop in the nominal ROE.

In the Czech Republic net interest income (as a percentage of average assets) went up in the first half of 2002 compared to the first half of 2001. Mirroring this increase – and most likely also the decline in expenses and the rise in noninterest income – the cost/income ratio improved dramatically. The share of classified loans in total bank lending came to 21.5% at the end of 2001. Considering that the share of the lowest category of nonperforming loans, i.e. loss loans, in total loans declined further from 13.7% at the end of 2001 to 10.6% at the end of June 2002, higher loan loss provisions are not likely to have reduced income very much. This reflects stronger domestic demand. By contrast, the decline in GDP growth mirroring the international cyclical weakness did not have any repercussions, at least not yet.

In the Slovak Republic, banks again canceled loan loss provisions in the first three quarters of 2002, raising income, though not to the record extent of 2001, when recapitalization and privatization powered the release of provisions. The share of classified loans in total bank lending kept dimin-

ishing, sinking from 15.9% at the end of 2001 to 11.5% at the end of September 2002. At the same time, higher net interest income and an improved cost/income ratio point toward a respectable ROE result, though perhaps a somewhat lower one than in 2001 as a whole.

In Slovenia, the cost/income ratio also shrank significantly despite the worsening of net interest income (as a percentage of average assets). The boost in income in the first six months of 2002 is likely to stem from the cut in operating costs and lower loan loss provisions. Changes in accounting rules may have had an impact as well. The very low value for the entire year 2001 may be pinpointed above all to the losses of a single bank disclosed in the second half of the year.

In Croatia the increase in the banking sector's income was contingent on the fact that unlike in the first half of 2001, no additional net risk provisions had to be made in the first half of 2002. Moreover, pronounced disinflation lifted the real ROE.

In Hungary, net interest income climbed, reinforcing the slight decrease in the cost/income ratio. Among the countries under review, Hungary posted the stablest income developments of its banking sector. The net changes in loan loss provisions were marginally positive most recently. The share of classified loans in total lending dropped from 12.7% at the end of 2001 to 11.6% at the end of June 2002.

Capital Adequacy

The ratio of equity to risk-weighted assets was in the double digits in all reviewed countries at the end of June or September 2002, ranging from 11.4% for Slovenia to 22.3% for Slovakia. Against the end of 2001, this ag-

Table 2

Net Interest Income							
	1999	2000	2001	2001 ¹⁾		2002 ¹⁾	
				June	Sept.	June	Sept.
	% of annual average bank assets						
Croatia	..	4.2	3.6	..	..	1.6	..
Poland	4.0	4.0	3.5	3.4	3.3	3.1	3.2
Slovak Republic	..	1.9	2.3	1.1	1.7	1.3	1.9
Slovenia	3.7	4.2	3.3	1.9	..	1.7	..
Czech Republic	2.4	2.3	2.4	2.0	..	2.3	2.2
Hungary ²⁾	3.7	3.8	4.0	3.8	..	4.0	..

Current Operating Costs							
	1999	2000	2001	2001		2002	
				June	Sept.	June	Sept.
	% of current operating revenues						
Croatia	..	..	65.6	58.9	..	59.1	..
Poland	65.2	63.2	62.2	61.4	58.7	60.7	60.5
Slovak Republic	78.6	67.7	65.7	64.2	63.7	58.8	59.5
Slovenia	61.5	55.3	61.0	59.8	..	56.3	..
Czech Republic	48.7	54.1	53.6	59.2	..	49.1	49.4
Hungary	..	65.0	63.4	63.0	..	62.6	..

Net Changes in Loan Loss Provisions							
	1999	2000	2001	2001		2002	
				June	Sept.	June	Sept.
	% of current operating revenues						
Croatia	..	..	13.7	6.1	..	- 0.4	..
Poland	14.3	16.3	17.6	14.2	16.2	19.2	21.4
Slovak Republic	103.3	- 17.1	- 33.4	- 46.1	- 30.4	- 6.4	- 9.8
Slovenia	21.8	23.9	29.0	15.1	..	12.2	..
Czech Republic	0.1	- 48.4	5.2	..	..	..	..
Hungary	15.2	- 0.9	4.2	..	..	- 2.1	..

Source: National central banks, OeNB.

¹⁾ Subperiod data are not comparable with annual data or across countries.

²⁾ Interest income in percent of interest-bearing assets minus expenditure in percent of interest-bearing liabilities.

gregate rose only in Slovakia, whereas it fell by roughly 1 percentage point each in Poland, Hungary and Croatia. The high capital adequacy score for Slovakia is chiefly the outcome of the

recapitalization measures taken in recent years. However, only further advances in 2002 could also signal too high a degree of credit restraint on the part of the banking sector.

Table 3

Capital Adequacy							
	1999	2000	2001	2001		2002	
				June	Sept.	June	Sept.
	%						
Croatia	20.6	21.3	18.5	18.8	..	17.5	17.3
Poland	13.2	12.9	15.1	14.4	..	13.7	14.0
Slovak Republic	5.3	12.5	19.8	..	..	21.0	22.3
Slovenia	14.0	13.5	11.9	13.5	..	11.4	..
Czech Republic	13.6	14.9	15.4	..	..	15.4	15.3
Hungary	15.0	15.2	13.9	15.1	..	12.5	..

Source: National central banks, OeNB.

This analysis of the conditions and risks for the stability of Austrian financial intermediaries reflects the difficult economic environment. The sluggish pace of the economy in 2002 contributed to a substantial drop in corporate loan demand, while continued stock market weaknesses affected the profitability of both Austrian banks and insurance companies – albeit to a smaller extent than in other countries. Banks' staff costs and administrative expenses advanced moderately, thus preventing cost/income ratios from deteriorating further in the wake of declining operating income. The relatively high costs of customer services, which can in part be explained by the still rather high number of banking offices per inhabitant (at end-2002, 897 Austrian banks operated 4,471 branch offices) leads us to expect further cost-cutting measures and mergers, in particular of small banks.

Austrian banks fare comparatively better than large German banks, which have to face considerable declines in operating profits and a substantial need for loan loss provisioning for current lending. Also in 2002, the successful performance of large Austrian banks' subsidiaries in the CEECs helped improve their parent companies' profitability, contributing 30% to 60% to consolidated group operating profits. Obviously, banks' profitability increasingly depends on the contributions from their subsidiaries in the CEECs.

Austrian banks mastered the difficult conditions prevailing in 2002, with capital ratios remaining largely unchanged at a satisfactory average of over 13%. External rating agencies

still rate the situation of the reporting Austrian banks as robust; only one bank was downgraded in 2002. The assessed risk categories do not indicate any immediate danger to the systemic stability of the Austrian banking sector, either. Market risks remained relatively unchanged, and banks did not increase their interest rate and stock market exposure. As Austrian banks hold only few stocks, the weak stock market developments hardly had an impact on their asset situation. The high volumes of foreign currency loans have a certain risk potential, however, as their regional concentration is high in particular in western Austria.

Banks

Business Activity and Profitability

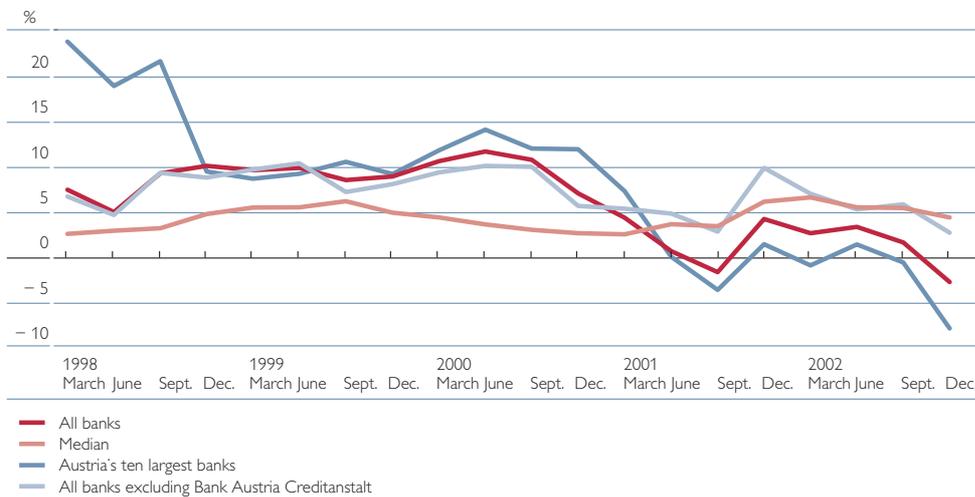
Total Asset Growth Declining

In 2002, the unconsolidated total assets of Austrian banks recorded a negative growth rate of 2.5% year on year (see chart 7). Among other factors, this development was ascribable to business policy decisions as well as changes and reorganization measures following the merger of Bank Austria and Creditanstalt in August 2002. The total assets of Austrian banks excluding Bank Austria Creditanstalt AG (BA-CA) went up by almost 3% – still a slight decline against previous years, however. This trend is traceable to the difficult economic situation and the ensuing drop in banks' business volume.

The impact of the BA-CA merger also shows in the changes in the total assets of Austria's top ten banks,¹⁾ which went down by 7.5% year on year, thus accounting for 52.8% of

¹ This calculation is based on the ten largest banks in terms of total assets at end-2002. As a consequence of the merger of Bank Austria and Creditanstalt in August 2002, an additional bank has been included in this group as of end-2002.

Chart 7

Austrian Banks' Total Assets Growth

Source: OeNB.

the total assets of all Austrian banks (end-2001: 55.7%). The median¹) of the total asset growth recorded by all Austrian banks trended downward as well, falling slightly to 4.6% at end-2002 compared to 6.4% in the previous year.

Further Growth in Derivatives Trading

In the fourth quarter of 2002, derivatives trading picked up 25%, reaching a volume of EUR 1,388 billion year on year and thus growing significantly faster than total assets. Thus, the volume of derivatives trading recorded by all Austrian banks was 2.4 times higher than banks' total assets at end-2002 (end-2001: 1.9 times higher). As in previous periods, interest rate contracts held the lion's share in derivatives traded (82.4%), with savings banks – among them BA-CA – accounting for 78.2% of all interest rate derivatives transactions. As in

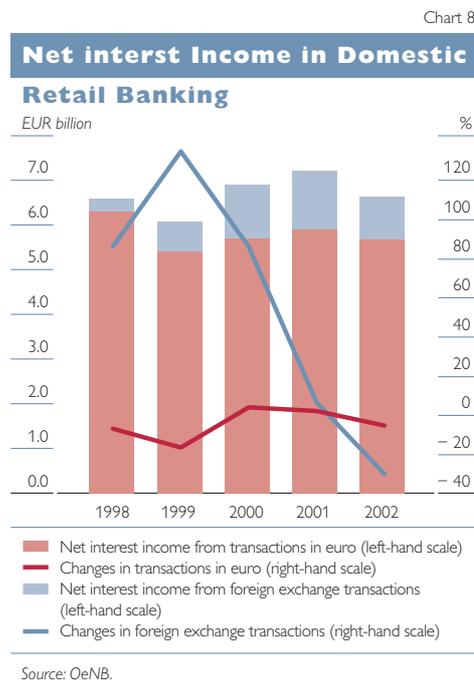
other countries, derivatives trading in Austria is mostly concentrated among the largest banks.

In the monthly return, Austrian banks report derivatives business data as nominal amounts, which is why these data cannot be used directly to assess the riskiness of the derivatives business. However, since the interest rate risk apparently did not increase for Austrian banks (see chapter “Market Risk of Austrian Banks”), one may assume rising volumes to be attributable almost equally to taking on risk positions and performing hedging transactions.

Profitability of Austrian Banks Weakens Compared to 2001

As in many other EU countries, the difficult economic environment in 2002, in particular sluggish growth and the turmoil on financial markets also affected Austrian banks, causing

¹ The median is the middle value in a set of data arranged in order of decreasing or increasing magnitude, with half the scores being above, the other half below the median. In contrast to the arithmetic mean, the median has the advantage of being stable against outliers. Special-purpose banks are not included in the calculation of the median.



operating profits to go down. Given the limited role of the mutual fund business and the substantial contribution of Austrian banks' subsidiaries in the CEECs to operating profits, banks' performance is weak, but does not give cause for concern.

Austrian banks' provisional 2002 operating result on an unconsolidated basis¹) decreased by 7.9% from EUR 4.6 billion to EUR 4.2 billion year on year. Whereas this period saw a decline in operating income by 2.4%, operating expenses remained almost unchanged.

Net interest income, which runs to some 52% of total operating income, remained largely unchanged as well (2001: EUR 7.09 billion; 2002: EUR 7.08 billion). A detailed analysis of the 2002 net interest income in domestic retail banking (see chart 8) reveals a year-on-year decline by 7.9% to EUR 6.6 billion, with the

contribution of foreign exchange transactions to net interest income plummeting by 27.2%, i.e. at a clearly faster pace than that of transactions in euro, which went down by a mere 3.7%. In domestic retail banking, transactions in euro contributed close to EUR 5.6 billion, or 79.6%, to net interest income. Interest margins dropped by 6 basis points from 2.93% in 2001 to 2.87% in 2002.

Accounting for 22% of total operating income, fee-based income is the second most important source of income after interest income. In 2002, this item contracted only slightly, by 1.6% or EUR 3.01 billion (after EUR 3.06 billion in 2001) – the smallest decline since the second quarter of 2001. A breakdown of fee income shows that income from lending operations surged by 28.9%, while income from payment services picked up slightly by 4.6%. The continued weakness of stock markets triggered a decline in the net income from securities transactions by 10.0%. Furthermore, the elimination of currency exchange fees in the wake of the introduction of the euro considerably reduced income from trading in foreign exchange, currency and precious metals by 17.8%.

The drop in operating income is largely attributable to the 9.8% decline in other operating income (mostly from noncore activities and nonbank activities) and to income from securities and equity interests, which account for a considerable share of 13% in operating income. As a result of the difficult stock market situation, income from securities and equity interests shrank by 9.6% to EUR 1.8 billion year on year, which

¹ The quarterly report (data of December 2002) records the income statement data of banks operating in Austria on an unconsolidated basis. Revenues and expenses of foreign subsidiaries, in particular, are thus not included.

in turn was largely ascribable to a reduction in income from stock transactions and – given current integration measures – from equity shares in affiliated enterprises.

Out of total operating expenses, which in 2002 posted the lowest growth in five years, staff costs rose moderately by 2.1% – an increase which basically no more than reflects the annual valorization of salaries and wages. Other administrative expenses even decreased by 0.4%, after having climbed continuously in recent years in the wake of Y2K-related computer projects, the introduction of the euro and the expansion of electronic banking. The low rise in operating expenses also indicates that cost-cutting measures initiated to improve banks' profitability are beginning to show first results. The clear rise in the depreciation of tangible fixed assets and intangible assets by 8.8% reflects the vivid investment activities of recent years.

As profitability went down, the cost/income ratio deteriorated to 69.3% in 2002, compared to 66.6% in 2000 and 67.4% in 2001. Compared to other EU Member States, the cost/income ratio of Austrian banks is relatively high. The mean cost/income ratio of the ten largest banks (taking into account the BA-CA merger in mid-2002) jumped from 65.1% in 2001 to 70.8% in 2002, which is also attributable to the 9.9% slump in income, given that

expenses went down by 2.1%. 10% of Austrian banks report a cost/income ratio of 82.4% or worse (90% quantile).

Banks operating in Austria expect to close the 2002 business year with an operating result (before taxes) of EUR 4.2 billion, a year-on-year decline of 7.8%. At EUR 2.0 billion, loan loss provisions are expected to be almost 8% lower than the exceptionally high figure recorded in 2001. Since transfers to provisions for securities and participations are higher than transfers from these items, their balance will have to be factored into expenses also in 2002. In previous years, by contrast, this – at times considerable – balance had always been factored into revenues. For 2002, a strong downtrend is expected in particular for income from the realized sale of securities and equity interests.

For a comprehensive assessment of bank profitability in Austria, the unconsolidated results based on banks' quarterly reports have been refined with the consolidated results based on their reports of condition and income. Taking account of the consolidated financial statements of the various banking groups prepared in compliance with the Austrian Commercial Code or using the IAS format ensures that the results adequately reflect the income earned and expenses incurred by each banking group as a whole (including subsidiaries abroad).

Table 4

Cost/Income Ratio					
	1998	1999	2000	2001	2002
	%				
Mean of the ten largest banks	64.6	71.1	66.9	65.1	70.8
50% quantile (median)	70.6	70.2	64.8	67.7	68.3
10% quantile	58.1	57.4	52.1	54.9	54.4
90% quantile	84.7	83.1	77.8	81.4	82.4

Source: OeNB.

On the whole, the consolidated profitability data broadly match the unconsolidated results. At year-end 2002, both the consolidated and the unconsolidated operating income in percent of total assets were below the comparable results of the previous years. Interest income remained fairly stable, as in recent quarters, whereas noninterest income fell markedly short of the 2001 result, reflecting the difficult situation in the securities markets. As a result, operating income in percent of total assets declined. While costs in percent of total assets did not deteriorate, the poorer operating income result caused the cost/income ratio to worsen to a similar extent from a consolidated and from an unconsolidated perspective.

Risk provisions tended to remain slightly below the record highs of 2002, also from a consolidated perspective. That the relative credit risk costs were lower at the end of 2002 than at year-end 2001 above all reflects the release of a high percentage of loan loss provisions. The fact that the profit for the year fell visibly short of the 2002 result, both from a consolidated and an unconsolidated perspective, can be attributed above all to the lower amount of income derived from the release of provisions for securities and participating interests.

Credit Risk of Austrian Banks

Economic Slowdown Dampens Loan Growth

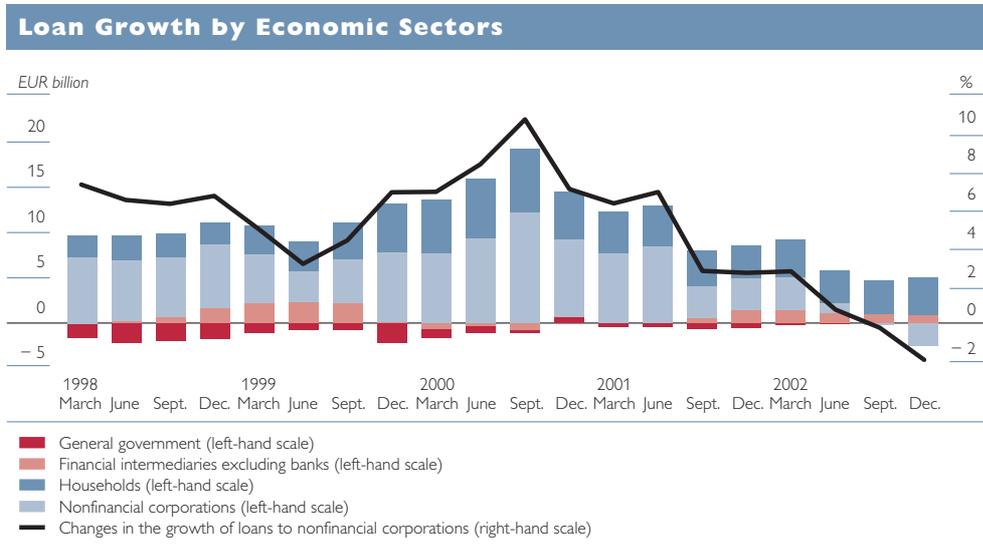
The downturn in both the national and international economy affected Austrian banks' lending activities in 2002, slowing down loan growth in spite of falling interest rates for commercial and personal loans. At the end of the fourth quarter of 2002, loan growth stood at 1.2%, compared to

3.5% in the last quarter of 2001. The ten largest banks recorded a 2.3% decline, following a 3.0% rise in the fourth quarter of 2001. The median of annual growth came to 3.8%, a slight reduction against the 4.5% recorded in the previous period.

For the second half of 2002, a breakdown of banks' lending by economic sectors (see chart 9) shows stable developments in particular in lending to households and financial intermediaries (excluding banks), with both sectors recording relatively constant year-on-year growth rates. In the second half of 2002, by contrast, changes did occur in the government and nonfinancial corporations sector. Lending to the general government went up slightly. Over the previous periods, the general government had cut back its loans from banks, partly by changing its financing strategy (notably by issuing more bonds) and partly owing to the fact that provincial governments substantially reduced their level of indebtedness. At the beginning of the second half of 2002, lending to the general government picked up again for the first time in quite a while, albeit only slightly. This rise, however, rather indicates short-term financing requirements toward the end of 2002 than a trend reversal in general government borrowing.

Moreover, lending to the corporate sector went down considerably and has even posted negative growth rates since the third quarter of 2001. At end-2002, the annualized growth rate stood at -1.8% (see chart 9, right-hand scale). Although this drop is in line with decelerating corporate loan growth in the EU in general, it is a lot more pronounced than the rate observed for the whole euro area (+3.5% according to ECB data).

Chart 9



Source: OeNB.

A similar decline in corporate loan growth in Austria was last recorded in 1992 and 1993, when the economic situation was comparably problematic. Thus, the rough economic conditions are probably one of the chief reasons for Austrian banks to steer a more careful and risk-sensitive course in borrowing. Furthermore, nonfinancial corporations currently seem to postpone their investment plans (and, subsequently, their demand for loans) or to opt for other forms of financing, in particular for debt securities (see above all chapter “The Real

Economy and Financial Markets in Austria”). A long-term analysis reveals that while at present, the slowdown in corporate loans is problematic in terms of growth, it does not entail risks for financial stability.

A breakdown by industrial sectors reveals that loan growth is going down above all in sectors sensitive to cyclical fluctuations. At the end of 2002 for instance, annual loan growth came to -7.9% in the energy sector, -10.2% in the transportation sector, -4.0% in the basic materials sector and -1.5% in construction.¹⁾

Bank Lending Survey for the Euro Area – Results for Austria

As the results of the second round of the new bank lending survey indicate, Austrian banks reacted to the higher risk resulting from the less favorable economic environment by pursuing a more cautious lending policy in the first quarter of 2003. Banks were more hesitant to approve loans or credit lines especially to enterprises than in 2002. At the same time, they tightened their terms and conditions for such loans, first and foremost by widening their margins for riskier loans.

The surveyed banks reported that demand for loans sagged as well, again reflecting above all the weak cyclical conditions. Overall, the recent pronounced slowdown of credit growth thus appears to have been caused by both demand-side and supply-side factors, though whether banks’ tightening of standards is stronger than warranted for cyclical reasons alone cannot be judged yet, as only the data from the first two surveys have become available.

¹ This breakdown of industrial sectors is in line with the ECB’s classification of industrial sectors and may deviate from other types of classification, such as ÖNACE.

Obviously, Austrian banks considered the risk profile of households to have changed less amid the economic slowdown, because they did not tighten their standards and conditions for loans to retail customers as much as for those to the corporate sector. This divergent assessment of corporate and retail customers is further reinforced by the slight rise in household loan demand reflected by the survey results.

Quite basically, lending by banks is a key aggregate in cyclical developments. Hence, the situation on the credit markets is a crucial factor in implementing monetary policy. To enhance the Eurosystem's knowledge of financing conditions for companies and households in the euro area, the Eurosystem (the ECB and the national central banks which have adopted the euro) launched a bank lending survey at the beginning of 2003. This survey requires 86 leading banks from all euro area countries – 5 of which are Austrian banks – to fill out a questionnaire four times a year. The first two surveys on euro area lending were conducted in January 2003 and April 2003 and were able to provide significant insights into the latest euro area lending developments.

In the U.S.A., where the Federal Reserve has been conducting bank lending surveys since 1967, and in Japan, such surveys have proved to be a valuable instrument and contribute importantly to the assessment of current and future lending conditions.

Continued Uptrend for Foreign Currency Loans to Households

While the share of foreign currency loans in total corporate loans outstanding has stabilized at just under 20% since the beginning of 2001, households' foreign currency financing keeps gaining importance. At the end of 2002, foreign currency loans accounted for 65% of the annual growth of household borrowing, with well over half of all loans granted to households in 2002 falling in this category. By the end of 2002, the foreign currency share of total claims on households had thus augmented by almost 2 percentage points to 25% compared to the previous year; Austrian banks' claims on domestic customers totaled EUR 44.5 billion (or 18.7% of total loans), with corporations accounting for almost EUR 25 billion, households for EUR 16.7 billion, and the general government and nonbank financial intermediaries for the remainder. The number of foreign currency loans outstanding doubled since mid-1999, coming to almost 300,000 at end-2002. Whereas financing in Japanese yen had surged in the past few years, borrowers have

started to opt for Swiss franc-denominated loans again since mid-2002. At the end of 2002, 55% or EUR 25.7 billion of total foreign currency loans were denominated in Swiss francs and 37% or EUR 17.4 billion in Japanese yen.

Home and home improvement loans constitute a major part of foreign currency loans to households. At the end of the fourth quarter of 2002, the foreign currency share in the total volume of residential construction loans outstanding came to 17% or EUR 8.2 billion. During this period, foreign currency loans accounted for around three quarters of the annual growth in home loans. Also commercial real estate financing saw a rise in foreign currency loans.

Regional Concentration of Foreign Currency Loan Exposure

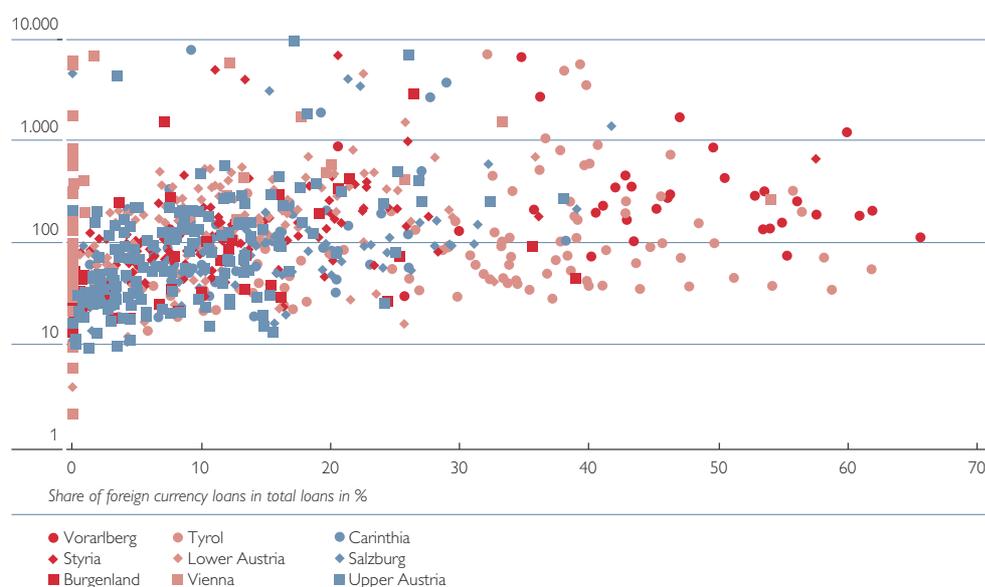
Taking out foreign currency loans entails a number of risks for borrowers, above all, for example, the exchange rate risk, i.e. the risk that interest rate or principal repayments go up as the foreign currency appreciates. Even though a foreign currency loan may provide an interest rate advantage of

Chart 10

Share of Foreign Currency Loans in Total Loans and Total Assets of Austrian Banks – Broken Down by Provinces

Data for the fourth quarter of 2002

Total assets in EUR million (logarithmic scale)



Source: OeNB.

Note: Banks with total assets of over EUR 10 billion are not included in this chart. Foreign currency loans account for between 5% and 20% of the total loan volume of these banks. Branch offices of foreign banks and banks without relevant lending operations were not included in this calculation.

several percentage points, exchange rate fluctuations may render this type of loan much more expensive at the end of the day than a comparable euro-denominated loan. Moreover, foreign currency loans have, in general, variable interest rates and are thus exposed to interest rate and/or spread risks, i.e. the risk that the interest rate goes up in the foreign currency and/or that the interest rate spread against euro rates narrows. In addition, foreign currency loans constructed as repayment vehicles¹⁾ are exposed to the so-called repayment risk. This term comprises the entire range of risks, which are related to the performance of the repayment vehicle and may cause the capital saved up in the repayment vehicle to be

insufficient to redeem the loan. As long as banks observe the principles of matching maturities and currencies in refinancing their foreign currency loans, the above risks are in principle borne by the borrower.

Since borrowers of foreign currency loans incur higher risks, banks' default risk goes up as well. Generally banks hedge against higher default risk by demanding higher collateral. However, we may presume that collateral provided by households, in particular, is of a certain homogeneity. Mostly, household collateral will consist of mortgages on real estate properties which may be located in more or less the same area with respect to individual regional banks.

¹ These are foreign currency loans that are fully repaid at maturity and where the principal is saved up during the time to maturity in the form of a repayment vehicle (e.g. a life insurance policy, mutual fund, etc.).

Chart 11

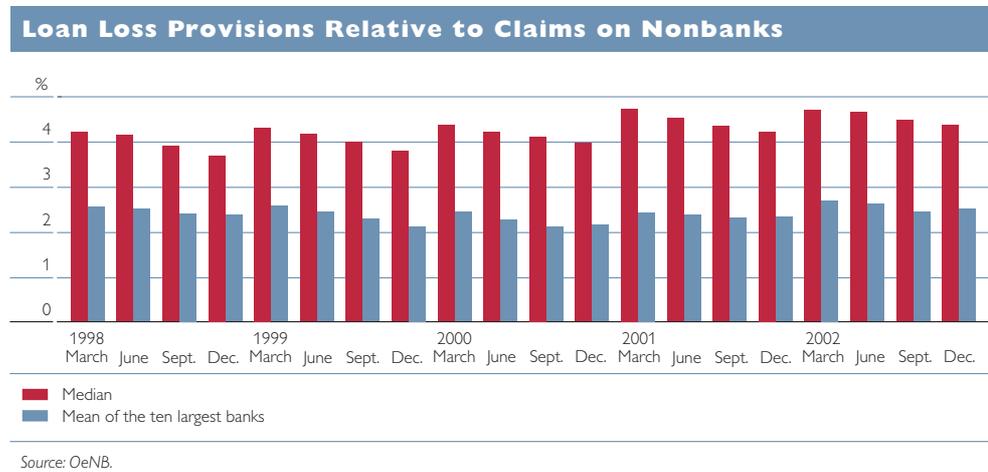


Chart 10 shows the share of Austrian banks' foreign currency loans in total claims on nonbanks. For 106 (or some 13%) of the 800 banks¹) analyzed, foreign currency loans account for over 30% of outstanding claims; for 23 banks (or close to 3%) this share is even higher than 50%. Banks with a very high share of foreign currency loans are almost exclusively small and medium-sized regional banks in western Austria. In individual cases, up to around 50% of total assets are based on foreign currency loans. Should several private borrowers become insolvent because of rising exchange rates, the simultaneous and complete realization of the above-mentioned collateral would considerably dampen the price to be achieved. Banks with a very high percentage of foreign currency loans thus incur a concentration risk which, as soon as collateral is to be realized, might especially endanger the stability of some regional banks in western Austria with a high share of foreign currency lending. From the perspective of financial market stability, the high share of foreign currency loans in Austria therefore harbors a certain risk potential;

the risks involved thus need to be closely monitored.

Loan Loss Provisions Do Not Indicate Any Marked Deterioration of Credit Quality

Given the difficult economic environment and the resulting slight rise in the number of insolvencies, loan loss provisions went up moderately as well (see also chapter "The Real Economy and Financial Markets in Austria"). At end-2002, loan loss provisions relative to claims on nonbanks amounted to 3.3%, after 3.1% in the previous year. A breakdown by sectors reveals that loss provisions relative to claims on nonbanks grew from 3.5% to 3.9% for savings banks and from 4.4% to 4.8% for Volksbank credit cooperatives, while joint stock banks recorded a decline of loan loss provisions relative to claims on nonbanks from 2.9% to 2.7%.

The mean value of loan loss provisions relative to claims on nonbanks of the ten largest banks also went up slightly from 2.3% to 2.5% (see chart 11). As in previous periods, the figure for the ten largest banks was clearly lower than the median, which picked up somewhat from 4.3% to 4.4%.

¹ See note to chart 10.

With respect to the development of loan loss provisions relative to claims on nonbanks over several years, 2002 recorded no substantial changes in credit quality compared to the previous year.

Market Risk of Austrian Banks

Exposure to Interest Rate Risk

Remains Stable

As of December 31, 2002, all Austrian banks have been required to compile and report quarterly interest rate risk statistics.¹⁾ These statistics comprise items sensitive to interest rate fluctuations (such as fixed-income securities and variable rate securities, savings deposits, loans or interest rate derivatives) and serve as a basis for deriving interest rate risk measures. A risk measure used by the Basel Committee on Banking Supervision is the ratio of the decline in a bank's economic value as a result of a potential interest rate shock of 200 basis points in relation to its eligible own funds. A group of 13 banks, accounting for 37% of Austrian banks' total assets at year-end 2002, started compiling and reporting these statistics as of December 31, 2001, without making use of the granted transitional period. Starting from a somewhat higher level, the average ratio reported by these banks dropped to 7.0% by mid-2002 and picked up slightly to 7.8% in the third quarter. At end-2002, it stood at 7.3%, which is clearly below the critical value (20%) specified by the Basel Accord. As of the third quarter of 2002, the group of reporting banks has included

the 32 largest Austrian banks, which together account for as much as 73% of total assets (as at end-2002). The average ratio of these large to medium-sized banks ran to 9.3% in the third quarter of 2002 and to 8.9% at year-end, a rise by some 1.5% against the comparable measure of the first group of reporting banks. In both cases, however, the interest rate risk follows the same trend, showing a slight decline as of late. Chart 12 shows the distribution of ratios for the 32 large to medium-sized banks.

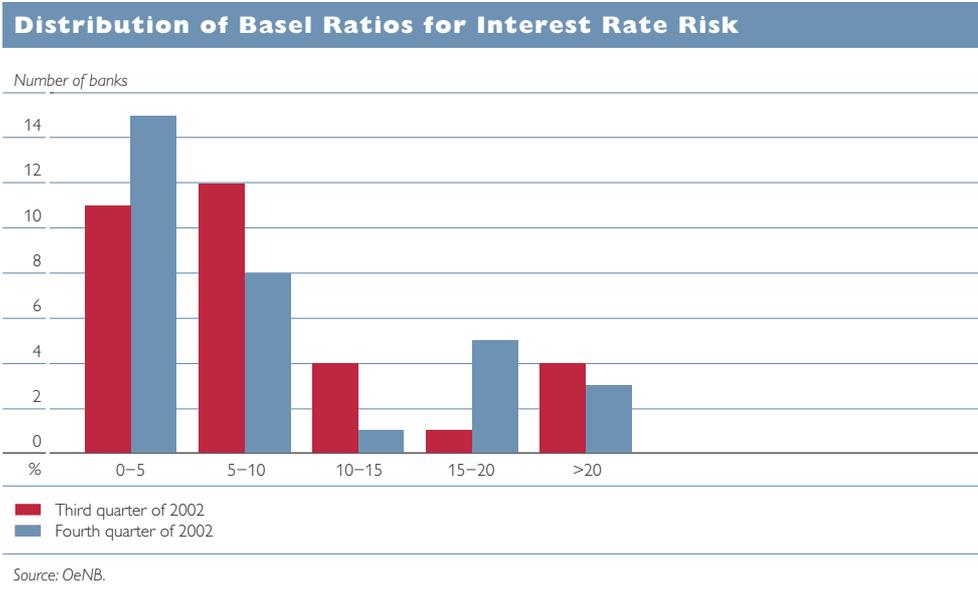
As chart 12 shows, most of the large to medium-sized banks use a rather conservative strategy with regard to the interest rate risk in their banking books. It should be pointed out, however, that there are some banks that would exceed the 20% threshold in case of an interest rate shock of 200 basis points; their number is going down, however.

Banks with large trading book exposures need not include trading book items in their statistics on the interest rate risk. Therefore, the capital required to cover the position risk of interest rate instruments serves as the basis for assessing the interest rate risk of trading book items.²⁾ These data do not indicate any rise in the interest rate risk in the trading book throughout 2002. Since the third quarter of 2001, the respective values have remained almost unchanged at a relatively low level.

From the data reported for the interest rate risk in banking and trading books one can conclude that Austrian banks did not build up any additional interest rate risk in 2002.

¹ Branch offices operating in Austria under freedom of settlement are exempt from these reporting requirements.

² To this end, the results of the standardized calculation of capital requirements are combined with banks' internal value-at-risk data.



Exchange Rate Risk Edging Up

The capital requirements for open foreign exchange positions¹⁾ may serve to assess the risk exposure of Austrian banks to exchange rate fluctuations. These data again combine the results of standardized and value-at-risk calculations. Chart 13 shows how capital requirements for open foreign exchange positions developed. It reveals that Austrian banks' current level of open foreign exchange positions is rather low. Moreover, the chart indicates relatively high fluctuations in the past, which are mostly ascribable to the exposure of individual large banks. After reaching a historic low of EUR 64 million at end-2001, this type of capital requirement has been edging up again, standing at EUR 80 million at end-2002; a stabilization of this value has been observed over the past one and a half years.

It is possible to allocate the exchange rate risk to individual currencies by means of the monthly peaks of the open foreign exchange posi-

tions. The total sum of the absolute amounts of all banks' peak values shows that at end-2002, Austrian banks' highest exposures were vis-à-vis the U.S. dollar (EUR 887 million), the Swiss franc (EUR 800 million) and the Japanese yen (EUR 718 million). Exposures vis-à-vis the Danish krone (EUR 192 million), the Australian dollar (EUR 156 million) and the pound sterling (EUR 143 million) were significantly lower.

The Austrian banking system's exposure to foreign exchange risk can be assessed as relatively stable, showing a slight uptrend as of late. Exposure is strongest vis-à-vis the U.S. dollar, the Japanese yen and the Swiss franc. When taking into account the historical volatilities of exchange rates, the U.S. dollar and the Japanese yen present the highest exchange rate risk.

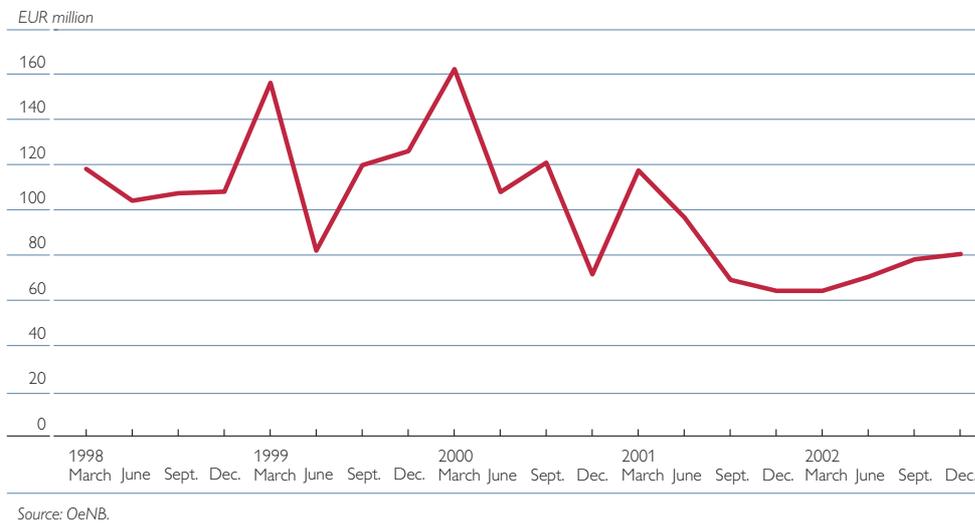
Exposure to Equity Price Risk Remains Low

The percentage of equity shares in Austrian banks' securities portfolios, i.e. in their holdings of debt securities

¹ This type of capital requirement refers to the bank as a whole, i.e. to both the banking and the trading book.

Chart 13

Capital Requirements for Open Foreign Exchange Positions



and other fixed-income securities, mutual fund shares and stocks, remained low. Based on book values, equity shares accounted for 2.5% of banks' securities portfolios at the end of 2002. While in the previous year, this share had come to 2.9%, it declined continuously in the course of 2002. This drop is attributable to stagnating equity portfolio volumes in Austria, accompanied by the continued – albeit less pronounced – growth in the volume of debt securities and other fixed-income securities in the second half of the year. The market values of banks' equity portfolios declined by 3% year on year. As a consequence, the equity shares in the Austrian securities portfolio hardly contain any revaluation reserves: The book-to-market ratio, which had stood at 90% at the end of 1999, climbed to 98% by the end of 2002, thus reaching about the level of 1997.

The share of domestic equity in the equity portfolio remained stable over the last two years, coming to

53% at end-2002. The percentage of listed shares, by contrast, continuously declined over the same time, falling from 77% at the end of 2000 to no more than 56% at the end of 2002, with the share of listed domestic issues clearly exceeding that of foreign issues.

The capital required to cover equity positions in the trading book¹⁾ also illustrates that Austrian banks did not expose themselves to any additional equity risk in 2002. At the end of 2002, the capital required to cover equity price risk in proprietary trading even fell clearly below the long-year average.

It can be concluded that – in the face of the continued uncertainty on the stock markets – Austrian banks' stock market activities were hesitant in 2002. There is no evidence for any significant shift of business toward investment in equities such as to compensate for loss of business in traditional areas.

1 These data combine the results of both internal value-at-risk models and standard calculations.

Risks Incurred Through Business in Central and Eastern European Countries

Several Austrian banks, notably large banks like BA-CA, Erste Bank der oesterreichischen Sparkassen AG and Raiffeisen Zentralbank Österreich AG, have by now gained a strong foothold in a number of Central and Eastern European markets. Following the strategy of “enlarged local community markets,” these banks took up business in various new markets at an early stage, relying on the advantage of geographical vicinity and existing historical ties.

By now, Austrian banks’ subsidiaries in the CEECs have become stabilizing factors in terms of operating profits. This trend prevailed throughout 2002, with CEE subsidiaries attributing over 30% – in one case even over 60% – to group results. The prospering economy in most of the CEECs (see section “Central and Eastern Europe” in chapter “International Environment”) and the intense prepa-

rations for EU accession in the candidate countries provide for a positive economic climate. However, we must take into account that the profitability of Austrian banks’ increasingly depends on markets that have so far proved to be a lot more volatile than the Austrian market. What is more, several CEECs have by now largely completed the catching-up process in the financial services sector, and the pressure on the hitherto excellent profit margins increases in tandem with fiercer competition.

Austrian banks continue their commitment in the privatization of financial services in the CEECs, setting up long-term business relations based on their strong background in retail banking. Examples of this approach are the acquisition, by BA-CA, of Splitska Banka (Croatia) and Commercial Bank Biochim AD (Bulgaria) with their 70 and 160 branch offices, respectively. Adequate risk management will become more and more important as lending to small and

Table 5

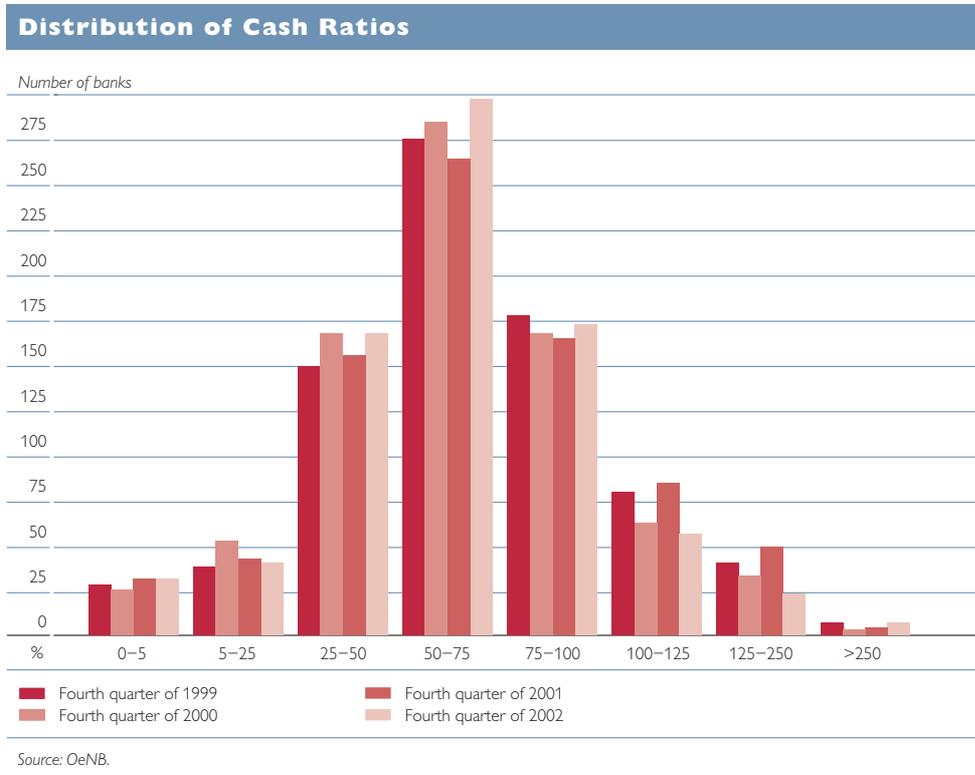
Key Ratios of Central and Eastern European Commercial Banks Majority-Owned by Austrian Banks¹⁾

	Total assets EUR million	Operating profit	Risk costs	Market share %	ROE	Staff Number	Banking offices
Croatia							
December 2001	3.855	90	– 8	18	38	2.108	81
December 2002	8.168	146	– 36	36	26	4.845	256
Slovak Republic							
December 2001	8.507	115	1	40	21	8.851	566
December 2002	10.751	147	– 32	46	16	10.207	583
Slovenia							
December 2001	944	13	– 5	5	3	413	15
December 2002	1.639	20	– 8	..	16	723	33
Czech Republic							
December 2001	21.159	272	– 87	25	11	15.486	756
December 2002	22.715	364	– 21	27	18	15.634	753
Hungary							
December 2001	5.742	98	– 16	15	17	3.455	160
December 2002	7.221	90	– 22	16	13	3.726	179
Total							
December 2001	40.237	588	– 115	x	x	30.313	1.578
December 2002	50.494	767	– 119	x	x	35.135	1.804

Source: OeNB.

¹⁾ National totals (rounded); excluding Poland for data protection reasons; provisional figures for 2002.

Chart 14



medium-sized enterprises and households expands.

In December 2002, the total assets of Austrian banks' subsidiaries in the CEECs ran to EUR 68 billion, corresponding to some 12% of total domestic assets. At almost 16%, subsidiaries' total asset growth against the previous year clearly lagged behind the comparable figure for 2000 and 2001, but still indicates continued acquisition activities in 2002, notably in Croatia (Rijecka Banka, Splitska Banka).

A breakdown of total assets by countries reveals the highest score for Austrian banks' subsidiaries in the Czech Republic (EUR 23 billion), in Poland (EUR 12 billion) and in the Slovak Republic (EUR 11 billion). Total assets in Croatia and Hungary came to EUR 8 billion and EUR 7 billion, respectively, but remained below EUR 1.7 billion in the other

countries under review. By means of their subsidiaries, the large Austrian banks engage in a wide range of activities, including some areas of focus, across a number of countries. This approach reduces their dependence on the business developments and profitability performance in individual countries and lowers the potential impact of regional slumps in profits on their overall profitability. Austrian banks hold a particularly high market share in the Slovak Republic (46%), Croatia (36%), the Czech Republic and in Bosnia and Herzegovina (27% each). Meanwhile, CEE commercial banks owned by Austrian banks operate some 3,000 banking offices with over 57,500 employees.

As at December 2002, banks' profitability also showed an upward trend. Coming to EUR 767 million, banks' total operating results in the countries presented in table 5 clearly

exceed the value recorded in 2001 (EUR 588 million), with risk provisions remaining largely unchanged despite a clear rise in total assets.

Assessment of Other Risks

Legal Minimum Liquidity Requirements

More Than Fulfilled

Liquidity shortfalls that prevent banks from servicing called liabilities pose a high risk of contagion to the entire banking sector. Article 25 of the Austrian Banking Act stipulates that banks must ensure that they are able to meet their payment obligations at all times. As a minimum requirement, banks must retain liquid resources of the first and second degree.

In order to maintain liquidity of the first degree, banks must retain highly liquid assets to the amount of at least 2.5% of their short-term liabilities (cash ratio).¹⁾ Maintaining the liquidity of the second degree requires holding sufficiently liquid assets relative to liabilities with residual or agreed maturities of up to three years (current ratio). The current ratio must at least come to 20%.

At end-2002, all banks met the cash ratio requirements, after two banks had failed to do so in 2001. The cash ratio of 31 banks ran to between 2.5% and 5%. Seven banks even held liquid resources a hundred times in excess of the minimum requirements. The 5% quantile, which indicates the liquidity ratio exceeded by 95% of banks, may serve as a measure for less liquid banks. In the past three years, this quantile remained unchanged at 6%; the median fluctuated just slightly

around 63%. The ratio for the entire Austrian banking industry amounts to 22%.²⁾ The banking sector thus holds sufficient cash liquidity.

The overfulfillment of minimum requirements for the current ratio is not as pronounced as for the cash ratio. At the end of 2002, ten banks posted a ratio of over 200%. At 26%, the 5% quantile remained almost unchanged over the past four years, just like the median value (53%). The ratio for the entire Austrian banking industry amounts to 48%. The banking sector thus holds sufficient assets to meet the current ratio requirements and is very stable in this respect.

Operational Risk from the Perspective of Payment Systems Oversight

As electronic payment systems are becoming increasingly important for the functioning of financial systems – and with a view to the mandate of the European System of Central Banks (ESCB), stipulated in the Treaty, to promote the smooth functioning of payment systems – the Oesterreichische Nationalbank (OeNB) has been entrusted with payment systems oversight as of April 1, 2002. This duty comprises inspecting the systemic stability of payment systems with a view to legal, financial, organizational and technical risks as well as, subsequently, the operational risks linked to the operation and systemically important participation in payment systems.

When dealing with payment systems, operational risk is in general defined as “the risk that operational

1 The central institutions of individual sectors have an additional obligation for covering 50% of deposits that may be used by other banks to meet their cash ratio.

2 Total liquid resources of the first degree of all banks in relation to their total short-term liabilities.

factors, such as technical malfunctions or operational mistakes, cause or exacerbate credit or liquidity risks.”¹⁾

A major system failure thus induced might truly endanger the stability of the financial system. What is more, implementing the monetary policy of the euro system would not, or only within limits, be possible without properly functioning payment systems.

Within the OeNB’s responsibility for payment systems oversight, monitoring operational risk is one aspect of the OeNB’s duties pursuant to Article 44a of the Central Bank Act. The obligatory inspections comprise collecting information, according to the respective guidelines, from system operators and systemically important participants on measures taken to safeguard systemic stability and to ensure safe participation as well as on-site investigations, if necessary. This information is then evaluated according to the defined oversight standards stating the substantive requirements for system security. If necessary, measures are initiated to remedy any deficiencies detected.

Austrian Banks’ Risk-Bearing Capacity Capital Ratio Remains Satisfactory Despite Slight Decline

Given the clouded economic outlook and unsatisfactory price developments at the international stock exchanges, banks’ capital is gaining importance when it comes to absorbing risks.

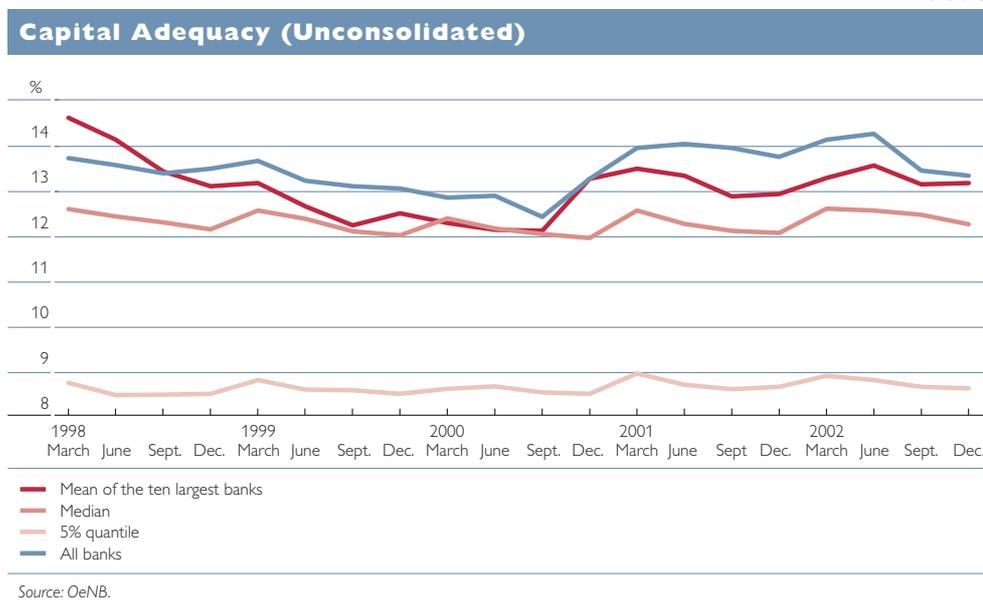
Despite the currently tight economic framework, the eligible capital of banks operating in Austria remains good, even if it edged down 1% in December 2002 year on year. At the end of 2002, the unconsolidated capital ratio²⁾ of all Austrian banks, which serves as an indicator of a significant part of banks’ risk capacity, stood at 13.3%. Although this means a slight reduction against the comparable 2001 figure of 13.7%, this ratio clearly remains above the legal minimum requirement of 8%. We also observed a slight decline in the tier 1 capital ratio, i.e. core capital as a percentage of the assessment base. At the end of 2002, the unconsolidated tier 1 capital ratio reached 9.1%, after having stood at 9.5% in the comparable month of 2001. In absolute terms, core capital (tier 1) came to EUR 26.8 million at end-2002, against EUR 27.4 million at end-2001, while supplementary capital (tier 2) remained unchanged year on year at EUR 13.5 million. Austrian banks thus have a capital buffer at their disposal in case economic conditions and, as a consequence, borrowers’ creditworthiness deteriorate even further.

Trial calculations based on consolidated data result in a clearly lower capital ratio (11.3%) than trial calculations based on unconsolidated data. This value improved slightly compared to the previous year and is thus also clearly above the legal minimum requirement of 8%.

1 *Committee on Payment and Settlement Systems. 2001. Core Principles for Systemically Important Payment Systems. Report of the Task Force on Payment System Principles and Practices. CPSS Publication 43. Basel: Bank for International Settlements. January 2001, p. 5.*

2 *In this context, the capital ratio refers to the capital eligible as credit risk cover under the Austrian Banking Act (tier 1 capital plus tier 2 capital minus deductible items) as a percentage of the assessment base. The capital ratios published in the OeNB’s monthly return and Financial Stability Report 2 (2001) also include tier 3 capital, which results in higher values. As tier 3 capital is subordinated capital that may only be allocated against market risk, it was not included here so as to produce a conservative capital adequacy assessment.*

Chart 15



The capital ratio of the ten largest banks (in terms of total assets) amounts to 13.2%, which is almost 1% higher than the median value of 12.3% (see chart 15), and is thus perfectly in line with past trends. Even banks with a comparatively low capital ratio remained above the minimum requirement of 8%. The value for the 5% quantile, indicating the banks with the lowest capital ratios, came to 8.7% at end-2002.

Banks' current capital ratios appear sufficient to meet future changes in capital requirements in the wake of the New Basel Capital Accord (Basel II). In the third Quantitative Impact Study (QIS 3), which was carried out at the beginning of the year to provide banks around the world with an opportunity to test the impact of the new capital requirements on their

current assets, Austria achieved quite satisfactory results.¹⁾ When applying the standardized approach,²⁾ the figures for capital requirements go up slightly, while internal ratings-based approaches indicated a reduction of capital requirements. Although the results of the QIS 3 test still need to be viewed with caution as discussions on the new capital adequacy framework have not yet been concluded, Basel II in its present form does not create an immediate need for Austrian banks to increase their capital ratios to meet future capital requirements.

Ratings of Large Austrian Banks Essentially Unchanged

Credit quality assessments and ratings are formal methods to evaluate credit risks. Each rating grade corresponds to a statistical probability of default

1 See also the contribution "Basel II, Procyclicality and Credit Growth – First Conclusions from QIS 3" by Redak and Tscherteu in this issue.

2 In principle, banks have two options to assess the creditworthiness of their customers: the standardized approach, where a customer is rated by an external rating agency, or the internal ratings-based (IRB) approach, where banks rate their customers themselves.

Table 6

Ratings of Austrian Banks

	Moody's Investors Service – Deposit Rating				Standard & Poor's – Deposit Rating		
	LT ¹⁾	ST ²⁾	BFSR ³⁾	Outlook financial strength	LT ¹⁾	ST ²⁾	Outlook
Bank Austria Creditanstalt AG	A2	P-1	B–	stable	A	A-2	negative ⁴⁾
Erste Bank der oesterreichischen Sparkassen AG	A1	P-1	C+	stable		A-2	
Raiffeisen Zentralbank Österreich AG	A1	P-1	C+	stable		A-1	–
Oesterreichische Kontrollbank	Aaa	P-1	–		AAA		–
Österreichische Postsparkasse AG	Aa3	P-1	C+				
Raiffeisenlandesbank Oberösterreich reg. GenmbH	A1	P-1	B–				
Landes-Hypothekenbank Oberösterreich AG					AAA	A-1+	negative ⁴⁾
Landes-Hypothekenbank Niederösterreich AG					AA+	A-1+	negative ⁴⁾
Landes-Hypothekenbank Steiermark AG					AA	A-1+	negative ⁴⁾
Landes-Hypothekenbank Tirol AG					AAA	A-1+	negative ⁴⁾
Landes-Hypothekenbank Vorarlberg AG	Aa		C		AAA	A-1+	negative ⁴⁾
Hypo Alpe-Adria-Bank AG	Aa2	P-1	C+	stable			
Österreichische Volksbanken-AG	A2	P-1	C+				
Bank für Arbeit und Wirtschaft AG	Aa3	P-1	C+				
Kommunalkredit Austria AG	Aa3	P-1	C+				
Investkredit Bank AG	A1	P-1	C–				

Source: Moody's Investors Service, Standard & Poor's.

¹⁾ Long-term.

²⁾ Short-term.

³⁾ Bank financial strength rating.

⁴⁾ A negative outlook indicates a potential downgrade within the next two to three years.

with respect to repayment obligations.¹⁾ In addition to the traditional bank deposit ratings for savings, sight and time deposits and for interbank business, Moody's Investment Service provides a Bank Financial Strength Rating (BFSR). This assessment system evaluates banks according to their own financial strength, irrespective of any support by a parent company or third party, e.g. in the form of a deficiency guarantee.

International rating agencies judge the Austrian banking sector to be stable because of its sustained, predict-

able performance and its growing commitment in CEE markets, which continue to show good growth potential.

In Austria, 16 large banks subject themselves to issuer credit ratings assessing their general financial strength and overall ability to meet payment obligations. An important aspect of these ratings is to raise the confidence of investors and customers, as a favorable rating both opens access to large-scale deposits and helps reduce refinancing costs.

With the exception of BA-CA, the issuer credit ratings of Austrian banks

1 Probability tables give the respective default probabilities for each rating, distributed over the years. The probability that an AAA-rated bond is not serviced in one year is 0%; the probability that it is not serviced in 15 years is rated at 1.06%. For a BBB rating, the 15-year probability amounts to 4.2%, for a CCC rating it stands at 42.96% (Source: S&P Corporate Default Study, August 1998).

were not downgraded in 2002. The rating agency Moody's Investors Service, however, downgraded both long-term and subordinated liabilities of BA-CA in July 2002 and then again in January 2003 by one grade each,¹⁾ quoting structural problems of the parent company Bayerische Hypo- und Vereinsbank AG as the reason for this downgrade.

In their current ratings of five regional mortgage banks, Standard & Poor's already take into account the long-discussed phase-out of state guarantees by adding the rating "Outlook negative," which means that the next two to three years may see a downgrade. At the beginning of April 2003, the European Commission and Austria reached an agreement on the existing system of state guarantees for Austrian banks.²⁾ The phase-out schedule provides for a transitional period: New instruments that are covered by state guarantees may only be issued until April 1, 2007, and existing guarantees may remain in place for operations maturing on September 30, 2017, at the latest. This means that the issuer credit ratings of regional mortgage banks are in danger of future downgrades.

Insurance Companies

Weak Business Activity in the Insurance Industry

The continued volatile development in investment markets had a sustained effect on the income of Austrian insurance companies for 2002 in general and in particular on life insurance companies – a fact which will also bear on bonus payments for 2002. In-

surance companies are likely to further cut profit share payments to between 4.25% and 5.5%. Moreover, the volume of life insurance premiums trended downward for the first time in five years, decreasing by around 2%. Surprisingly, the number of equity-linked life insurance policies went up despite unfavorable stock market developments. In the property/casualty insurance segment, premiums augmented by 6% according to the Austrian Association of Insurance Companies. Claims payments, however, went up twice as fast as premium income, which is in part attributable to payments related to the floods of summer 2002. A total of around EUR 368 million in flood damage claims were made on Austrian insurers, EUR 305 million of which were covered by reinsurance plans. Moreover, insurance companies registered a steep increase in claims payments for fire insurance, which came to around EUR 454 million.

In 2002, the number of domestic insurers reporting to the OeNB went down to 62, as 3 institutions were closed. There are three Austrian insurance groups – the current market leaders – that are listed at Wiener Börse AG. At just under EUR 200 million, however, the market value of their trades remained rather low.

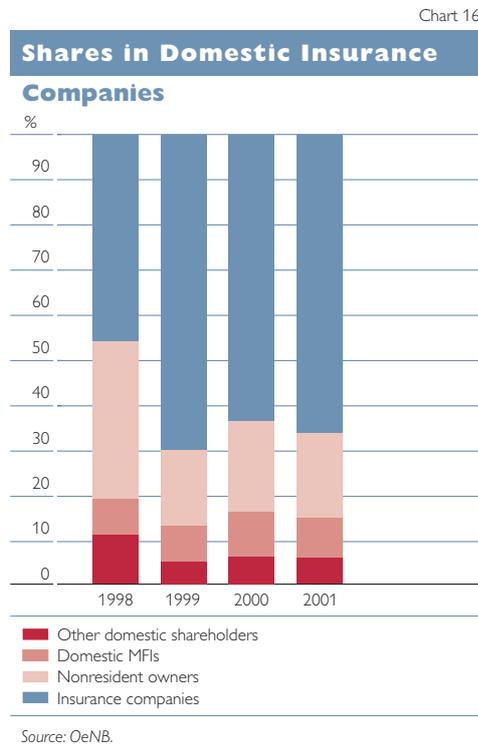
The total assets of the Austrian insurance industry (excluding the reinsurance business) came to EUR 58.3 billion at end-2002, up 5.8% against the previous year. This means that growth continues to slacken – a trend observed since end-1999 – albeit at a slower pace.

- 1 *These ratings fall in the category of "good financial condition and soundness," which means that in case of unfavorable macroeconomic conditions negative effects on the respective enterprise cannot be ruled out.*
- 2 *This agreement affects seven regional mortgage banks, for which the respective regional authorities provide guarantees, and 20 municipal savings banks, for which the respective municipality is liable.*

No Spillover Effect Evident for the Austrian Banking Industry

Austrian insurance companies clearly tended to invest more in domestic assets in 2002. At end-2002, investment in equity securities and other domestic securities recorded the strongest growth since 2000 (+15% year on year); moreover, having expanded to 26% of total investment, this category has become the second most important investment category for insurers. Investment in domestic equity capital went up fastest, at a rate of +29%. This rise, however, is essentially attributable to the conversion of shares into equity capital as well as to additional contributions by shareholders at a couple of insurance companies. Accounting for 27% of total assets, external assets remain the most important investment category, with investment volumes also going up in 2002. As in previous years, lending continued to slow down, mainly because government borrowing subsidised further. Investment in domestic debt securities, which had shown a clearly slackening tendency over the last few years, appears to have stabilized for the time being. With investment coming to EUR 7.7 billion, this category accounts for 13% of total investment assets.

Insurance technical reserves, which reflect insurers' liabilities vis-à-vis their subscribers, account for the lion's share of liabilities. They comprise premium reserves and other technical provisions. The amount of required premium reserves is calculated according to actuary principles; it is the amount the (life) insurer must have at its disposal to be able to fulfill its payment obligations. In the fourth quarter of 2002, insurance technical reserves amounted to EUR 53.5 billion, thus accounting for around 85%



of total liabilities. Life insurance companies hold the largest share (close to 77%) of these reserves, namely EUR 41.3 billion, while property/casualty insurance accounted for 18% and health insurance for 5%.

Despite its poor profitability and the resulting impact in particular on the life insurance segment, the domestic insurance industry does not constitute an immediate risk factor for financial stability. Domestic insurers were able to partly replenish the reserves they had released in 2002 in order to compensate reduced income from financial assets and to meet payment obligations. This was possible due to low interest rate levels and the ensuing profits in the bond segment, which helped compensate the reduction of reserves in equity. In particular insurance companies with a strong real estate backing show high reserve ratios.

There is no evidence that the current weakness of the insurance industry

constitutes any additional burden on the profitability of the Austrian banking sector in particular. On the one hand, the volume of loans granted to insurance companies is low. Although at the beginning of 2002, lending increased compared to previous years, banks' claims on insurance companies and pension funds merely accounted for around 1% of eligible capital in the fourth quarter of 2002. On the other hand, linkages between banks and insurance companies (in the form of financial conglomerates) are relatively rare in Austria. Cross-majority ownership does not exist between domestic banks and insurers and even though there are cases of majority ownership between banks and insurers, no single large bank holds a majority stake in a large insurance company. Chart 16 shows that the majority of stakes in insurance companies are held by other insurance carriers. Since the end of the 1990s, these stakes have obviously gone up at the expense of equity interests held by foreign or other domestic owners. Domestic insurance companies have majorities in investment companies, severance funds, real estate companies or other direct investment enterprises or funding organizations. In December 2002, one of the leading domestic insurance holding companies was the first Austrian insurer to establish a credit institution.

Other Financial Intermediaries

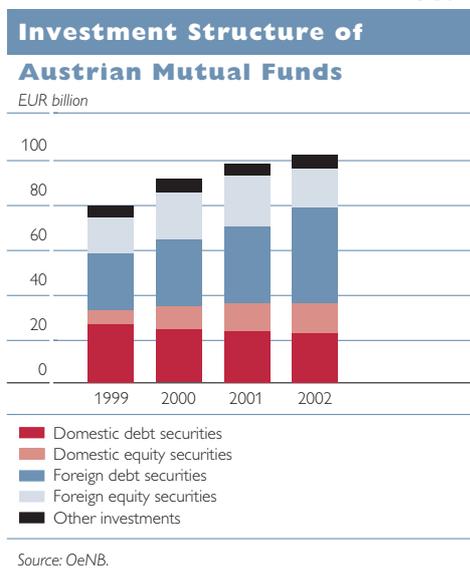
Mutual Funds Boost Low-Risk Investment

Forthcoming changes to the applicable legal framework are going to have consequences for the future business of Austrian mutual funds. By August 2003, two directives¹⁾ will have to be transposed into national law through amendments to the Mutual Funds Act and the Banking Act. Among other things, the directives ensure equivalent market access rules and operating conditions for management companies through the issuance of a "European passport." Taking into account market developments of previous years, they also provide for a wider range of investment options for mutual funds.

Despite uncertainties about economic developments and the continued weakness of the stock markets, private and institutional investors bought mutual fund shares worth EUR 10.6 billion in the course of 2002. This drove up the volume of funds managed by the 22 Austrian investment companies to EUR 102.7 billion at end-2002 – an increase by around 4% (compared to 2001) which largely relied on foreign debt securities (see chart 17).

1 Directive 2001/107/EC 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 a view to regulating management companies and simplified prospectuses, and Directive 2001/108/EC 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 OeNB. 2002. *Financial Stability Report* 3. p. 45.

Chart 17



The continued weakness of capital markets is reflected, however, in the performance of Austrian mutual funds. The major part of equity funds and balanced funds recorded negative performance results in 2002 owing to the decline in stock prices, while as many as 87% of fixed income funds reported positive results. The trend toward low-risk investment continued in 2002. Compared to the previous year, the share of debt securities in the volume of total investment increased further to around 64%, while shares and equity securities went down from a share of 20% at end-2001 to 14% in 2002. Investment in mutual fund shares also declined from previously 18% to around 16%.

Weak Stock Markets Affect the Performance of Pension Funds

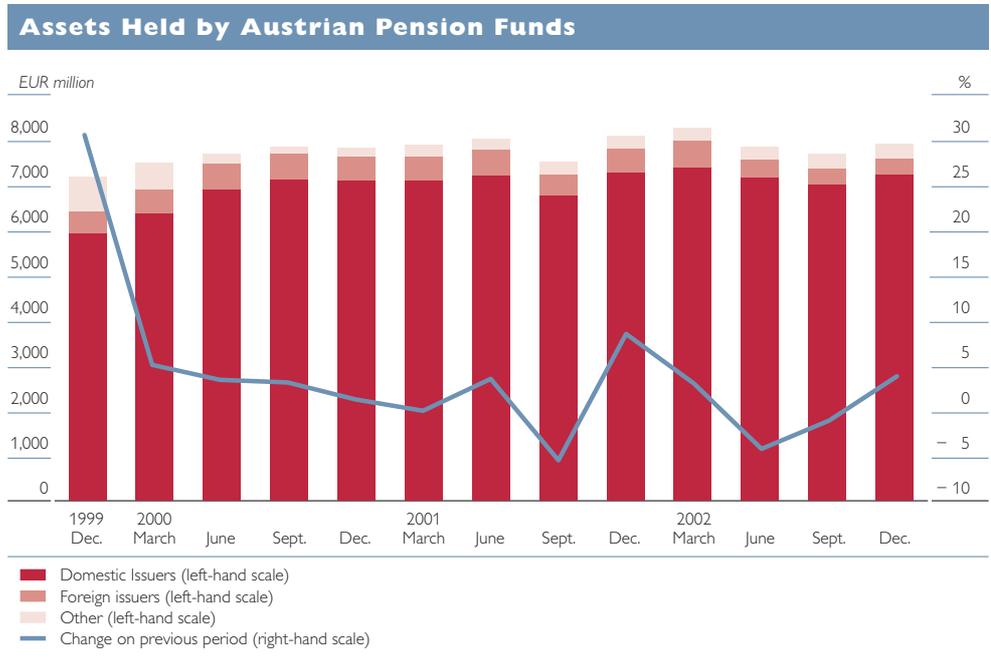
Like other financial intermediaries, Austrian pension funds¹⁾ suffered from the prolonged weakness of the stock markets in 2002. According to preliminary calculations for 2002 by the Oesterreichische Kontrollbank, Austrian pension funds reported a negative investment return of 6.2%. As a result, supplementary contributions were required. These payments remained moderate by international comparison, however, as the majority of Austrian externally managed pension funds rely on defined contribution schemes.²⁾ Those European enterprises, however, which largely rely on defined benefit plans will increasingly be under pressure as weak stock markets will cause solvency ratios to fall below the prescribed level.

Assets held by Austrian pension funds amounted to EUR 7.9 billion at end 2002 (see chart 18). In the last quarter of 2002, investment assets resumed an upward trend for the first time in two quarters, climbing by around 3%. The majority of assets continue to be invested in securities of domestic issuers; accounting for around 91% of total investment assets, mutual fund shares continue to be the most important category.

1 For further information on pension funds, see section "Private Pensions in Austria and Their Role in the Capital Market" in the chapter "The Real Economy and Financial Markets in Austria".

2 These pension schemes rely on predetermined contributions, with the actual amount of retirement benefit payments depending on an annuity paid on the assets accumulated in the pension fund, on the interest accrued and on the actuarial profit/loss. Defined benefit plans by contrast clearly define the amount of future retirement benefit payments, calculating the amount of ongoing contribution payments on the basis of this predetermined amount.

Chart 18



Source: OeNB.

The Real Economy and Financial Markets in Austria

Nonfinancial Corporations Weak Economy Depresses Potential for Self-Financing

In 2002, companies operated in a sluggish economic environment, which had a negative impact on their profitability. The economy grew by just 1.0% in real terms in 2002, only slightly more than in 2001 at 0.7%.

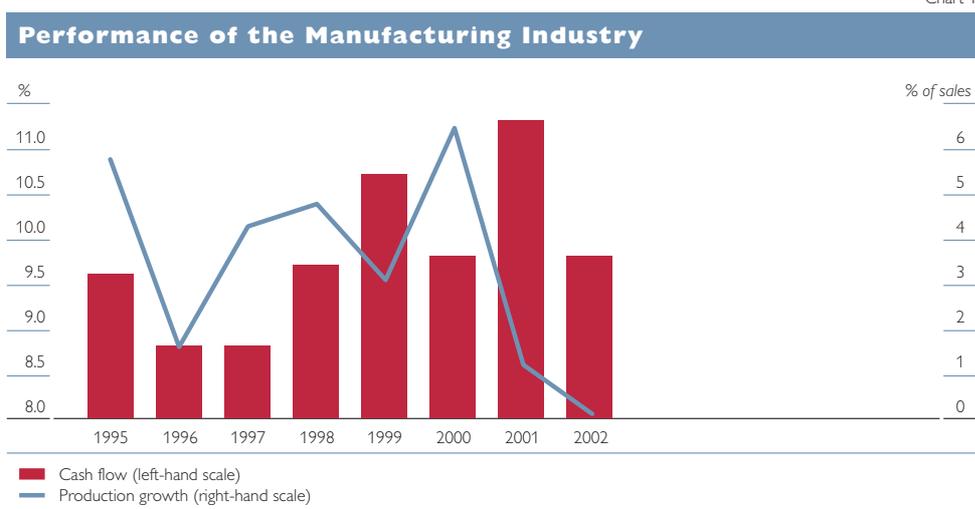
In lockstep with the cyclical slump, key operating expenses also became less of a liquidity burden on enterprises. In addition, the low level of interest rates helped ease the constraints on profitability. Companies were able to refinance liabilities assumed during an earlier period in which interest rates were higher. Also, short-term and adjustable rate loans reduced interest expenditure. The cost of labor also rose only marginally on account of slow economic growth. The real wage increases for payroll employment lagged labor productivity in 2002, which helped profit margins improve.

Currently, energy represents a major uncertainty factor on the cost

side. The appreciation of the euro in the first months of 2003 partly offset the hike in oil prices, but a long-term rise in the price of oil would affect firms' profit outlook and thus their financial position.

As no data for the earnings of the aggregate corporate sector are available, the profit development in the manufacturing sector, which contributes most to value added across the entire economy, will serve as an example. Output merely edged up in 2002, rising 0.1% in real terms. Hence growth fell substantially short of comparable values recorded in the previous years. The cash flow ratio probably also reflects this output development, albeit with a one-year lag (see chart 19). According to estimates by the Austrian Institute of Economic Research (WIFO),¹ manufacturing cash flow amounted to 9.8% of sales in 2002 compared to 11.3% in 2001, a level attained despite the slowdown of the economy.

Chart 19



Source: WIFO.

¹ See Peneder M. and M. Pfaffermayr. 2003. *Mäßige Ertragsentwicklung im Jahr 2002. Cash-Flow und Eigenkapital der österreichischen Sachgütererzeugung*. In: *WIFO-Monatsberichte 3*. Vienna: Austrian Institute of Economic Research.

Table 7

Development of Nonfinancial Corporations' Equity and Debt Finance					
	1995	2001	1995	2001	Growth since 1995
	EUR billion		Share in %		%
Equity	26.6	62.3	17.4	24.1	134.0
Domestic investors	13.3	27.5	8.7	10.7	107.3
Foreign investors	13.3	34.8	8.7	13.5	160.4
Debt finance	126.4	195.9	82.6	75.9	55.0
Bonds	7.7	18.6	5.0	7.2	141.4
Loans	112.5	171.5	73.5	66.4	52.5
Other liabilities	6.2	5.8	4.1	2.2	- 6.5
Total capital	153.0	258.2	100.0	100.0	68.7

Source: OeNB (financial accounts).

This markedly reduced companies' ability to finance investment from their sales revenue. With enterprises' self-financing capacity diminishing, additions to equity from profit is likely to have been on the decline, but no data have become available yet to confirm this assumption.

Equity Financing Gains Importance

Companies succeeded in partly countering lower self-financing capacity by external finance in the form of equity. While funds raised on the Vienna stock exchange by capital increases against cash deposits widened to EUR 1.2 billion from 2001 to 2002, only one domestic company was in fact newly listed on Wiener Börse AG.

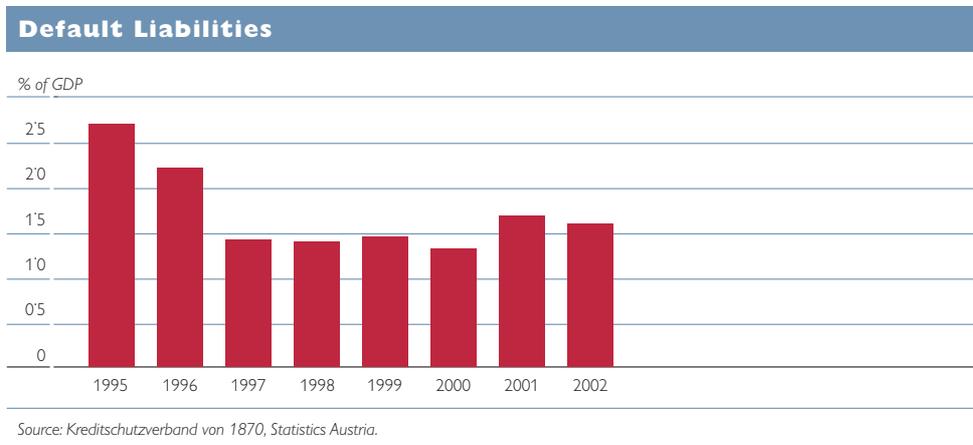
Equity accounted for a rising share of total capital from the mid-1990s, augmenting from 18.1% to 24.7% in 2001 (see table 7). Foreign lenders have had a growing impact on Austrian companies' financial position through direct investment (inward FDI). According to the financial accounts, foreigners owned 13.5% of Austrian enterprises' total capital as against 8.7% six years earlier.

Since 1995 companies have more than doubled their capital base. This perceptibly improved the corporate sector's financial stability, which not only gave companies greater financial leverage in making investment decisions, but also improved their position in negotiating with lenders.

Chart 20



Chart 21



Greater Recourse to the Bond Market

Borrowers opted increasingly for bond financing rather than bank loans to finance debt. In the past year, some 25 enterprises issued bonds, partly in the form of private placements. Most, but not all, of these were large firms. The funds raised by means of bond issues doubled to over EUR 1.4 billion from 2001. Nevertheless, the volume remained small at 1.1% of loans outstanding.

Bond issues are the instrument of choice for companies that have either a high capital intensity or that plan large-scale – expensive – restructuring measures. In addition, this type of debt is repayable at maturity, keeping demands on companies' liquidity lower during the life of the bond than for a classical bank loan. This is important for companies above all during the current economic downturn. However, such a procedure does not rule out that the repayment of the bond at a later point in time may represent a burden on corporate financing debt in the future.

Are There Signs of a Credit Crunch?

Bank lending to the corporate sector was down by 1.8% in 2002 from the year before. One reason was that companies' financing needs shrank in

2002. The low capacity utilization accompanying demand weakness in Austria and abroad clearly reduced investment demand; companies slashed equipment spending by 8.9% in real terms in 2002. Expectations that sales would perform poorly in 2003, which the latest forecasts on aggregate economic growth in Austria confirmed, induced companies to hold back on expansion investment. Construction investment, one key input for the expansion of manufacturing capacities, dropped, which is a sign of companies' hesitancy to invest last year. Enterprises' concentration on replacement investment, which is mainly financed through write-offs, kept a lid on the demand for loans. Moreover, their debt financing of expansion and rationalization investment lost importance in the light of capacity underutilization and helped perceptibly dampen the dynamics of corporate debt.

In addition, many corporates are likely to represent a risen credit risk considering the weakness of business activity. Insolvencies expanded by 2.0% in 2002; nevertheless, liabilities in fact diminished marginally even though economic growth decelerated noticeably. One important reason for insolvencies was inadequate capital cover, which became a critical ingre-

dient in insolvencies again last year. However, insufficient capital is not the sole factor implicated in insolvencies.

Thus it is not unlikely that companies exposed to a higher default risk face a restricted supply of loans. In any event, banks are likely at least to

boost the cost of lending to cover the growing risk of debtor default in an environment of economic weakness. Enterprises with low capital levels are likely to be hardest hit by this measure. However, there is no evidence of a general credit crunch for Austria.

What Financial Systems Contribute to Economic Growth

A complex interrelationship exists between the real economy and the financial system, and this interdependence represents a new challenge for economic policymakers. At an OeNB workshop held on January 27, 2003, academic and economic policy experts discussed which financial system is best suited to fostering economic growth, risk allocation and stability.¹) In a study, Franz Hahn used econometric methods to examine the links between financial market development and economic fluctuation in 22 OECD member countries from 1970 to 2000. The results indicate that capital market financing in the OECD countries tends to destabilize economic performance whereas funding via banks has a neutral effect. The public sector used to act a collective investment and risk association for the pay-as-you-go pension system; the risk is now being shifted more and more to households. Households have been investing more on financial markets – without a replacement for the erstwhile investment and risk association to allocate risk having been established yet. The participants of the workshop were nearly unanimously convinced that an orientation on shareholder value alone would impose problematic limitations on the functions of financial systems. The most recent scandals in the U.S. economy are evidence that up to now, no one has been able to define what the best financial system of all is.

Households

Weak Growth of Household Income and Consumption

The adverse economic conditions prevailing in 2002 took their toll also on household income. Real income grew by just 1.0%, which is below average. Among other things, the sluggish growth of income reflects the impact of the rise in the jobless rate to 6.9% from 6.1% in 2001 and the stagnation of employment.

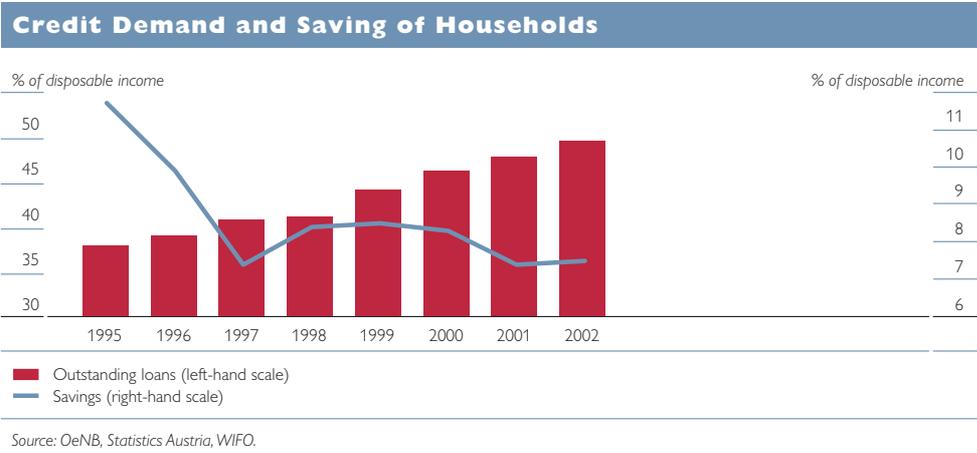
Households reacted to the deteriorating outlook for incomes by spending significantly less. Consumption expenditures rose by just 0.9% in 2002, compared with 1.5% in 2001. Purchases of consumer durables even declined by 0.2%, as households evidently postponed larger purchases in

the light of the unfavorable economic conditions. From a risk perspective this behavior is sensible as households thus avoided putting an extra strain on their budgets, which are already stretched by the weak growth of income and the uncertainty clouding the employment outlook.

Owing to lower consumer demand, the saving rate did not decrease any further in 2002 after having declined steadily since the mid-1990s. The decision of households to save more from current income under the prevailing tight economic conditions implies that they continue to be skeptic about the income outlook and are building up precautionary savings to tide them over any lean income times.

¹ The workshop contributions were published in the OeNB's Focus on Austria 1/2003.

Chart 22



Loan Growth Exceeds Income Growth

Despite the weak economy, lending to households grew at a faster pace than disposable income. Loan growth in 2002, while less than half the peak rate registered in mid-2000, was as high as at the beginning of 1999 when the income situation had been much brighter.

Due to the high financing requirements for housing needs, the cost of servicing such loans accounts for a huge part of households' regular financial expenses.

The ability to finance real estate and housing purchases with debt is an important precondition for any real investment by households. In this respect it should be noted that, in relation to wages and salaries, the volume of mortgage loans has been increasing steadily since 1995. Households tend to finance their housing needs above all by borrowing from (domestic) banks as well as building and loan associations. In recent years, they have shown an increased preference for loans with long-term maturities. Consequently, the percentage of mortgage-backed loans with an agreed ma-

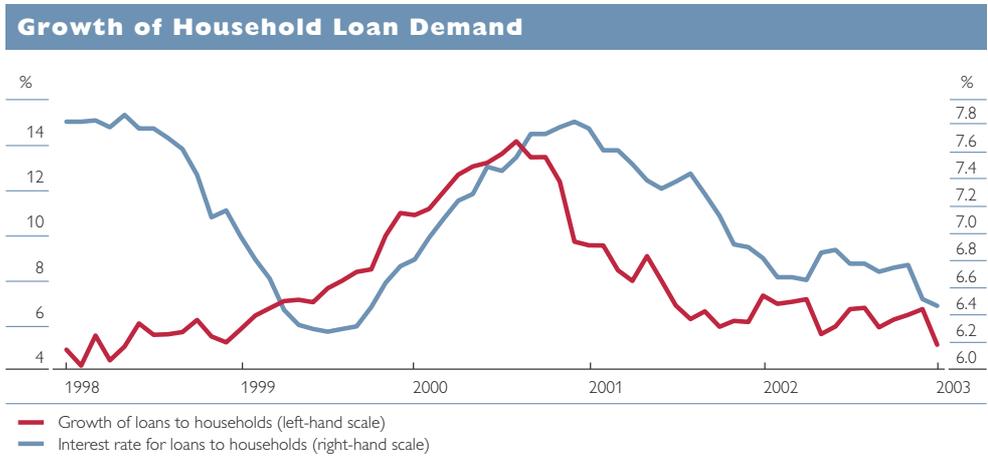
turity of more than five years climbed to 88% by December 2002. Borrowers rolling over short-term loans to medium-term and long-term loans as the yield curve flattened have benefited from lower current interest rate payments.

17.8% of all housing loans outstanding in 2002 were foreign currency-denominated. Hence, foreign currency debt of households and the underlying risks have continued to grow. The big appeal of foreign currency loans¹⁾ is that interest payments are much lower than on a comparable euro-denominated loan. However, the savings made on interest payments come at the price of exchange rate uncertainty, which may cause asset positions to worsen visibly when the euro depreciates against the loan currencies. A more cautious and forward-looking handling of this financing instrument by borrowers and lenders is called for in order to prevent, as much as possible, potential risks from becoming actual problems.

The number of private bankruptcy proceedings increased by 6.9% in 2002. The private bankruptcies filed

1 It should be noted that the interest rate advantage of foreign currency loans is reduced by any additional costs of borrowing.

Chart 23



Source: OeNB.

in 2002 were characterized by low levels of overindebtedness, so that the debt volume declined somewhat from EUR 490 million to EUR 464 million.

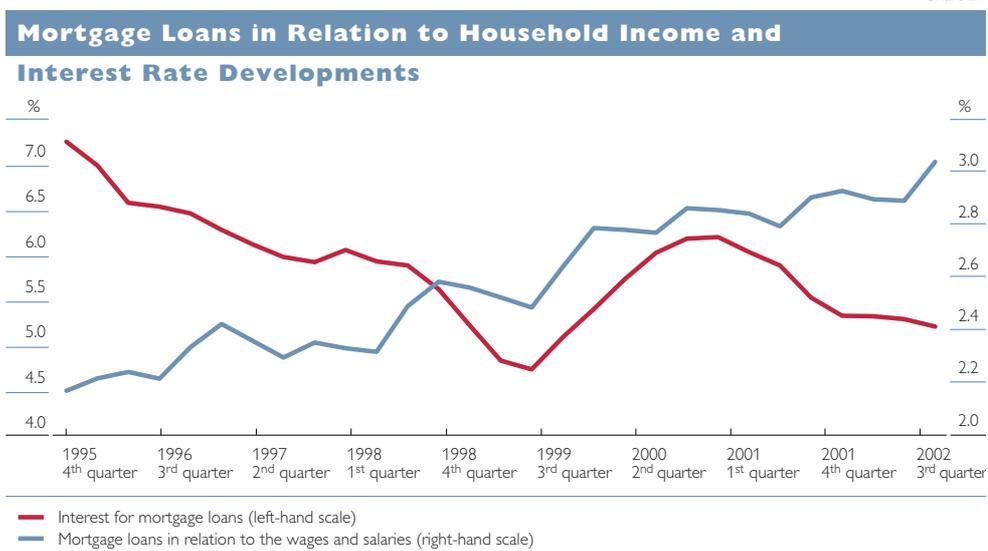
Financial Investment is Boosted by Rising Property Income

Apart from borrowing, households built up savings on the order of approximately EUR 10 billion, which is visibly below the comparable figure of 1995, when EUR 12.8 billion were saved. Consequently, the overall

growth of financial investment was also lower in 2002, with property income increasing and thus raising financial investment.

On the one hand, the rise in financial investment caused by growing property income reflects the strong profit orientation that guided households' financial investment decisions in the past. On the other hand, households have been saving less from their labor income, but instead have been relying more heavily on income generated from investment in property.

Chart 24



Source: OeNB.

Table 8

Structure of Household's Disposable Income

	1995		2001		Growth since 1995 %
	EUR billion	Share in %	EUR billion	Share in %	
Mixed income	16.0	20.1	14.6	15.4	25.3
Property income	7.7	13.4	7.0	10.3	74.7
Compensation of employees	81.0	91.9	74.0	70.3	13.5
Social security benefits	4.7	5.3	4.3	4.1	12.9
Disposable Income	109.4	130.7	100.0	100.0	19.5

Source: Statistics Austria, OeNB calculations.

Since property income falls short of labor income as a source of savings, households needed to borrow as investment rose. At the same time, the procyclicality of saving increased, as under the continued weak economic conditions property income, which includes interest and dividends received on investments, is lower than in times of strong economic growth.

Financial Investment Heavily Affected by Price Losses

Households' investment decisions have been influenced considerably by the high price losses investors suffered in capital markets in recent years and the decreased availability of funds for investment.

For instance, following the negative overall performance of Austrian mutual funds and the ensuing valuation losses, mutual funds lost much of their appeal in 2002, after having been very much in demand with investors in recent years. In the first three quarters of 2002 the value of mutual fund assets held by private investors shrank by EUR 3.6 billion, with the losses even exceeding net new investment made in 2001 by about EUR 600 million.

At the same time, the high uncertainty in stock markets and the weakness of both the national and the international economy made bonds more

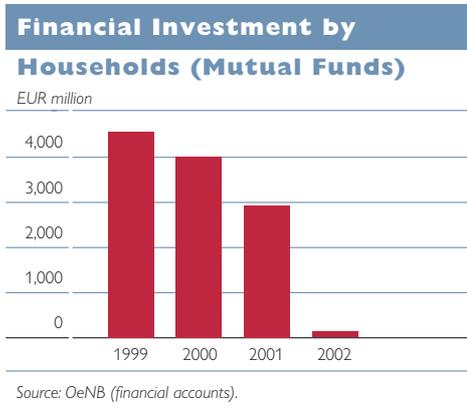
attractive for investors. Purchases of capital market instruments accounted for the bulk of financial investment in 2002. They totaled EUR 1.2 billion.

These asset reallocations motivated by price losses show that investors have been watching market developments and have responded adequately by choosing sound assets. As households have become more market-oriented in making investment decisions, they have, however, become more strongly exposed to price risks as well. As a result, households now face cyclical fluctuations with regard to both income and financial wealth. The valuation losses private investors suffered in 2002, according to preliminary calculations, were roughly as high as the combined price losses realized in 2000 and 2001, which totaled EUR 3.5 billion. This amount equals 2.6% of the disposable income of 2001.

At the same time, capital market developments are having a stronger impact on income, as the increasing additions to financial investment resulting from property income show.¹⁾ The fact that pension fund benefits are currently being cut is another case in point for the higher dependency on capital market developments. In Austria, pension funds continue to play a minor role in retirement provision and their cyclical decline in profitability is likely to have a limited effect on

1 The expansion of the second and the third pillar of pension provision should reinforce this trend.

Chart 25



households. However, individuals may be less inclined to take responsibility for saving for their own retirement and may become more uncertain about how future income replacement benefits are going to be funded considering that a period of poor pension fund performance is coinciding with a period of pension regime reforms.

To sum it up, in 2002 households were saving more from income than in previous years. At the same time, loan demand remained high despite the difficult economic situation. This

implies that households have been slightly more inclined again to build up own funds to finance investment spending. However, the propensity to rely on debt could increase the financial burden if incomes were to develop less favorably in the future, which would at the same time increase default probabilities.

Real Estate: Housing Prices Rise

Real estate holdings account for a sizeable share of household assets, and financing home purchases is a key motive for taking out a loan. Property prices last boomed in Austria when the migration inflow surged unexpectedly following the opening up of Eastern Europe and when baby boomers started to buy real estate at the beginning of the 1990s. From 1993 onward, this price boom tapered off, and toward the end of the 1990s prices even declined. However, since mid-2001, prices have been on the rise again. In the latter half of 2002, housing prices climbed by 0.7%, which is still below the long-

Chart 26

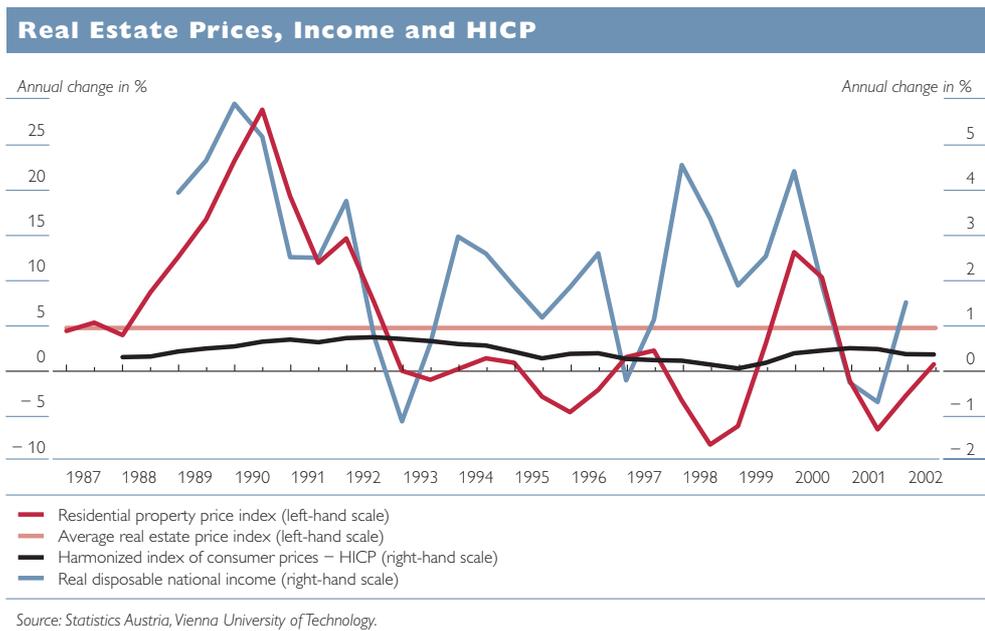
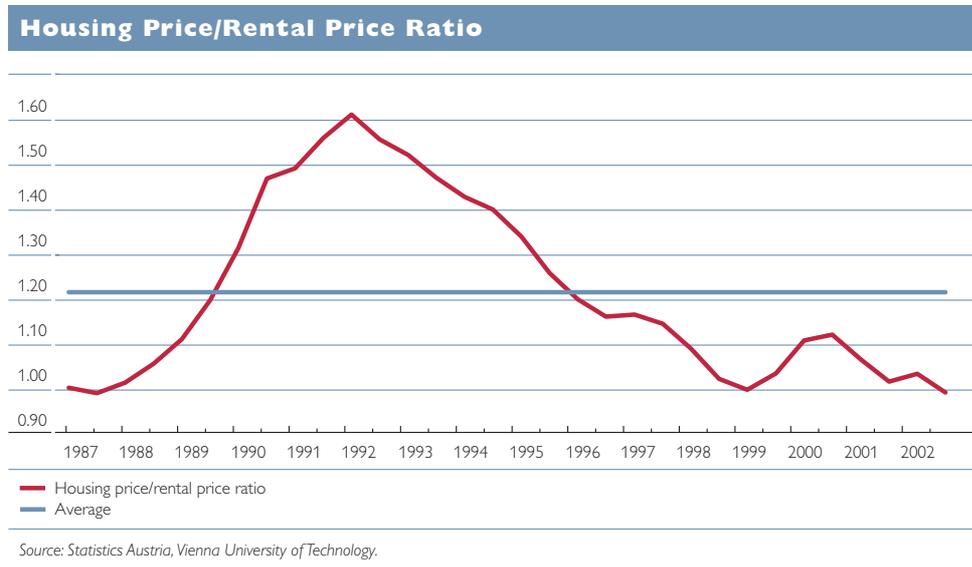


Chart 27



term average. The real disposable net income improved in the first half of 2002, but only by 1.4%.

Even though housing construction activity has been contracting for years, no price pressures have emanated from the demand for housing: The decline in building permits came to roughly 10% annually from 1998 to 2000 and slowed to about 3% in 2001, whereas the number of housing completions slumped by 14.7% in 2001. The marked 17.7% increase in building permits issued in the third quarter of 2002 implies that the market may have bottomed out.

The relationship between housing prices and the equivalent rental values (i.e. the rent homeowners would pay or receive if they were renting the residences they own) is evident from the housing price/rental (p/r) value index, which is a kind of price/earnings

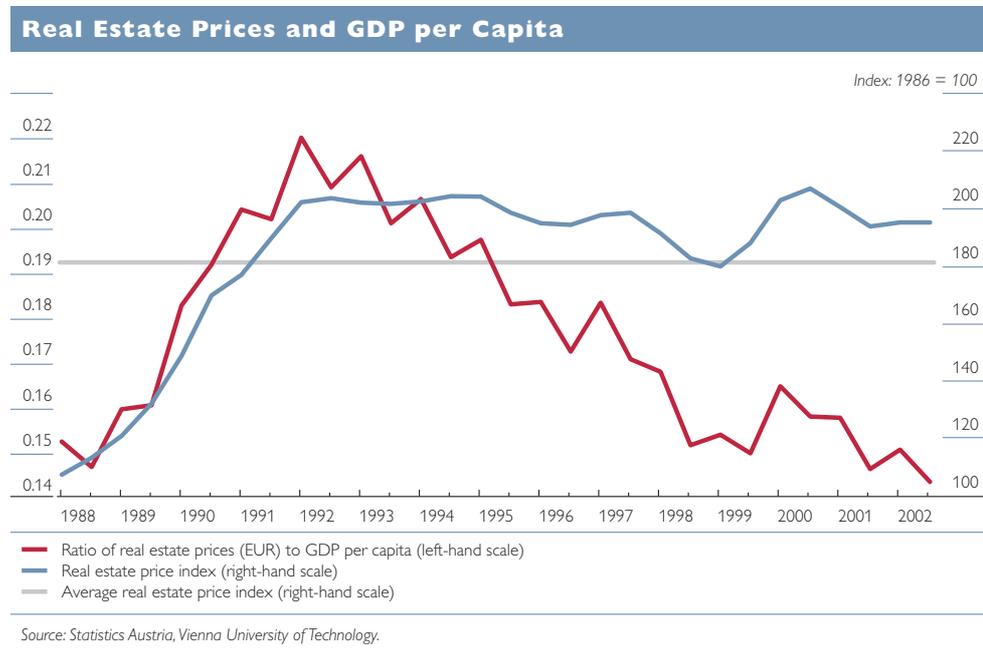
ratio for the housing market.¹⁾ This ratio clearly indicates a peak in housing prices in 1992. The decline of the ratio, incidentally, reflects less a decline in housing prices than a rise in imputed rental costs.²⁾

The ratio of housing prices to GDP per capita indicates whether such prices mirror the general path of economic developments.³⁾ While this ratio was still 15% above the long-term average in the first half of 1992, it has since dropped continually – with the exception of upward movements at the beginning of 1997 and of 2000 – to a value of around 26% below the long-term average.

To sum it up, developments in the housing market have not constituted an upward risk to price stability in Austria in recent years and there are no signs of a housing price bubble for the time being.

- 1 Leamer, E. E. 2002. *Bubble Trouble? Your Home has a P/E Ratio Too*. UCLA Anderson Forecast, June.
- 2 A high p/r value can be warranted in two situations: First, if other asset prices are also high, e.g. if stock profits and mortgage rates are low, and, second, in regions where housing demand surges and price increases are thus to be expected.
- 3 If this ratio remains constant over time or declines somewhat, this means that, provided all other macroeconomic determinants remain unchanged, the ability of individuals to finance housing purchases remains unchanged or decreases slightly.

Chart 28



Private Pensions in Austria and Their Role in the Capital Market

With the Austrian pension system based primarily on the first pillar, the public pay-as-you-go system, private pensions have typically played as minor role. Unsurprisingly, the fact that the public pension system is highly developed is being blamed in the economic policy debate not only for the rising problems of financing this regime as the population ages, but also, among other things, for the low degree of development of the Austrian capital market because saving for retirement through institutional channels (i.e. institutional investors such as insurance and pension funds) tends to generate little trading activity.

Against this background, the reforms of the private pension regime since the 1990s have also aimed at

contributing to the development of the Austrian capital market, above all by mobilizing accrued pension capital tied up in companies for investment with occupational pension institutions and by providing tax incentives for taking out personal pension plans launched by institutional investors.

New Severance Payment Scheme and Externally Managed Pension Funds

Under the 2002 reform of severance payments, existing severance claims may, and newly accruing severance claims (corresponding to 1.53% of wages) must, be transferred to dedicated severance funds.¹⁾ This regime is modeled on the transfer of internally funded corporate pension promises to externally managed pension funds. The conditions that apply to severance funds in general and the investment rules in particular are simi-

¹ While the new regime allows employees to opt for a lump-sum payment of their severance claims, which used to be the rule, it provides for tax incentives designed to prompt beneficiaries to roll over these assets into pension plans, i.e. to save for retirement through institutional channels.

lar to the rules governing pension funds. The permissible equity exposure of severance funds has been set at 40%.

Given their analogous function and regime, severance funds are likely to have more or less the same effect on the capital market that pension funds have had: Pension fund assets tend to be invested mostly in mutual funds, which in turn invest only a fraction of their assets in Austrian shares. In fact, the underdevelopment of the Austrian capital market can largely be attributed to the lack of participation of Austrian institutional investors in trading at the Vienna stock exchange.¹⁾ Judging from the insignificant contribution pension funds have made to the development of the Austrian capital market so far despite the sizeable amount of assets they manage (about EUR 8 billion), severance funds are unlikely to stimulate capital market activity significantly.

Can The Third Pillar of the Pension System Boost Activity in the Austrian Capital Market?

The recent reform introducing a tax-advantaged personal pension scheme (the so-called *Zukunftsvorsorge* scheme) can be seen as an attempt to link individual retirement saving to the development of the Austrian capital market more efficiently than was possible with the various private pension options available earlier. State subsidies for individual retirement saving will henceforth be concentrated on a single scheme. The investment rules governing this scheme have been specifically tailored to boost the Austrian capital market: a minimum of 40% of assets under management must be

invested in shares of EEA countries whose stock market capitalization is below 30% of GDP.

However, concentrating the state subsidy for individual retirement saving with institutional investors on a product with a high share of domestic stocks may be fairly problematic from a financial and economic perspective. Irrespective of the development of the Austrian capital market, such a high share of domestic stocks obstructs a further international diversification within this asset class and thus an efficient risk diversification. Obstructing risk diversification is all the more problematic as especially from the portfolio perspective of the three-pillar model of the pension system, the exposure of the first pillar to domestic economy risks would call for an international diversification of the second-pillar and third-pillar schemes.

This built-in home bias of the newly introduced subsidized personal pension scheme exposes individual retirement saving through institutional channels to significant risks. It remains to be seen whether the use of these channels to develop the capital market can compensate for the ensuing risks and efficiency losses.

Of the assets accumulated under the *Zukunftsvorsorge* scheme, about EUR 300 million a year are likely to be invested in stocks over the medium term according to industry estimates. This corresponds to roughly 1% of the market capitalization of 2002 and to 1.65% of the average stock exchange turnover of the past 10 years. Given the traditionally low turnover rate on the Vienna stock exchange, the subsidized personal pension scheme

¹ See Waschiczek, W. and F. Fritzer. 2000. *Austrian Stock Market Survey and Outlook*. In: *Focus on Austria 4*. Vienna: Oesterreichische Nationalbank.

is unlikely to contribute significantly to the development of the capital market in the medium term. At the same time, it cannot be excluded that, as a result of the low liquidity, volatility may rise.

The built-in home bias of the subsidized personal pension scheme hardly appears to be suitable to compensate for the low participation of domestic institutional investors in the capital market up to now; at the

same time, the concentration of tax subsidies on this scheme may significantly increase the risk exposure of personal pensions. One channel through which this risk might spread to the systemic level is a general loss of confidence in retirement provision schemes, which might in turn affect key asset classes (such as domestic shares) in which the pension capital is invested.

Pension Reform, Risks and Financial Markets

The increasing prominence of financial market issues in the pension reform debate has put this issue on the radar screen of central banks, as is evidenced, for instance, by a conference organized by the Deutsche Bundesbank on "Aging, Financial Markets, and Monetary Policy" in 2001. More recently, on December 6, 2002, the OeNB held an international workshop on "Pension Finance Reform: From Public to Financial Economics."¹)

According to the introductory statement of Johann K. Brunner, University of Linz, the risks and benefits of switching to a funded system must be weighed carefully because the higher returns in funded systems do not guarantee a Pareto improvement: it is, after all, almost impossible to design the transition in tax and transfer systems without a generation or specific individuals being made worse off.

Among other things, the workshop focused on the role pension funds play in European financial markets. Philip Davis, Brunel University, London, showed that the financial market effects of the European Economic and Monetary Union and the effects of the growth of institutional investors, including pension funds, are mutually reinforcing and thus make a switch to funded pension regimes more appealing. At the same time, he noted that demographic aging constitutes a risk for financial stability in both unfunded and funded systems, because it introduces a cyclical component in financial markets, much like the lifecycle model of saving.

In his discussion of the paper presented by Philip Davis, Josef Zechner, University of Vienna, pointed out some other risks that are linked with strengthening the funded pillar of the pension system, in particular the remaining weaknesses in product design (no protection against inflation) and partially insufficient corporate governance mechanisms, which cannot be fully compensated by the existing regulatory framework.

1 The workshop contributions are published in *Focus on Austria* 2/2003.

SPECIAL TOPICS

Basel II, Procyclicality and Credit Growth – First Conclusions from QIS 3¹⁾

Vanessa Redak,
Alexander Tscherteu

I Introduction

Recently, there have been increasing concerns that the New Basel Capital Accord (Basel II) may have adverse macroeconomic effects. In particular, it is feared that small and medium-sized enterprises (SMEs) may be faced with restrictive bank lending practices and that the new capital adequacy framework may have procyclical effects on the overall economy. The first part of this article gives an overview of the current status of the discussion regarding the above-mentioned aspects of Basel II. Then the authors analyze the arguments brought forward in the debate as to their relevance for Austria, taking into account, in particular, the results of the third Quantitative Impact Study (QIS 3),²⁾ which required the participating Austrian banks to apply the New Basel Capital Accord to their balance sheet assets.

2 Basel II and Procyclicality

In addition to the financial sector's inherent procyclical tendency, the procyclicality specifically identified in connection with Basel II is based on the following mechanism: Basel II provides for the calculation of the probability of loans to default. As these probabilities of default (PDs) correlate with cyclical factors, the PD rises or falls with the business

cycle. Thus a downturn implies higher capital requirements for banks than an economic boom because of the higher PD. The change of the capital ratio, in turn, affects the volume of potential lending. During a downturn, for example, banks can provide fewer funds for lending because of higher capital requirements. This decline in lending limits – *ceteris paribus* – the financing options for businesses and households and thus reduces consumption and investment activities, which consequently dampens down economic growth even further.³⁾

In general, all financial regimes with minimum capital requirements are said to be procyclical, as a recession and the write-offs of and provisions for loans it entails drive up capital requirements, and, thus, the capital cushion for lending shrinks. Already the Basel Capital Accord of 1988 (Basel I) had raised the question of to what extent capital requirements generate procyclical effects or encourage restrictive lending policies. This discussion was especially delicate in the early 1990s, when numerous industrialized countries were on the brink of recession and when there were concerns that more rigid capital requirements might aggravate the situation and lead to a credit crunch. The majority of studies on the topic,⁴⁾ however, concluded that there was no clear empirical evidence for a connec-

¹ *The analysis in this paper is largely based on the compilation of the Austrian country report in the course of the third Quantitative Impact Study (OeNB, 2002, p. 57). The banks participating in the field test calculate how the New Basel Capital Accord affects their assets and, consequently, their capital requirements. The data of the individual banks were aggregated by the Oesterreichische Nationalbank (OeNB) to prepare the country report for Austria. The conclusions drawn from QIS 3 when compiling the country report, which are presented in this paper, would not have been possible without the manifold contributions of the OeNB staff members involved in the preparation of the country report. We would like to thank in particular the following colleagues for their valuable contributions, interpretations and support: Nikolaus Böck, Gabriela de Raaij, Evgenia Glogova, Yi-Der Kuo, Mario Oschischnig, Birgit Wlaschitz.*

² See also BCBS (2002).

³ See also Altman et al. (2002); Diamond and Rajan (2000).

⁴ For a summary, see Jackson (1999).

tion between Basel I and the crisis or restrictive lending practices. However, some studies yielded opposite results for specific sectors (real estate, SMEs) in several U.S. states, for Japan and also for Austria.¹⁾ Hahn (2002b), for example, concludes from a panel-econometric investigation, which includes data from 750 Austrian banks, that banks' capital ratio in accordance with Basel I had a slight adverse effect on Austrian banks' exposure.

Basel II is expected to have a stronger procyclical effect. Contrary to Basel I, where the capital requirements for a number of loans do not change over time, Basel II requires banks to make differentiated risk assessments of borrowers and to adjust capital requirements accordingly. Therefore, the extent of procyclicality largely depends on how banks assess credit risk. Basically, they have two options: the standardized approach, where external credit assessment institutions (e.g. rating agencies) provide ratings, and internal ratings-based approaches (IRB)²⁾, where the ratings have to be calculated by the bank itself.

3 The Choice of Rating Systems

The choice of rating systems and the concrete design of the rating largely determine the extent of the procyclical effects of the New Basel Capital Accord. A number of studies have

been dedicated to this topic, which often go beyond the empirical investigation of the interrelation between rating, capital requirements and procyclicality, putting forward proposals for the improvement of the design of the ratings.³⁾ Recently, the Bank for International Settlements (BIS) itself published a great number of papers on the procyclicality of rating systems or provided support for such publications.⁴⁾

The majority of these studies applies Basel II to a historic banking portfolio⁵⁾ and examines the effects of the new framework on banks' capital requirements. As expected, all the studies mentioned find that procyclicality increases especially if banks apply the IRB approach instead of the standardized approach. We know from experience that rating agencies leave their ratings of companies unchanged for a longer period of time, which implies that a changed economic situation does not automatically increase or reduce the probabilities of default. Therefore, the standardized approach, which is based on external ratings, is less sensitive to the business cycle than the IRB approach, where banks recalculate the probabilities of default usually every year.

Interestingly, the studies find that this procyclical bias of the IRB approach is especially strong in very contrasting economies, i.e. in capital market-oriented countries and in

1 For the U.S.A. see also Hancock and Wilcox (1998), for Japan see Honda (2002).

2 The IRB approaches are divided into the foundation internal ratings-based approach (FIRB), where the bank determines only the probability of default, and the advanced internal ratings-based approach (AIRB), where the bank also estimates the loss given default (LGD) as well as the exposure at default (EAD).

3 For considerations on this subject, see the study "Calibration of Rating Systems – A First Analysis" by Breinlinger et al. in this publication.

4 See also Borio et al. (2001); Altman et al. (2002); Lowe (2002); Segoviano and Lowe (2002); Allen and Saunders (2003); Catarineu-Rabell et al. (2003).

5 Altman et al. (2002) analyzed in detail an Italian portfolio; Segoviano and Lowe (2002) a Mexican one and Catarineu-Rabell et al. (2003) a British portfolio.

developing countries. In the former it makes sense to apply rating systems that are also strongly based on stock prices. The classic example for this kind of rating system is the KMV model. A strong correlation between stock prices and cyclical developments also results in strong procyclical effects in the rating.

The IRB approach might have an adverse effect in developing countries as well.¹⁾ Owing to the comparatively high default rates in developing countries and emerging markets, the average capital requirements under the IRB approach may be extremely high (Reisen, 2001; Segoviano and Lowe, 2002). Therefore, some authors assume that, in addition to the technological difficulties of implementing an IRB approach in these countries, the higher capital requirements will also cause these countries to refrain from applying internal ratings-based systems, which, in turn, runs counter to the intention of Basel II.

A common problem of internal ratings-based systems is the use of one-year point-in-time data. The short-term (one-year) time horizon of rating systems is attributable not only to accounting and tax aspects, but in particular to the lack of adequate datasets. Hence, the average rating of a loan portfolio changes with the business cycle. During an economic boom, credit risk declines because it is assumed that the probability

of default will be low in the following year (Borio et al., 2001).

Several revisions²⁾ to the capital adequacy framework which were made before the launch of QIS 3 aimed at refuting the argument that Basel II would further reinforce the procyclicality of lending and thus accelerate both downturns and upswings.

Basel II addresses this problem by requiring a time series of at least five years for the calculation of probabilities of default. In light of the problem of generating longer time series, however, transitional arrangements were put in place to enable especially small banks to collect a sufficient amount of data.

Moreover, since the launch of the second consultative paper the risk-weight curves have been flattened considerably. However, procyclicality was not the original motive for this revision. The intention was simply to achieve a lower risk weight for all probabilities of default than originally planned, as the results of the studies preceding QIS 3, i.e. QIS 2.0 and QIS 2.5, had indicated – in the opinion of the Basel Committee – that the capital requirements³⁾ for corporate exposures were too high (see table 1). These results prompted changes in the risk-weight functions,⁴⁾ which now yield a generally lower and flatter risk-weight function. The result of the follow-up study QIS 2.5

- ¹ At this point, there is no room for comments on the meanwhile fairly comprehensive discussion about the effects of Basel II on developing countries and emerging markets. Interested readers may want to consult the following papers: Griffith-Jones et al. (2002) and Hayes and Saporta (2002).
- ² The introduction of “dynamic provisioning” (i.e. “anti-cyclical capital buffers”), as has been proposed by some EU countries, the ECB and the European Commission and which is employed in Spain, has been discussed by the Basel Committee but has not been incorporated in the current framework. For the Spanish example see especially Fernández de Lis et al. (2001) and <http://www.bde.es/provesta/proestae.htm>.
- ³ At the same time, the increased risk-weighted assets result in higher capital requirements.
- ⁴ The main reason for the change of the risk-weight function as proposed in the second consultative paper was the switch from the assumption of a fixed correlation to one with a fluctuating probability of default.

Table 1

Change of Risk-Weighted Assets in QIS 2.5 and QIS 2.0

	Change of risk-weighted assets in QIS 2.5 %	Change of risk-weighted assets in QIS 2.0
Corporate	- 7	+22
Retail	-38	-28

Source: BIS.

clearly reflects the obvious effect of the changes. The new risk-weight functions were already used in QIS 2.5,¹⁾ which caused a reduction of the risk-weighted assets by 29 percentage points in corporate exposures and by 10 percentage points in retail exposures. However, the flatter risk-weight function also results in a less fluctuating risk weight at a given change of the probability of default. On the assumption that the ratings depend on the business cycle, the capital costs remain fairly constant over the business cycle, which would reduce procyclical effects.

Catarineu-Rabell et al. (2003) is among the few studies on the relationship between ratings and procyclicality that already uses these new risk curves. The authors aim to determine the different capital requirements of the old and new risk-weight curves and, at the same time, identify the differences between various rating models. In particular, they compare Moody's rating model to the KMV model,²⁾ which is clearly more sensitive to market prices. The basis for this empirical test is a hypothetical corporate loan portfolio, which is typical of an average G-10 bank. This portfolio was shocked with data reflecting a recession spanning several

years in order to determine the corresponding deterioration in the loan quality. It was found that the new risk-weight curves caused the capital requirements to rise considerably less sharply than the old risk-weight curves. At the same time, Moody's rating model proved to be less sensitive to the business cycle than the KMV model; with both curves, the increase in the capital requirements in a recession is clearly less pronounced with Moody's than with the KMV model.

4 Credit Risk Mitigation and Procyclicality

Some critics of Basel II have pointed out that procyclical tendencies may also be linked to credit risk mitigation (CRM) and the related recognition of collateral as proposed by the new framework. The increased recognition of CRM techniques marks another effort of the Basel Committee to render the new Accord more risk-sensitive. The recognition of loan collateral is part of risk mitigation. The 1988 Accord recognized only three types of collateral, i.e. cash, securities issued by OECD central governments and public-sector entities, and securities issued by specified multilateral development banks. Moreover, only guar-

1 It must be noted that the sample of participating banks has become smaller.

2 As already mentioned, in the case of the KMV model stock prices are directly included in the calculation of probabilities of default. If stock prices are highly volatile, the ratings also fluctuate more distinctly than with other models.

antees by OECD central governments and public-sector entities, multilateral development banks as well as banks and investment firms were recognized as limiting to capital requirements. The reduction of the capital requirements was achieved by replacing the risk weight of the borrower by the risk weight of the organization providing the guarantee or the collateral.

The new Accord recognizes a significantly larger number of types of collateral and institutions providing guarantees (BCBS, 2002). Moreover, it facilitates not only the substitution of risk weights, but also the deduction of the value of the collateral or guarantee¹⁾ from the value of the exposure.

With regard to concerns about the heightened procyclicality linked to the new capital adequacy framework, the increased recognition of collateral has triggered the question of whether the value of collateral also fluctuates with the business cycle and thus, aside from the creditworthiness of the borrower, a second factor, i.e. the value of the collateral or guarantee, amplifies procyclicality (Hahn, 2003, p. 143).

5 The Effects of Basel II on SMEs

The SME sector, which is prevalent in economies like Austria and Germany, depends heavily on bank lending.²⁾ An increased procyclicality of lending would cut these businesses off from one of their most important sources of financing, especially in economically slow times. In addition, their often low capital ratio would, in con-

junction with difficult borrowing conditions, further increase these businesses' insolvency risk.

Particularly in Germany,³⁾ this was subject to a broad and, at times, heated debate. A number of studies supported the Basel-critical view, finding – on the basis of empirical investigations – that loans for SMEs would become more expensive (Hansmann and Ringle, 2001; Taistra et al., 2001; Grunert et al., 2002). Surveys conducted at savings banks and enterprises as well as estimates of the sensitivity of lending rates to changed parameters such as capital costs, ratings and LGDs showed that Basel II might have considerable adverse effects on SMEs, including a surge in interest rates on loans by up to – in an extreme case – 245 basis points (Grunert et al., 2002, p. 1059).

In mid-2002 the Basel Committee decided to modify the draft framework in order to accommodate the concerns regarding lending to SMEs. The new proposal permits banks to apply retail treatment to SME exposures of up to EUR 1 million. Hence, under the IRB approach, an SME loan classified as retail exposure with comparable risk will require 40% less capital than large enterprises.

6 Basel II and Lending

One difficulty that arises when assessing the question of to what extent Basel II will have an impact on credit growth is the general lack of information available on the actual lending motives of banks. Although Basel II includes mechanisms that increase capi-

1 It is not the actual value of the collateral which is subtracted from the actual value of the exposure, but, as a rule, haircuts are applied in both cases. These are upwards or downwards adjustments that may reduce the value of the collateral and increase the value of the exposure.

2 For Austria, see Valderrama (2001).

3 For the discussion of results for Austria, see also Partsch and Wlaschitz (2002), Schwaiger (2002) and the study "Calibration of Rating Systems – A First Analysis" by Breinlinger et al. in this publication.

tal requirements, the direct connection between capital and loan supply has hardly been investigated. From an econometric point of view, the lack of data makes it impossible to accurately identify the supply and demand-side criteria that are crucial for lending.

The Deutsche Bundesbank recently carried out a study which analyzes the development of bank lending against the backdrop of Basel II (Deutsche Bundesbank, 2002). In Germany, a controversial debate has been going on about the question of to what extent the decline in loan growth over the past few months can be traced to banks' preparations for Basel II and the associated restrictive lending practices.

This survey, which is based on an econometric estimation of loan equations, in many points rejects the assumption that the decrease in lending in Germany is attributable to Basel II. Rather, the weak credit growth can be explained by the cyclically induced restraint in credit demand by businesses and households. On the demand side, the slight increase in the demand for other financing instruments (debt securities and other securities) has contributed, if not considerably, to the weak credit growth.

On the supply side,¹⁾ banks' lending restraint can mainly be explained by the jump in corporate and consumer insolvencies in Germany over the past few years. Owing to these insolvencies, banks rate borrowers' creditwor-

thiness principally worse and change their lending terms accordingly. The authors of the study do not see a direct impact of Basel II but point out that the upcoming new capital adequacy framework seems to have heightened banks' income and risk awareness.

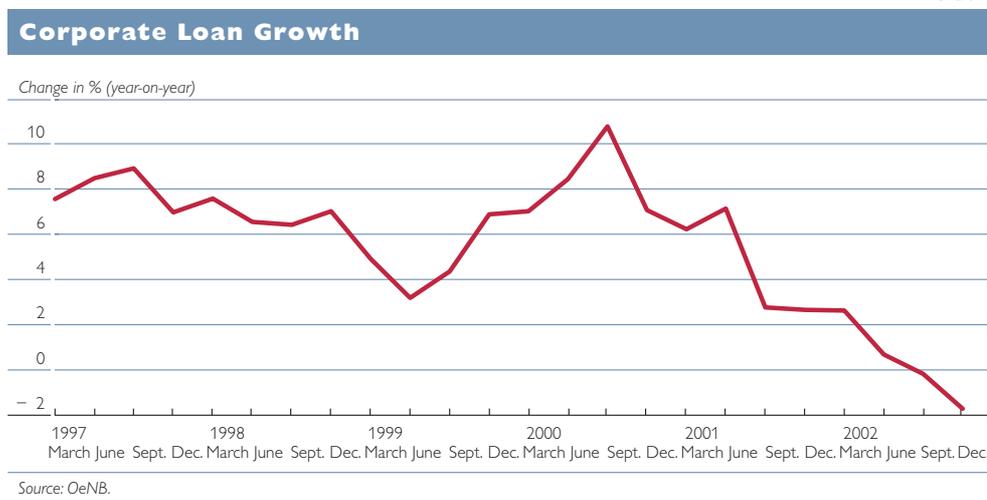
As for Austria, there is no immediate necessity from a balance sheet point of view to limit lending, since most Austrian banks' own funds exceed the required 8%. The average (unconsolidated) capital ratio of the Austrian banks almost continuously amounted to more than 12% in the past five years (OeNB, 2002, p. 56). Banks are therefore holding a sufficient capital buffer, even if the loan quality deteriorates owing to macroeconomic developments.²⁾

However, credit growth has recently been extremely weak in Austria, as in numerous other European countries as well as in the U.S.A. Corporate loans have been decreasing sharply; the growth of loans to nonfinancial corporations has been negative since the third quarter of 2002 (see chart 1). Large Austrian banks in particular have meanwhile become increasingly aware of the changes induced by Basel II and already started to prepare for the transition to the new capital adequacy directive. However, it is unclear whether these preparations have already led to increased risk awareness in lending or whether the decline in loan growth can be mainly traced to cyclical and demand-side developments.

1 The authors point out that the analysis of the supply-side factors was not determined by the econometric investigation; the determination was only possible by conducting a survey among banks.

2 In the course of stress tests carried out by the Oesterreichische Nationalbank, macroeconomic factors which lead to an increase in credit risk and, consequently, in capital requirements were identified (Boss, 2002; Kalirai and Scheicher, 2002).

Chart 1



7 QIS 3

The following analysis of QIS 3 includes some initial considerations on the effects of Basel II on lending in Austria as well as on the macroeconomic implications mentioned before. After a brief introduction of QIS 3, we aim to show the extent to which its results can provide insights into the following group of subjects which were discussed in several studies mentioned earlier:

- procyclicality and the shape of the risk-weight functions
- small and medium-sized enterprises (SMEs)
- small and medium-sized banks
- credit risk mitigation and procyclicality

7.1 General Facts on QIS 3

In October 2002, the Basel Committee on Banking Supervision launched a comprehensive field test for banks entitled “Quantitative Impact Study 3” (QIS 3).

The exercise and the resulting country report serve as the basis for assessing to what extent the submitted proposals on risk weighting are suited for increased risk differentiation and,

consequently, the establishment of risk-adequate capital requirements.

QIS 3 aims at facilitating a comparison of the three approaches to credit risk assessment, i.e. the standardized approach, the foundation IRB approach (FIRB) and the advanced IRB approach (AIRB), with the provisions of the existing Accord. Aside from the five core portfolios – corporate, interbank, sovereign, SMEs and retail – QIS 3 for the first time also takes into account the effects of the new framework on the trading book, investments in related entities and securitization. Furthermore, the effects of operational risk were also considered.

Thanks to the participation of a great number of Austrian credit institutions – a total of more than 30 banks provided data – it was possible to create a, by international comparison, large sample. The results for the standardized approach presented below are based on data from a total of 18 credit institutions, 11 of which also used the foundation IRB approach. These 18 institutions represent approximately 48% of all Austrian banks’ total assets.

On the basis of the banks' individual reports, the participating countries prepared a country report, whose data were further aggregated (e.g. for G-10 countries, non-G-10 countries within the EU, etc.). The results will be incorporated in the new consultative paper, which is scheduled to be published in mid-2003.

7.2 Procyclicality and the Shape of the Risk-Weight Functions

The Basel Committee aimed to dispel concerns that the new capital adequacy framework would further increase the procyclicality of lending and thus amplify both economic downturns and upswings by making some adjustments.

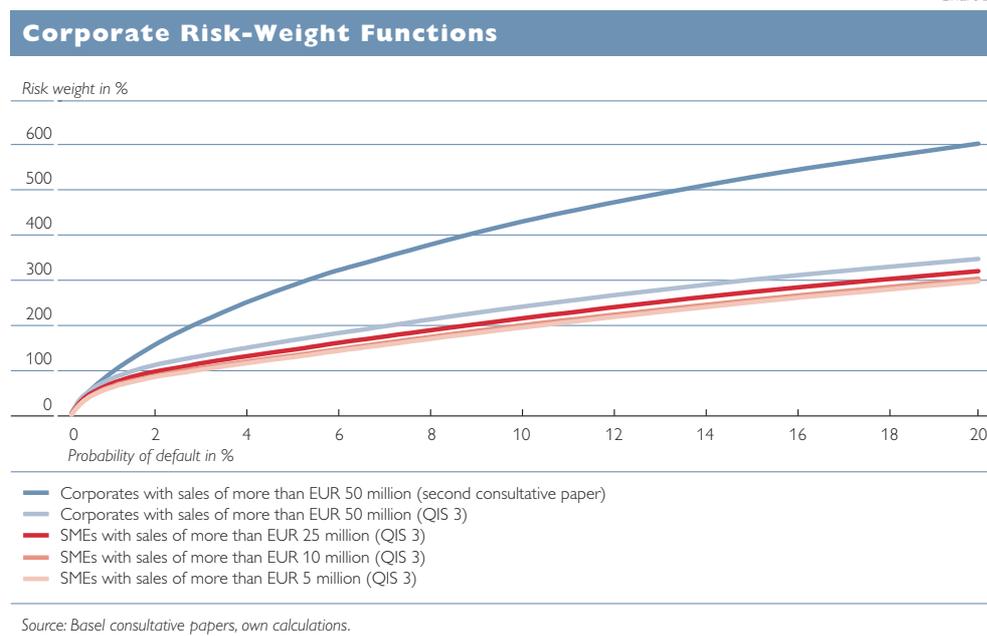
First, the already mentioned introduction of longer time series for estimating of the probability of default reduces the cyclical dependency of the resulting credit assessments and is thus more in line with "rating through the cycle," as recommended by external rating agencies.

Second, as mentioned above, the risk-weight curves have been noticea-

bly flattened since the launch of the second consultative paper.

The corporate risk-weight functions were further modified for QIS 3. Among other things, a discount was introduced for SMEs, which depends on the firm size (measured by sales). Thus the curve is not only flatter than in the second consultative paper, the discount additionally ensures that smaller firms are assigned a lower risk weight at the same probability of default compared to larger firms, which implies that they incur lower costs for their loan. Chart 2 illustrates the relationship between the level of the risk-weighted assets and the probability of default. It can be seen that the change of the risk-weight function compared to the second consultative paper has led to a clearly lower and flatter curve. Although the newly introduced discounts for SMEs represent another decrease in risk-weighted assets, it is significantly less pronounced than the change from the second consultative paper to QIS 3. However, the additional discount does not have any impact on the shape (flatness) of the curves.

Chart 2



7.3 Small and Medium-Sized Enterprises

In general, the treatment of small and medium-sized enterprises (SMEs) depends on whether a bank applies the standardized approach or an IRB approach for credit risk measurement.

When comparing the standardized approach with the currently valid framework, the following applies: According to the existing provisions, the bulk of corporate loans must be assigned a risk weight of 100%, unless they are collateralized by real estate, which allows a risk weighting of 50% of the loan.

Under the standardized approach, a loan to an SME can be classified as a corporate or a retail exposure. In the corporate sector, the exposure is weighted according to the rating available on the basis of the risk-weight categories for the corporate portfolio. Since unrated enterprises, i.e. the majority of Austrian SMEs, are assigned a risk weight that is no worse than that in the currently valid framework, the following picture can be drawn from the QIS 3 data:

- A total of 72% of the SME exposures retains a risk weight of 100%;
- Approximately 8.3% are risk weighted at 150% and 19.8% are risk weighted at 50% or lower;
- The extended options of credit risk mitigation reduce the aggregated risk weight for SMEs by another 9%.

In order to be mapped to the retail portfolio, an SME exposure has to fulfill not only some qualitative criteria

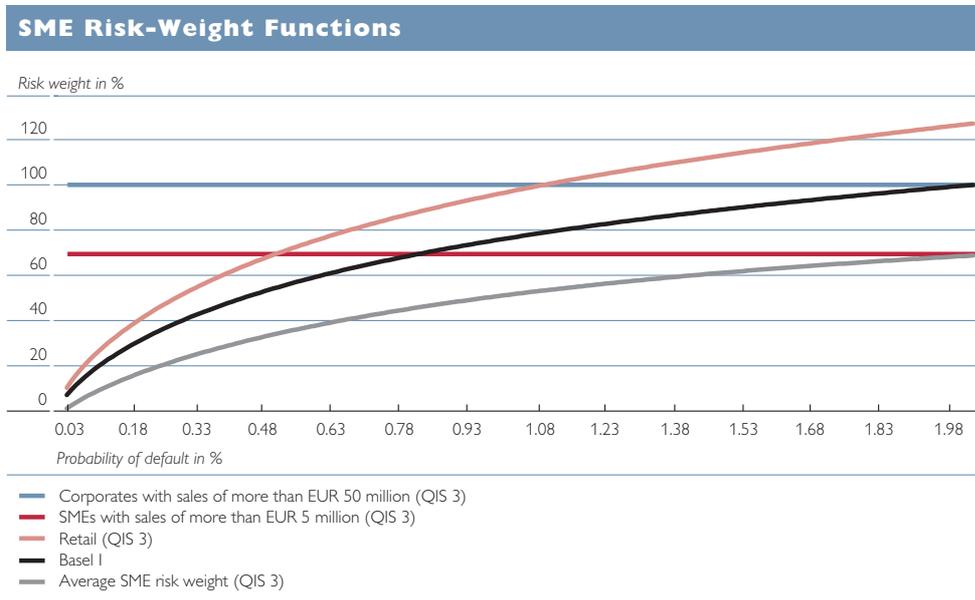
that were not examined in detail within the framework of QIS 3, but also two quantitative criteria: The loan must not exceed EUR 1 million and the share in the total retail portfolio must not exceed 0.2%.¹⁾ In the retail segment, an unsecured loan is risk weighted at 75%, a loan collateralized by residential real estate at 35%. Both risk weights are below those that are assigned under the currently valid provisions.

Under the IRB approach, an SME exposure can either be mapped to the corporate or the retail sector. In case of corporates it must, however, be considered that if the sales provisions are met, an SME discount is deducted from the corporate curve. If the loan is classified as a retail exposure, it will be assessed on the basis of the risk-weight function for other retail exposures. The potential risk-weight functions as well as the 100% Basel I risk weight are shown in chart 3,²⁾ which also illustrates the average risk weight (approximately 69%) for the entire SME exposure of all 11 banks participating in QIS 3 applying the foundation IRB approach. It is clear that – regardless of the category to which the SME exposure is actually assigned – the Basel II Accord always yields a more favorable result than the existing framework, since the points of intersection of the risk-weight functions with the average risk weight are always below the Basel I line. In other words, for the probabilities of default postulated in the study, the new provision result in a lower risk weight at all times.

¹ This criterion has meanwhile been relaxed.

² For reasons of clarity, the corporate curve with SME deduction was only drawn for the biggest possible deduction. The two other possible curves with deduction would be located between the curve “Corporates with sales of more than EUR 50 million (QIS 3)” and the curve “SMEs with sales of more than EUR 5 million (QIS 3).”

Chart 3



Source: Basel consultative papers, own calculations, QIS 3 country report.

This implies that banks with a high share of retail or SME exposures can expect a reduction of capital requirements if they apply the IRB approach.

7.4 Small and Medium-Sized Banks

Apart from the concerns voiced with regard to SMEs, there have also been warnings that small and medium-sized banks may be unable to comply with the requirements of Basel II. However, QIS 3 showed that such concerns are mostly unfounded. Small banks in particular have been closely involved in QIS 3, where they all applied advanced approaches (IRB foundation) (see table 2). This was made possible

by the efforts undertaken in the individual banking sectors to find a common solution for implementing the new Accord in the entire sector. Aside from small specialized banks, small and medium-sized banks typically tend to have a high share in retail and SME exposures in their portfolios, which require lower capital charges because of the lower risk weighting in these classes.

The advantage of sector solutions is not only confirmed by the fact that – compared with larger banks – the number of small banks that have chosen an advanced approach for credit risk measurement is very high in Austria, but also by the fact that

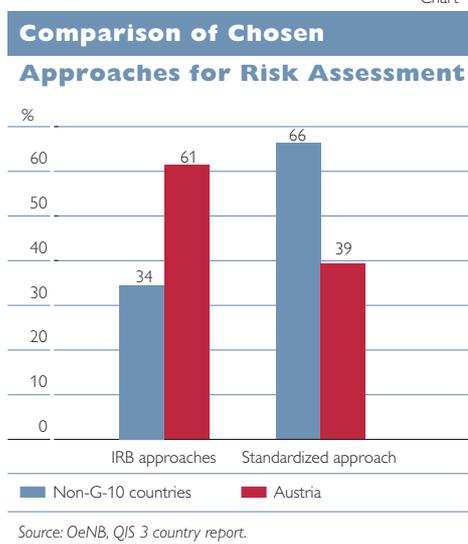
Table 2

Credit Risk Rating Systems Chosen by Austrian Banks in QIS 3

Total assets (EUR billion)	Number of banks total	Thereof standardized approach	Thereof FIRB approach	Thereof AIRB approach
< 0.5	5	–	5	–
< 10	6	5	1	–
< 20	4	1	2	1
> 20	3	1	2	–

Source: OeNB, QIS 3 country report.

Chart 4



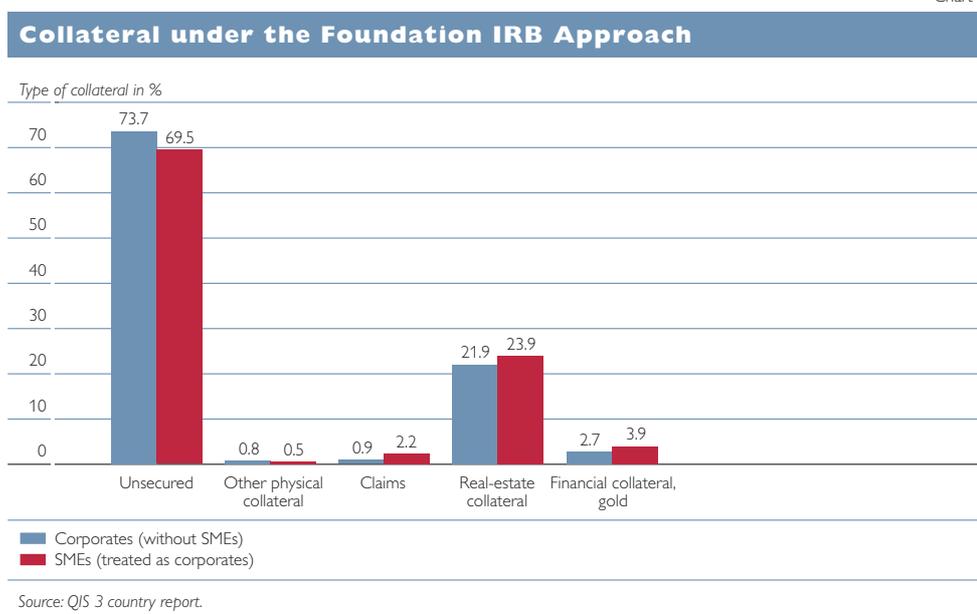
the total Austrian banking sample shows a significantly higher share in banks that apply internal models for credit risk measurement compared with the data supplied by the remaining non-G-10 countries.¹⁾

7.5 Credit Risk Mitigation and Procyclicality

As mentioned above, the treatment of collateral in credit risk mitigation is also a procyclical element in the New Basel Capital Accord. However, the QIS 3 results reveal two noteworthy observations: First, the level of corporate collateralization²⁾ – overall, only 26.7% of the outstanding corporate exposures and 30.5% of the SME exposures – limits the effect collateral with a fluctuating value can have on the capital requirements of an exposure. It must be noted, though, that the tight timeframe in which the study was carried out and IT-related shortcomings at the banks made it impossible to use credit risk mitigation techniques on a large scale. The extent of actual collateralization might therefore be higher.

Second, the specific characteristics of collateral in Austria also counter

Chart 5



- ¹ In QIS 3, Austria was assigned to the group of non-G-10 countries with economic structures that differ markedly from those in other countries. The report by the European Commission will provide information about the relevance of the Austrian results with regard to comparable economies. However, the report is not yet available.
- ² Only the corporate portfolio is taken into account here, since owing to the general high creditworthiness in the sovereign and banking portfolio, hardly any collateral is required there.

the concern of additional procyclicality caused by collateralization. The by far most common type of collateral in the Austrian lending business is mortgage-backed collateralization (see chart 5). Since Austrian real estate prices hardly fluctuate, that is, they have a very small cyclical component, a procyclical effect generated by the increased use of credit risk-mitigating techniques cannot be derived from the QIS 3 results.

8 Conclusions

The current scientific discussion of the effects of the New Basel Capital Accord is focusing on the question of to what extent lending may increasingly fluctuate with the economic cycle. First of all, it has to be noted that in general no clear answer has been found to the question of which factors determine lending. However, numerous of the studies referenced assume that loan supply is determined by capital costs.

Analyses of the details of the new Accord often conclude that the conception of the rating models and the evaluation of collateral are factors that may possibly increase procyclicality. In this context it should be noted that the flatter risk-weight functions and the longer timeframes for the estimation of probabilities of default envisaged by the Basel Committee, *ceteris paribus*, reduce the fluctuations of risk weights. Compared with the original

Accord, the capital resource ratio thus varies less over the economic cycle. However, the relationship between the specific features of the rating system applied and procyclical effects will be strong in the future; the regulatory authorities should also – besides other aspects – take them into consideration when examining and approving rating models.

A comparison of the results of QIS 3 with the questions raised in various papers reveals that the following seems to apply to those loan segments in particular where loan demand is considered to be sensitive to the economic cycle, i.e. corporate and retail exposures: The application of the rules proposed by QIS 3 leads to a marked decrease in capital requirements for corporate and consumer loans compared to the capital charges under the existing framework. Since this effect is generated by the transition from Basel I to Basel II, it is a one-off leveling effect.

It is difficult to derive an increased procyclical effect of the new capital adequacy framework solely from the results of QIS 3. However, the latest revisions to the proposal and the specific characteristics of the Austrian credit market have acted as a dampener on procyclical effects. Overall, it seems that the one-off leveling effect is much more pronounced than the (potential) procyclical effect.

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Calibration of Rating Systems – A First Analysis

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Andreas Höger¹)

1 Introduction

The need for adequate calibration is an issue that necessarily arises in the process of constructing a rating system as well as in its ongoing maintenance. Owing, among other reasons, to the implementation of the New Basel Capital Accord (Basel II), this issue will increasingly attract attention in the near future. The present study was based on credit data made available by the credit information bureau Creditreform consisting of some 10,000 data sets for each of the years 1996 through 2001. In this initial attempt to explore the issue of calibration, we restricted our research to static methods. This implies that the estimates of probabilities of default are based on one-year transitional rates, and the classification into rating classes relates to a single point in time in each of the years. The dynamics created by an intertemporal approach are, for the time being, taken into account only where our considerations refer to the conceptual framework. In general, this study focuses on methodological aspects. As to the results of the analyses, it is interesting to note that – given our static approach – the *ceteris paribus* increase in the number of rating classes generated using the calibration methods applied is paralleled by a decrease in the capital requirement. However, once an intertemporal approach is chosen, the demand for monotonicity in the structure of default probabilities imposes a natural limit on the maximum possible number of rating classes. Moreover, capital sensitivity to default rate

changes further corroborates the need for intertemporal modeling (as well as sufficiently long data histories).

The study is composed as follows: Section 2 provides an outline of the database. Chapters 3.1 and 3.2 are dedicated to the empirical calibration analyses estimating default probabilities on the basis of the relative frequency of defaults (Chapter 3.1) on the one hand, and by means of logistic regression (Chapter 3.2) on the other. Chapter 3.3 focuses on integrative considerations. A summary and an outlook conclude the present paper.

2 Database

Creditreform delivered the data it made available to the Oesterreichische Nationalbank (OeNB) in two sets: one set containing data as of year-ends 2000 and 2001 and the other containing data as of year-ends 1996 to 2001. The two data sets were extracted from the database at different points in time (in July and in August 2002) and are not immediately comparable with regard to the period covered by both sets, December 31, 2000, to December 31, 2001. Sample checks showed that scores and other key data were changed between the two extractions from the database (sometimes retroactively), and data had been added or deleted, etc. Finally, the data obtained from Creditreform were complemented by data from the Major Loans Register of the OeNB.

The data sets used in this study are structured as follows:

Data set 1: 9,752 observations, with characteristics including com-

¹ The authors are members of the Banking Analysis and Inspections Division of the Oesterreichische Nationalbank. The opinions stated in this paper are those of the authors and should not be interpreted as reflecting the view of the Oesterreichische Nationalbank.

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pany register number, postal code (region), sector code (as assigned by Creditreform), sales volume as of December 31, 2001, credit risk score assigned by Creditreform as of December 31, 2000 and December 31, 2001, Major Loans Register data (above all credit line utilization) as of December 31, 2001. Of the 9,752 companies reported solvent as of December 31, 2000, 196 defaulted in the course of 2001, which translates into an average probability of default of about 2% for the respective year.

Data set 2: 10,273 observations including the same characteristics as data set 1 for the period December 31, 1996, to December 31, 2001. This data set provides sales volume figures as of December 31, 2000, and December 31, 2001.

The Creditreform credit standing index is a key component of both data sets. This credit risk score reflects Creditreform's credit assessment of the individual companies. It may vary between 100 (highest creditworthiness) and 600 (lowest creditworthiness, default) and is based on 15 criteria. These criteria include, among others, payment status, credit decision, company development, order book and sector development. Accounting for about 50% of the weighting, payment status and credit decision are crucial to determining the credit risk score.

3 Analyses and Results

3.1 Formation of Classes Based on Relative Default Frequencies

Classification by relative frequency of default (hereinafter referred to as frequency analysis) denotes the construction of rating classes through counting

processes that are directly based on the credit standing index (score). For this purpose, the enterprises are sorted by score and then assigned to a specified number of classes (e.g. class 1: score 100 to 200 etc.). One possible classification approach is to keep the number of companies per class more or less constant (uniform distribution of companies), with operationalization, for example, being effected by applying the following standard: Given ten rating classes, 10% of the companies are assigned to each rating class, while in the case of five rating classes each class contains 20% of the companies, etc. This approach has been adopted in the present study. Another possible variant is the approach pursued in the study by Lawrenz and Schwaiger (2002), which the present study builds on. It requires ex ante definition of the share in total defaults of each rating category (predefined default profile). Both methods use the relative frequency of defaults in the respective class as the estimator for the probability of default (PD).

Our preparatory research comprised the following steps, with the computations based on the update on the New Basel Capital Accord of October 2002 (which incidentally applies with regard to all calculations made): IRB¹) foundation approach with 45% LGD²) and an adjustment for small and medium-sized enterprises (SME) depending on sales volume figures, the latter having been filtered out from the database. Credit line utilization data taken from the Major Loans Register were used as proxy for actual drawings and the default probabilities, owing to the lack of an adequate data

¹ Internal ratings-based.

² Loss given default.

source and contrary to the requirements of Basel II (see chapter 3.3.), were calculated on the basis of one-year observation periods.

Calculation 1: The capital requirement and the PD structure (i.e. a rating system's structure of default probabilities) were calculated for different numbers of rating classes, leaving conditions otherwise unchanged if possible. The objective was to analyze the effects of a systematic variation in the number of rating classes on both capital requirement and PD structure. These calculations were based on data set 1.

Calculation 2: The capital requirement was calculated and the PD structure was examined over time, based on data set 2. Again, default probabilities were in each case computed on the basis of a one-year observation period.

The method of uniform distribution of companies was applied to ensure comparability of the results: this means that the number of rating classes was varied while an approximately equal number of companies was assigned to each of the classes. The approach based on a predefined default profile (instead of a uniform distribution of companies), by contrast, would in a first step require the definition of a method allowing for a consistent *ceteris paribus* variation in the number of rating classes.

As to calculation 1, we examined the capital requirement and the PD structure for 5, 7, 10, 12 and 15 classes. As these calculations show, the capital requirement declines steadily as the number of rating classes increases, namely from 6.18% (5 classes) to 5.88% (15 classes).

The PD structure, however, exhibits a monotonically rising pattern

only with a system of five classes (with the probabilities of default increasing monotonically from the highest to the lowest class), whereas monotonicity is absent given a system of seven or more classes. This implies that, other things being equal, the number of rating classes cannot be increased arbitrarily without forfeiting certain desirable characteristics of the PD structure, such as monotonicity.

As to calculation 2, based on data set 2, we investigated the behavior of the capital requirement and the PD structure over time. From the total number of observations made we filtered out the individually relevant data sets for each of the years, eliminating, among other things, enterprises that had become insolvent by the beginning of the respective year. We thus obtained differing numbers of data sets for each of the years, with the number of observations increasing from 6,137 for 1996/97 to 9,419 for 2000/01. We set up seven classes, each comprising approximately the same number of companies. The average probability of default increases across the entire observation period from 1.16% in 1996/97 to 1.93% in 2000/01.¹⁾

As the sales figures required for calculating the capital requirement over time were not available from Creditreform for the years 1997, 1998 and 1999, the SME adjustment for all of these years was invariably computed on the basis of the 2001 sales volume. Drawings were again estimated on the basis of the Major Loans Register data (credit line utilization) for the individual years. The following picture emerges with regard to the capital requirement over time (see table 1):

¹ *As already mentioned, the differences between data sets 1 and 2 with regard to the year 2000/01 are attributable to the different dates at which the data were extracted from the Creditreform database.*

Table 1

Capital Requirement Over Time					
	1996/97	1997/98	1998/99	1999/2000	2000/01
	Number				
Companies	6,176	6,883	7,653	8,527	9,419
	%				
Capital requirement	4.68	5.32	5.40	5.29	5.86
Default rate	1.16	1.23	1.33	1.37	1.93

Source: Creditreform, OeNB, own calculations.

It should be noted in this context that the development of the capital requirement reflects the marked rise in the average probabilities of default in the observation period: for the years 1997/98 to 1999/2000 default rates equaled between 1.2% and 1.4%, while the capital requirement varied between just below 5.3% and 5.4%. By comparison, the default rate for the year 2000/01 was substantially higher at 1.93%, resulting in a corresponding increase in the capital requirement to 5.86% against the previous years. The same applies vice versa for the year 1996/97 by comparison to the subsequent years or for a direct comparison of the years 1996/97 and 2000/01, subject to the reservation that the figures for 1996/97 have to be interpreted with a certain degree of caution owing to the smaller sample size.

The average capital requirement for the five years observed is 5.31%, given an average default rate of 1.41% for the period as a whole. Factoring out 1996/97 from the calculation, the average capital requirement is shown to be 5.47% at an average default rate of 1.47%.

The changes in the PD structure computed on the basis of the frequency analysis show that the form varies over time. The only uniform aspect is a monotonic increase in the probabilities of default across all years from class five downwards. The better classes fail to exhibit a constant structure over time. These observations lead to the conclu-

sion that frequency analysis, if calculated on the basis of a one-year observation period, allows the characteristic of monotonicity to be generated in a PD structure just once, but that this feature will be lost over time, all other things remaining equal.

This applies both for the uniform distribution of companies used in calculation 1 and in calculation 2, and the approach based on a predefined default profile. With the latter, a consistent monotonicity over time will only be obtainable if the predefined class-specific default rates are modified for each of the years to reflect the changes in the database, but not if these rates are assumed to be constant. Such an approach would also require the continuous adjustment of the (score) thresholds for the individual rating classes, thus increasing the erratic migration of some companies across different rating classes quite independent of their actual economic situation.

3.2 Logistic Regression

The logistic regression model estimates the relationship between a linear combination of impact factors $\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n$ and a dependent variable which may assume only one of two values (in our case default / no default). Furthermore, it is important that the score values (the values of the index $\beta'x$, which can serve as measure for the credit quality of a company) are mapped on the interval $[0,1]$, in which way each score value

relates to a number from the interval $[0,1]$ that can be interpreted as probability of default (n being the number of companies, \mathbf{x} the vector of the independent variable, and $\boldsymbol{\beta}$ the vector of the parameters). The index $\boldsymbol{\beta}'\mathbf{x}$ may serve as a measure of the credit-worthiness of a borrower.

For the nondirectly observable variable y^* we have:

$$y^* = \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n + \varepsilon$$

Let ε have a logistic distribution, with the median 0 and the variance 1 of the distribution being nonrestrictive assumptions. The distribution function of the logistic distribution reads:

$$\Lambda(\mathbf{x}, \boldsymbol{\beta}) = \frac{\exp(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)}{1 + \exp(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)}$$

We can directly observe:

$$y = 1 \text{ if } y^* > 0 \\ y = 0 \text{ if } y^* \leq 0$$

The probability that $y=1$ is hence:

$$P(y = 1) = P(y^* > 0) = \\ = P(\beta_0 + \beta_1 x_1 + \dots + \varepsilon > 0) = \\ = P(\varepsilon > -\beta_0 - \beta_1 x_1 - \dots - \beta_n x_n) = \\ = P(\varepsilon < \beta_0 + \beta_1 x_1 + \dots + \beta_n x_n) = \\ = \Lambda(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)$$

as the logistic distribution is a symmetrical one.

The maximum likelihood optimization method is used to estimate the coefficient vector $\boldsymbol{\beta}$. This method maximizes the probability (L) that the estimated model will reproduce the values observed for y . The logistic function Λ indicates the probability of default, whereas $1-\Lambda$ indicates the probability of survival.

$$\text{Max}L = P(Y_1 = y_1, \dots, Y_n = y_n) = \\ = \prod_{y_i=0} [1 - \Lambda(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)] \\ \prod_{y_i=1} \Lambda(\beta_0 + \beta_1 x_1 + \dots + \beta_n x_n)$$

The logistic model is used to assign a probability of default to each company, to set up classes and to calculate the capital requirement for Austrian SMEs. It is implemented in four steps:

3.2.1 Selection of the Explanatory Variables Based on Data Set 1 with a View to Maximizing the Model's Robustness and Power

Model specification (MS) 1: A constant and the Creditreform credit risk score were included as explanatory terms. In a next step we examined whether the inclusion of other available variables with a potential impact on the credit standing of a borrower had the effect of improving the quality of the model.

Model specification 2: Constant, Creditreform credit risk score and $\ln(\text{sales } 2001)$ as proxy for the company size.

Model specification 3: Constant, Creditreform credit risk score and a dummy variable indicating the Austrian province to which it pertains.

Model specification 4: Constant, Creditreform credit risk score, $\ln(\text{sales } 2001)$ and a dummy variable indicating the Austrian province to which it pertains.

Sector membership was also tested on the basis of data set 2 using dummy variables. Application of the same maximum likelihood optimization routine failed to produce a satisfactory solution. One reason for this is that the effect of sector membership is already accounted for by the industry risk variable included in the Creditreform scoring model, which actually obviates the explicit inclusion of industry dummies as it only results in a less satisfactory model specification.

Table 2

Estimates Obtained on the Basis of Data Set I: Coefficients with the Appertaining Values

for t- and p (in parenthesis)

	Constant	Score 2000	ln(sales 2001)	Vienna	Lower Austria	Tyrol	Upper Austria	Salzburg	Vorarlberg	Styria	Burgenland	Capital requirement %
MS 1	- 9.85	0.02										6.04
	-24.84 (0.0)	17.2 (0.0)	..	..	..	..	..	..	..	..	..
MS 2	14.23	0.02	0.26									6.50
	- 9.63 (0.0)	17.14 (0.0)	3.12 (0.002)	..	..	..	..	..	..	..	..
MS 3	10.38	0.02	0.73	0.60	0.68	0.66	0.25	-0.41	1.00	0.13		5.94
	-20.43 (0.0)	16.83 (0.0)	2.34 (0.02)	1.78 (0.08)	2.00 (0.05)	2.00 (0.05)	0.71 (0.48)	-1.09 (0.28)	2.35 (0.02)	0.39 (0.70)	..	
MS 4	14.27	0.02	0.23	0.67	0.58	0.69	0.64	0.25	-0.39	1.00	0.11	6.27
	- 9.37 (0.0)	16.7 (0.0)	2.75 (0.006)	2.13 (0.03)	1.70 (0.09)	2.02 (0.04)	1.95 (0.05)	0.70 (0.48)	-1.03 (0.30)	2.34 (0.02)	0.33 (0.74)	

Quelle: Creditreform, OeNB, own calculations.

It is evident from the t statistic, which shows whether a coefficient is significantly different from 0 (“discriminatory power”), and its p value (the probability that this t value will be observed) that not only the score, but also ln(sales 2001) has a high information content. The joint significance of the province dummies was tested by means of the Wald test (Greene, 1993): The χ^2 statistic yields 1.12, with the critical value of the χ^2 distribution with eight degrees of freedom at the 95% confidence level being 15.50; this implies that the hypothesis that the coefficients of all province dummies are 0 cannot be dismissed. Creditreform does not take into account the province effects in calculating the credit risk score (a certain degree of significance is therefore observed in the above estimates), but a province-specific model specification still requires some further considerations.

In order to ensure a meaningful application of the goodness-of-fit measures in the further process, it is necessary to verify the robustness of the estimation model in the first place. Most of the problems arising with regard to the robustness of a logit-type

model are related to heteroskedasticity, as it results in inconsistencies in the estimated coefficients (implying that the precision of the parameter estimate decreases as the size of the sample increases). We applied the statistical test by Davidson and MacKinnon (1993) to test for the hypothesis H_0 of homoskedasticity. The results of this test show that H_0 cannot be dismissed for the model specifications 1 and 3: In the first case, the χ^2 statistic is 0.08, in the second, 14.15, with the critical value of the χ^2 distribution with nine degrees of freedom being 14.68 at the 10% confidence level. In the case of model specifications 2 and 4, heteroskedasticity can be dismissed only at the 10% confidence level.

Model specification 1 hence represents the best model in terms of robustness and significance of the explanatory variables.

The goodness-of-fit tests, by contrast, provide no information on the model specifications, but only with regard to the information contained in the explanatory variables. One of the goodness-of-fit measures implemented in the present study is that of McKelvey and Zavoina (1975):

$$R_{MZ}^2 = \frac{\sum_{i=1}^n (\hat{y}_i^* - \hat{y}_i^*)^2}{\left(\sum_{i=1}^n (\hat{y}_i^* - \hat{y}_i^*)^2 - n\right)}$$

with n representing the number of observations, \hat{y}_i^* the estimated value of y_i^* , and \hat{y}_i^* the corresponding mean value. According to the test results, R_{MZ}^2 being 59%, model specification 4 shows the highest information power.

Another goodness-of-fit measure implemented is the Gini coefficient derived from Gini curves. The Gini curve is created by sorting the companies by their risk, i.e. by their credit standing index. The fraction of defaulted companies $y(x)$ is established for each fraction x of companies with the highest risk score. The Gini coefficient is defined as the area between the model's Gini curve and a random model Gini curve ($y(x) = x$ applying for the random model) divided by the area between the Gini curve of a perfect model and a random model Gini curve. The higher the value of the Gini coefficient, the higher the model's power of differentiating companies according to their creditworthiness. The Gini coefficients vary between 62.08% for model 1 and 66.56% for model 3.

A conspicuous feature is that the models containing the explanatory variable $\ln(\text{sales } 2001)$ are less well specified, but exhibit a higher information content. The estimation re-

sults of model specification 1 (see table 3) also indicate that average sales per rating class generally decrease as the probability of default increases. These findings suggest either that the company size has an impact on the probability of default – but this is already accounted for in the Creditreform score – or that other size indicators such as the number of employees might actually prove to be a more suitable proxy for the company size instead of sales.

3.2.2 Calibration and Formation of Classes

Calibration was based on the assumption that our sample exhibits the same default level as the universe, i.e. that it is sufficiently large and representative.

The classification into classes using the logistic approach was also subject to the rule that approximately the same number of companies had to be assigned to each rating class. Our objective was to calculate the capital requirement in line with the Basel requirements in terms of monotonicity and an adequate number of companies per class, but always restricted to one year at a time. This means that in calibrating the model we renounced the objective of temporal stability (and the implied homogeneity of rating classes).

Table 3 provides a list of the estimated probabilities of default set against the observed relative fre-

Table 3

Results Based on Model Specification I and Data Set I

	Probability of default	Default rate	Average sales volume	Average drawings
	%			
	EUR			
Rating class 1	0.303	0.359	12,369,335	661,056
Rating class 2	0.454	0.574	10,978,920	447,701
Rating class 3	0.553	0.431	655,008	225,184
Rating class 4	0.737	0.790	582,990	285,106
Rating class 5	1.298	0.790	767,034	343,341
Rating class 6	2.323	2.728	527,660	198,157
Rating class 7	8.402	8.399	394,803	173,116

Source: Creditreform, OeNB, own calculations.

Table 4

Five-Year-Development – Estimates Based on Data Set 2

	1996/97	1997/98	1998/99	1999/2000	2000/01
Capital requirement	5.29	5.66	5.44	5.19	6.12

Source: Creditreform, OeNB, own calculations.

quency of default (default rates). An interesting observation is that, as seen in columns four and five, average sales volume figures and average drawings decline as creditworthiness decreases.

3.2.3 Variation in the Number of Rating Classes

Based on data set 1, we calculated the capital requirement for different numbers of classes – 5, 7, 10, 12 and 15 classes – for model specification 1 as defined in chapter 3.2.1. We formed classes by assigning an equal number of companies to each class. The results show that the capital requirement declines continuously from 6.08% in the case of five rating classes to 5.96% given 15 rating classes.

3.2.4 Five-Year Development

By analogy with calculation 2, we examined the behavior of the capital requirement and the PD structure over time.

The capital requirement varies between 5.29% in 1997 and 6.12% in 2001, with the average value for the five-year period equaling 5.54%.

3.3 Integrative Considerations

3.3.1 Basel II Minimum Requirements and

Their Implications for the Present Study

The basic principles behind the IRB minimum requirements are that rating and risk assessment systems should ensure:

- a well-founded assessment of the debtor and transaction characteristics,
- a meaningful risk differentiation,

- adequately accurate and consistent quantitative risk estimates.

3.3.1.1 Rating Structure

With explicit reference to corporates, banks and sovereign exposures in the present context, a bank must, both in terms of its debtor rating and its facility rating, exhibit a meaningful distribution of exposures across the different grades (without excessive concentrations) – i. e. sufficient to enable adequate risk differentiation. To ensure compliance with this requirement, a bank must have a minimum of seven debtor grades for nondefaulted borrowers and one for defaulted borrowers. The supervisory authority may (in the case of banks with borrowers of heterogeneous debtor quality) demand a higher degree of differentiation.

Banks with credit portfolios concentrating on a specific market segment and a certain default risk range must have a sufficient number of grades within this range to prevent an excessive debtor concentration within any specific grade. Significant concentrations within individual grades must be accompanied by sound empirical evidence to the effect that the grade covers a tolerably narrow PD bandwidth.

Worth discussing in this context is the Basel requirement regarding the minimum number of seven rating grades for nondefaulted borrowers. We compared this minimum number requirement with the results of the present study by mapping rating

classes in conjunction with the monotonicity feature in the PD structure. We observed that the Creditreform data for mapping classes on the basis of the relative frequency of default, given an equal number of companies per class, only yield a monotonically increasing PD structure if the computations are made on the basis of five rating classes. The assumption is that the approach of modeling on a single reference point in time for each of the years would be more likely to yield a monotonically increasing PD structure than a dynamic approach. The observation derived from the Creditreform data is hence evidence of the fact that the number of possible and assignable rating classes is a function of the discriminatory power of the rating system and cannot be treated as a separate feature. The degree of subdivision into rating classes is limited by the discriminatory power of the rating system.

3.3.1.2 Evaluation Horizon and Stress Scenarios

The time horizon used for computing PD estimates was one year. Banks, however, must base their rating assignments on a longer time horizon. The PD estimates must represent a long-term average of realized one-year default rates for the borrowers in the respective grade. A bank may use a simple average of PD estimates for individual borrowers in a given debtor class. Irrespective of whether a bank uses external, internal or pooled data sources or a combination of the three, the series of observations for at least one source must cover a minimum period of five years. If the available observational data from one of the three sources cover a longer period of time and the data are relevant, this longer period must be used. In order to avoid

unjustified optimism, the bank must increase its estimates by a conservative margin, the size of which depends on the probable range of the estimation errors.

Given the difficulties of forecasting future events and their effects on the financial situation of specific borrowers, the bank must adopt a conservative stance with regard to forecast information. Furthermore, in the event that only a restricted database is available, the bank must adopt a conservative bias in its analyses.

Bank-internal assessments of the performance of their internal rating systems must be based on a long data history and cover a range of basic economic conditions ideally one or several economic cycles. A debtor rating must reflect the bank's assessment with regard to the capability and readiness of the borrower to meet its obligations even in an adverse economic environment or despite the occurrence of unexpected events.

To comply with this requirement, the bank must base its rating assignments on specific adequate stress scenarios. Alternatively, the bank may meet this requirement without explicit specification of a stress scenario by taking into account the debtor characteristics that reflect the borrower's vulnerability to adverse economic conditions and unexpected events. The range of economic conditions considered in the assessment must make allowance for both the current conditions and the conditions likely to prevail across an economic cycle within a specific sector or geographical region.

The bank must have a regular process cycle of model validation in place, including monitoring of the model's performance and stability as well as testing of model outputs against out-

comes. Model validation must include out-of-time and out-of-sample tests. Moreover, it must state the circumstances under which the model fails to generate efficient results.

As the subject of the present study does not consist in dynamic (i.e. inter-temporal) PD estimates, but rather in the analysis of specific situations with reference to a specific point in time, the rules prescribed by Basel II were not applicable in the present context. Still, it is worth mentioning that the long-term averages of one-year default rates required with regard to PD estimates are inconsistent with the approach of mapping classes in accordance with the principle of predefined class-specific default rates. The difference between the two approaches basically manifests itself in the fact that the Basel provisions, owing to the envisaged inclusion of the default rates across the economic cycle, offset the procyclical PD trend (and the implied cyclical fluctuation in the capital requirement). By contrast, if based on predefined class-specific default rates, a constant PD structure for the rating classes and the individual companies cannot be obtained over time for two reasons: on the one hand, the PDs of the individual rating classes vary depending on the number of borrowers assigned to a class and the realized one-year default rates attributed to them. Assignments – based on the ranking derived from the score – are made in accordance with predefined threshold values for the cumulative default rates. Given a classification based on cumulative default rates, on the other hand, companies may be seen to migrate between adjoining rating classes over time.

At this point, we would like to underline that the issue of model validation was not subject of the present

study, nor could it have been owing to the insufficient data source. However, there is no doubt that the issue of validating rating systems will assume a crucial role within the context of further system developments and the implementation process.

In the same vein, an IRB bank must have sound stress testing processes in place for determining capital adequacy. Stress testing must involve identifying possible events or future changes in economic conditions that could have unfavorable effects on a bank's credit exposures, as well as assessment of the bank's ability to withstand such changes.

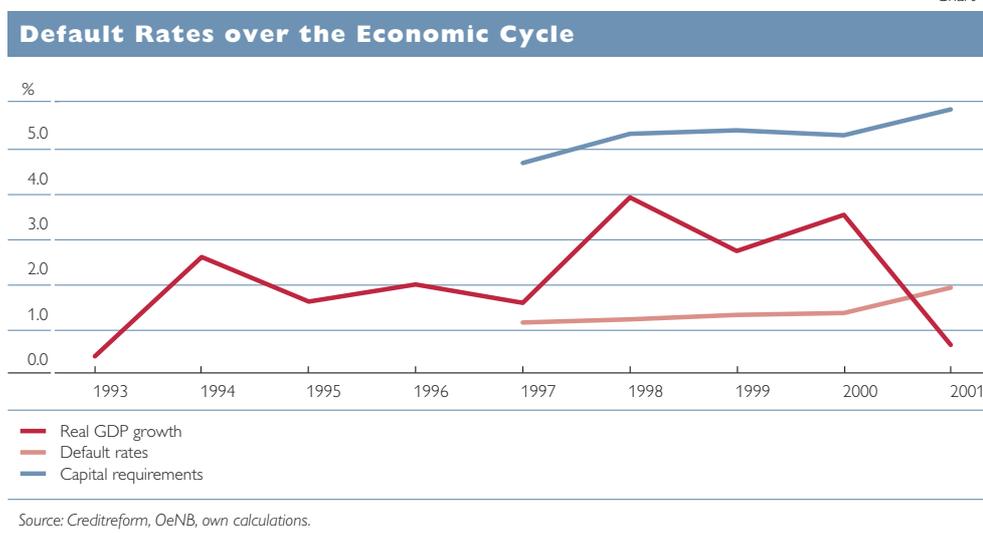
3.3.2 Embedding the Data in a

Macroeconomic Framework

In chart 1 the default rates of the Creditreform data used are set against the capital requirement computed by applying the frequency analysis method and given uniform company distribution, and annual GDP growth. The calculations were based on the period from 1993 to 2001, allowing a representation of the data embedded in the cyclical development. What immediately catches the eye is the fact that the real-term decline in growth of about 3 percentage points in the period from 2000 to 2001 entailed an increase by $\frac{1}{2}$ percentage point in the computed capital requirement.

However, as suggested above, the change in the capital requirement is not to be interpreted as an indicator of procyclical behavior, because, since the PD estimates are based on one-year default rates, they fail to meet the required smoothing across the entire economic cycle as required under the New Basel Capital Accord. Chart 1 nevertheless clearly demonstrates that in the absence of this smoothing function, the period 2000 to 2001 would exhibit

Chart 1



procyclical effects, since the decline in real GDP growth and increased default rates would result in a higher capital requirement.

4 Summary

The computations illustrate the sensitivity of the annual capital requirement to the respective average annual default rate. Any substantial increase in actual defaults, as observed in 2000/01 against the previous years, entails a marked increase in the capital requirement. In order to forestall undesirable procyclical effects, the New Basel Capital Accord prescribes that the default probabilities per rating class must be calculated on a data set comprising several years (a minimum of five years). The frequency analysis method is not a suitable instrument for generating stable and monotonic PD structures over time, hence other methods must be applied. A promising approach consists in the application of logistic regression.

The structure of a rating system's default probabilities (PD structure), generated on the one hand by varying the number of rating classes and, on the other hand, by testing the PD structure over time, yields the follow-

ing picture: The maximum number of rating classes depends on the structure of the underlying data and the goodness of fit (discriminatory power) of the rating. The greater the number of representative data that are available in adequate quality and the higher the discriminatory power of the rating, the larger the number of rating classes with a monotonically increasing PD structure that can be created.

Further steps suggesting themselves for the sequel to the research conducted within the context of the present study include:

- 1) calibration on the basis of a longer time series,
- 2) validation of rating systems and
- 3) dynamic (intertemporal) modeling of the PD structure.

Of these three items, the wide area of validation in particular should be seen as a rather complex task. Although the working group on validation appointed by the Basel Committee on Banking Supervision has been dealing with this issue, it is to be expected that there will be ample scope for discretionary action at the national level.

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Overview of Austrian Banks' Internal Credit Rating Systems

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I Introduction

Under the Financial Market Supervision Act (Finanzmarktaufsichtsgesetz), the rules of the Austrian Banking Act (Bankwesengesetz) governing the Major Loans Register (Großkreditevidenz) have been expanded to include additional reportable items. Accordingly, as of the start of 2003,¹⁾ Austrian credit institutions have to report to the Oesterreichische Nationalbank (OeNB) for each reportable borrower²⁾ also the value of collateral held against major loans, the amount of specific loan loss provisions made and the credit rating given to the borrower. The rules of Article 75 paragraph 1 item 4 of the Banking Act are supplemented by the OeNB's guideline on reporting major loans. Under this guideline, banks are obliged to disclose to the OeNB also their internal principles and rules for the valuation of collateral, the calculation of specific loan loss provisions and the establishment of internal credit ratings. This documentation is to provide a description of the procedures and methods used as well as of their integration into the overall credit risk management. Initially, it will be sufficient for banks to submit the documents they use internally for those purposes.

The expansion of the reporting requirements for the Major Loans Register was worked out by the Austrian supervisory authorities together with the OeNB and the banking industry. This step was motivated by the need to meet the increasing demand for information about credit quality from international bodies such as the International Monetary Fund and the

World Bank. Moreover, the idea was to initiate joint preparations for the requirements to be introduced under the new capital adequacy framework ("Basel II") due to take effect at the end of 2006. Basically, this type of information is to enable the supervisory body to perform two types of analyses:

- to assess the quality of (major) loans portfolios
- to assess the quality of credit risk rating systems

These analyses are now being implemented at the OeNB step by step. In this process, the OeNB will publish important findings through its various means of communications. This first report provides an overview of the credit rating systems Austrian banks use. The procedures employed for the valuation of collateral and the calculation of risk provisions are to be analyzed at a later date. This overview is based on the system descriptions provided by the Austrian banks to date. It is preceded by a theoretical section outlining a general framework for a comparison of the banks' credit rating systems. The criteria derived from this exercise will then be used for comparing the Austrian banks' credit rating systems. By way of introduction it is pointed out that the system descriptions provided by the banks as a first step were compiled with different levels of detail and therefore do not always cover all areas required for a comprehensive analysis. This initial overview is therefore confined to a number of key components of banks' internal credit rating systems. The concluding summary aims to assess the status of the Austrian

1 The reporting duty commences in the fiscal year ending after April 1, 2002. As the majority of banks have fiscal years ending on December 31, the first reporting date for most banks is January 31, 2003.

2 Loans qualify as major loans if the borrower's credit line or use of a facility is in excess of EUR 350,000.

banks' credit rating systems, specifically with a view to Basel II and to identify potential further steps in the analysis of credit risk rating systems and loan portfolios.

2 Potential Frames of Reference for Banks' Internal Credit Rating Systems

In the past few years, the focus of theoretical studies and practical applications has shifted increasingly to a common frame of reference for diverse credit rating and credit risk measurement procedures, with new developments in banks' credit risk management practices being a key driving factor in this process. Since about the mid-1990s, banks operating internationally have increasingly been introducing integrative control practices based on risk-return principles to all business functions. A key component of such practices is a standardized measurement of risk across banks' different categories of risk. At the same time, new risk measurement methods have been developed, mainly to control market risk, and applied to other types of risks as well. This confronted many banks with the practical challenge of rendering not only different types of risk – such as market risk and credit risk – comparable but of also standardizing risk measurement for different categories of credit risk, such as corporate loans, retail loans as well as interbank lending and sovereign lending.

These developments in the banking sector are now being recognized in reforming the capital adequacy framework. Under Basel II, the international supervisory authorities are seeking to establish a general framework for credit risk classification and measurement that is designed to cover

the different types of banks' internal systems as well as external ratings. In addition, the Basel Committee for Banking Supervision, while working on the reform of the capital adequacy framework, has also been considering the definition of generally recognized standards for credit risk management. In developing our frame of reference we therefore start with the general requirements to be met by credit risk management and, on that basis, discuss the current proposals for Basel II. This will be supplemented by some references to theoretical considerations.

2.1 The Supervisory Framework for Banks' Internal Credit Rating Systems

The Principles for the Management of Credit Risk issued by the Basel Committee for Banking Supervision (2000) in September 2000 address the following four areas of credit risk management:

- credit risk strategy and policy
- the credit-granting process
- credit administration, measurement and monitoring
- credit risk control

The standards for risk classification systems in the area of credit administration, measurement and monitoring are specified in more detail, with a special focus on the following areas:

- continuous monitoring of the quality of each loan including procedures for determining adequate risk provisions
- development and operation of an internal risk classification system for a differentiated identification of credit risk
- information system and analytical methods for the measurement of credit risk

The principles governing credit-granting activities include an additional list of criteria to be applied in determining a borrower's legal capacity to borrow and credit-worthiness prior to approving a credit, such as the purpose of the credit, the borrower's risk profile, its debt repayment capacity and debt service history, the management's business expertise, the status of the borrower's industry, the terms and conditions of the credit, the adequacy of collateral and guarantees as well as the borrower's personal integrity.

The Principles for the Management of Credit Risk published by the Basel Committee for Banking Supervision (2000) include only a very general description of the required credit rating system. Specific aspects of credit assessment are addressed only in the standards governing the credit-granting process. As another essential observation, the credit rating system is regarded as a component of an overall risk classification system that is closely integrated with ongoing credit monitoring and risk measurement activities.

In the current proposals for Basel II, the key rules for credit risk classification are found in the so-called minimum requirements for internal ratings and the admission criteria for external ratings.

The rules governing the recognition of outside credit rating agencies focus on the validation of ratings on the basis of published data including default histories, transition statistics or ratios between upgrades and downgrades. With regard to credit rating methods the very general requirement is that these have to be validated strictly and systematically against historical data. Ratings have to be reviewed on an ongoing basis and

adapted to changed economic circumstances. In addition, the rating agency is required to have adequate resources to be able to maintain continuous contact with the managements of the rated enterprises to assure the quality of the rating results.

The minimum requirements to be met by internal rating and risk measurement systems are to ensure, quite generally, a valid assessment of borrower and transaction characteristics, adequate risk differentiation and sufficiently exact and consistent estimates of the risk parameters. The highly detailed rules are subdivided into rating system design, rating procedures, corporate governance and control, use of rating results in credit risk management, risk quantification, validation of risk parameter estimates, use of supervisory estimates, and disclosure rules. The key details of the provisions that appear to be essential to the following analysis of credit rating systems are identified and summarized below.

The rules for system design define, first of all, the concept of the rating system. According to the capital adequacy framework, the term "rating system" comprises "all of the methods, processes, controls, and data collection and IT systems that support the assessment of credit risk, the assignment of internal risk ratings, and the quantification of default and loss estimates." A bank's internal credit assessment system is thus to be viewed as an integrated part of a bank's internal rating system. Within an asset class – in the internal ratings-based (IRB) approach, Basel II differentiates the following asset classes: corporate exposures (including special lending), sovereign exposure (including loans to certain other public sector entities), bank exposure, retail exposure and equity exposures as well as eligible purchased

receivables and securitized assets – a bank may use different rating systems. The question of the minimum number of different rating systems a bank has to operate has not been addressed specifically. Based on the other rules, particularly the roll-out rules and the rules for risk quantification, it is to be assumed, however, that different rating systems will have to be applied to corporate exposures, sovereign exposures, interbank exposures, and retail exposures. Equity exposures may be grouped with corporates (at least for the purpose of credit rating), purchased receivables and securitized assets with the rating system that applies to the underlying type of receivable. The situation is less clear with regard to a separate rating system for special lending, which the proposals had long recognized as a separate class of assets, and with regard to exposures to small- and medium-sized enterprises (SMEs), which depending on the total debt outstanding may be classified either as corporate or as retail exposures. Overall, it may be concluded from the above that under the IRB approach banks require different credit rating systems for different categories of borrowers.

Another key provision concerning rating design relates to the rating dimensions. Basically, a two-dimensional rating system is called for, which assesses and measures borrower-specific risks and transaction-specific risks separately. Credit rating is thus to be separated from the assessment of the loan agreement structure, e.g. debt service hierarchies and any collateral and guarantees that may be involved. A separate transaction rating should be employed for the second rating dimension. For banks that wish to pursue only the foundation IRB approach, a so-called facility rating will be adequate, which – similar to a rat-

ing agency's issue rating – merely modifies the credit rating by taking into account transaction characteristics. Exceptions are allowed only for special lending, e.g. for real estate projects, for which a two-dimensional system is not required, as in such cases the borrower's credit rating is virtually inseparable from the valuation of the collateral. For retail lending, a fundamentally different type of risk classification is required. Borrowers or loans with identical risk characteristics are to be aggregated into so-called risk pools. Criteria for such pooling are, first, borrower characteristics and, second, transaction characteristics as well as various stages of payment delinquency.

Another central element of system design is the number of risk classes. Under the IRB approach, a minimum of seven rating classes have to be provided for performing borrowers and a minimum of one class for nonperforming borrowers in order to ensure sufficiently fine risk differentiation. A minimum number of classes has not been specified for the purpose of transaction or facility rating. For special lending, only a minimum number of four classes of performing borrowers are required if a simplified risk weighting procedure is used. A minimum number of pools for retail exposures has not been specified.

The provisions relating to the rating criteria are worded in very general terms and regulate their level of detail, transparency, consistency of application as well as the completeness and timeliness of information. The rating horizon should be longer than one year. For the use of statistical models slightly more detailed requirements have been defined regarding proof of their forecasting ability and periodic review.

Of the provisions governing rating procedures those regulating rating coverage appear to be of importance in the context of credit rating systems. Basically, credit ratings are required for all borrowers and all counterparties in transactions that are sensitive to credit risk. In addition, banks have to implement processes for the ongoing procurement of information about changes in the borrowers' credit standing and other facts relevant to risk, such as changes in the valuation of collateral. A formal rating procedure has to be performed for each borrower at least once annually. Exemptions are provided, however, for retail exposures, where ongoing monitoring may be confined to a representative sample of the loans in a pool.

The provisions for risk quantification describe the procedures eligible for estimating the probability of default for each credit class. As a general rule, these should be based on internal credit loss data in conjunction with external data, e.g. from outside rating agencies, and so-called pooled data, such as data originating from several banks operating equivalent credit rating systems.

With regard to the credit rating systems, the current proposals for Basel II are much more detailed than the Principles for Credit Risk Management, particularly where rating classes and rating dimensions are concerned. Rating criteria, however, are likewise defined only in very general terms.

2.2 Theoretical Considerations on Banks' Internal Credit Rating Systems

In recent years, the theoretical literature about general standards for rating systems has also been influenced strongly by the consultations on Ba-

sel II and has therefore likewise addressed the subject of comprehensive risk classification systems (RCSs). The following summarizes the requirements to be met by credit rating systems as defined in a number of representative articles.

Krahnhen and Weber (2001) set out the theoretical requirements for risk measurement and, from these, derived the following key principles for credit assessment:

- a bank's rating system should be able to rate all of its past, current and future clients
- there should be as many different rating systems in place as necessary and as few as feasible
- risk classification should be as fine as necessary
- the rating system should be information efficient, i.e. all of the information available should be correctly factored into the rating

Garside and Greenman (2002) define the essential elements of a robust rating system that have to be incorporated in any bank-wide risk measurement system in a similar manner, from a consulting company's perspective:

- a two-dimensional rating structure with separate rating of borrower and transaction risks
- a differentiated master scale for credit risk, calibrated to a credit cycle-neutral probability of default
- different credit rating systems for different customer groups based on a common master scale
- differentiation of transaction-specific risk factors by product and collateral characteristics
- recognized validation processes to establish the reliability of rating tools and calibrating parameter estimates

Harris (2002) examines banks' internal rating systems from an outside

rating agency's perspective and arrives at similar criteria:

- adequate degree of risk differentiation for each business area
- separate assessment of the borrower and the facility
- consistent application across the entire banking group
- tracking of default and loss events and integration of findings into system development

The steps of a prototypical risk classification process as defined by Crouhy et al. (2002) are outlined below as representative of the numerous articles about the credit rating criteria of an internal rating system from a bank's point of view:

- (1) assessment of a borrower's financial status

Result of step 1: **preliminary borrower rating**

- (2) analysis of management quality
- (3) the borrower's competitive position
- (4) assessment of the quality of financial information
- (5) analysis of country risk
- (6) comparison with external rating information, if available
- (7) analysis of lending structure

Result of steps 1 to 7: **final borrower rating** and probability of default

- (8) assessment of loss in case of default across the various facilities
- Final result: **facility rating** representing the product of probability of default and expected amount of losses

In addition, reference is made to a list of rating criteria that was still part of the second consultative paper of the Basel Committee for Banking Supervision on the new capital adequacy framework but was then removed.¹⁾

- (1) the borrower's capacity to earn cash flows for funding debt service and maintenance of business activities
- (2) capital structure
- (3) profitability
- (4) quality of borrower information
- (5) diversification of business activities and sources of income
- (6) financial flexibility and access to financial markets and alternative sources of finance
- (7) management capabilities
- (8) competitive position in the industry and industry outlook
- (9) country risk

2.3 Areas to Be Analyzed by Credit Analysis Systems from Supervisory and Theoretical Perspectives

The Principles for Credit Risk Management published by the Basel Committee for Banking Supervision do not have to be implemented in Austria immediately, and the current proposals for Basel II can still be amended before implementation in 2006. Nonetheless, a number of key areas can be identified for an initial analysis of the credit rating systems from a supervisory perspective. A selection of theoretical articles written from different perspectives suggests roughly the same areas to be analyzed by credit rating systems. Within the scope of this paper, only a limited selection of potential areas can be made on the basis of the highly heterogeneous information base (see above). Therefore, the following important aspects of credit rating systems are to be examined empirically with a view to the Austrian banks below:

- basic orientation: pure credit rating or transaction rating

¹ Quoted for instance by Szczesny and Ewert (2002).

- specialization and completeness: general rating system or focus on specific categories of borrowers
- degree of differentiation: number of rating classes
- methodological basis: expert system or statistical model
- information content: coverage of relevant areas of analysis
- basis for risk measurement: combination with external ratings

3 Analysis of Austrian Banks’ Credit Rating Systems

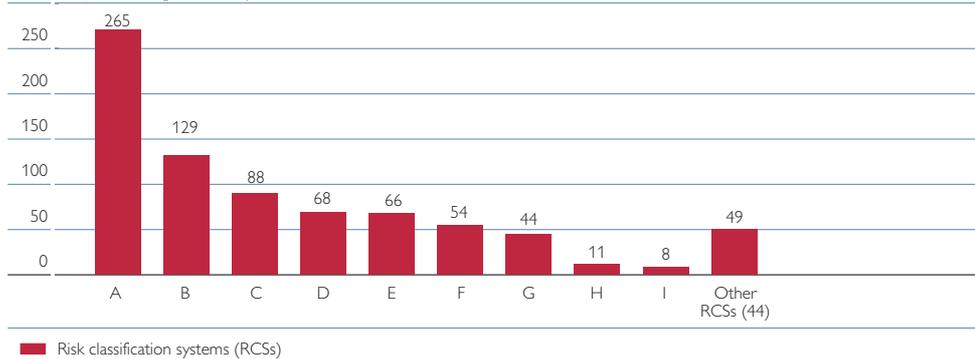
3.1 Underlying Data

The OeNB has received the system descriptions of a total of 782 banks’ RCSs. These RCSs each consist of one or several credit analysis systems,¹⁾ with banks belonging to the same banking group or sector typically using the same RCS. Overall, the Austrian banks were found to operate a total of 53 different RCSs.

Chart 1

Distribution of Risk Classification Systems

Number of banks using the same system

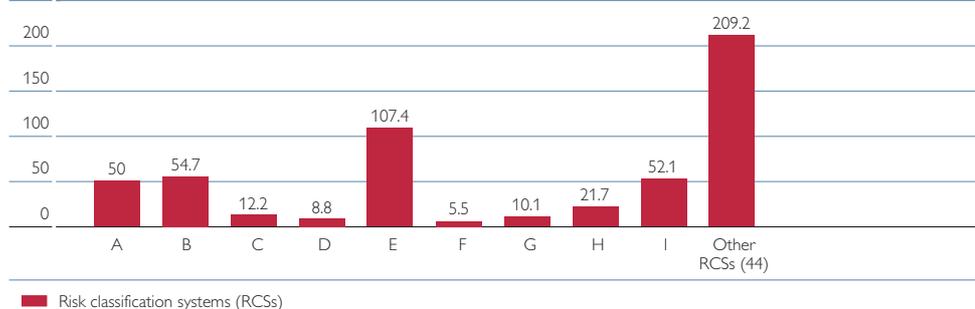


Source: OeNB.

Chart 2

Distribution of Total Assets by Risk Classification System

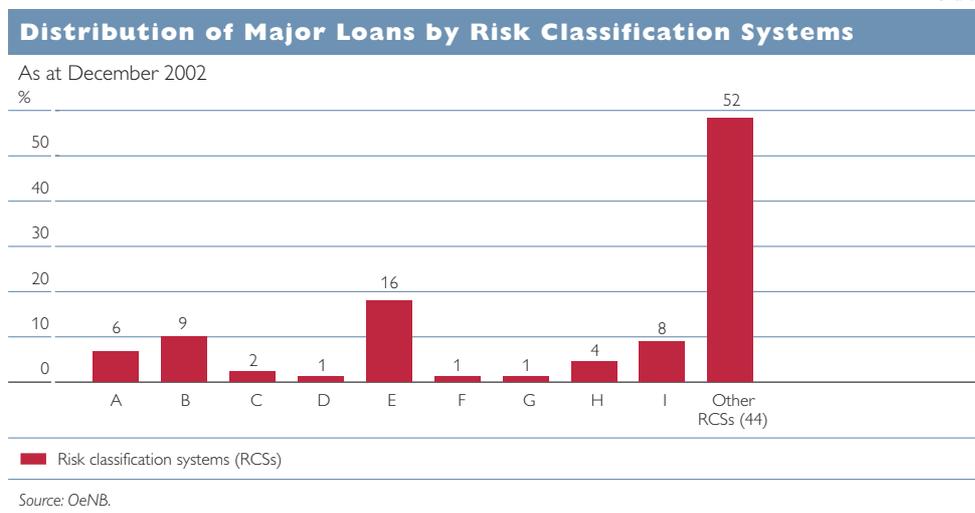
EUR billion



Source: OeNB.

¹ The terms “risk classification system” and “rating system” are used synonymously and, as explained in section 2.1, comprise both credit analysis systems, which examine borrower-specific risk, as well as assessment systems for transaction-specific risks.

Chart 3



Identical systems are those for which the banks specifically reported using a shared system. Chart 1 shows the distribution of RCSs, i.e. the number of Austrian banks sharing a system:

Of the total number of 53 RCSs, 9 systems (A–I) are used by more than three banks and, overall, by approximately 95% of all credit institutions having submitted reports to date. Of the remaining 44 RCSs, 3 are used by two banks each and 41 by just one single institution.

The charts 2 and 3 show the distribution of total assets by RCS (chart 2) and the distribution of major loans by RCS (chart 3) as at December 2002. These charts clearly show that large institutions tend to use their own systems whereas small banks affiliated with a specific banking sector use shared RCSs.

3.2 Basic Orientation

Almost all of the RCSs reported assess borrower-specific and transaction-specific risks separately. Only some very small institutions use a mixed system, i.e. one that factors in both borrower-specific and transaction-specific ratings. These institutions are unable to separate these two as-

pects (as required for the reporting of major loans) and report only the borrower-specific portion of the credit rating.

3.3 Specialization and Completeness

Two-thirds of all RCSs reported include only one single general credit rating system, i.e. all borrowers are reported through one undifferentiated system. The other RCSs distinguish

Chart 4

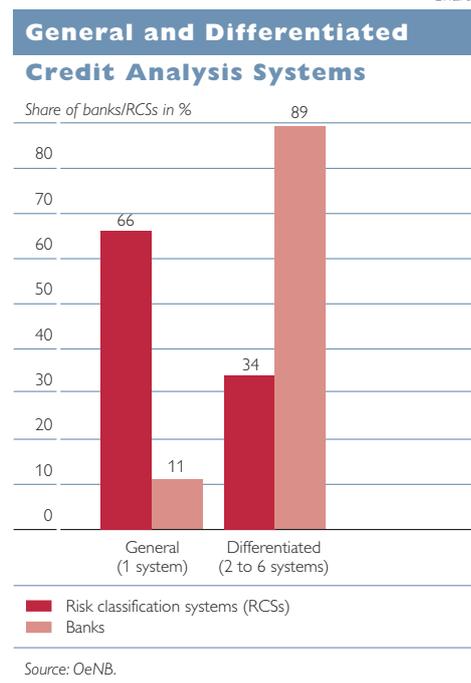
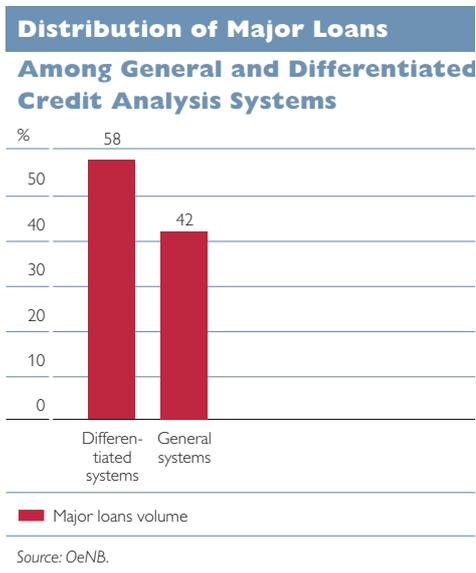


Chart 5



fact operate a differentiated assessment procedure for different customer groups in the background.

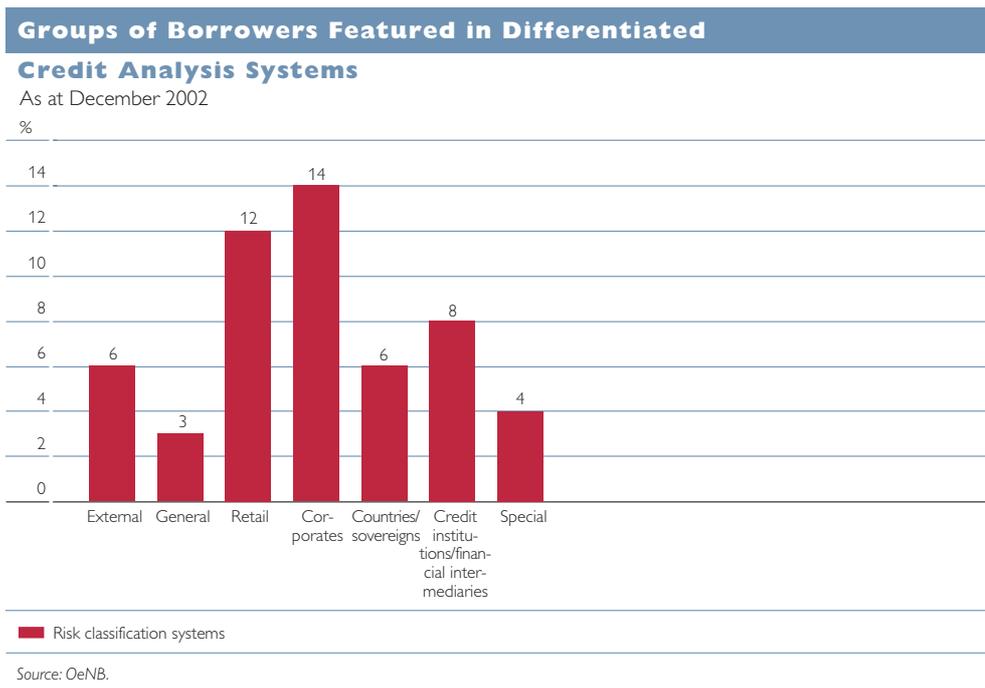
As at December 2002, about 60% of major loans were reported by banks with differentiated systems and about 40% by banks with a general system (see chart 5).

This distribution of volumes shows that even some of the larger banks reported using only a general system. This lends added weight to the assumption that they use in fact a so-called “master scale,” which means that the bank feeds data from its different credit rating systems into a single scale for major loan reporting purposes.

between different groups of borrowers, with the number of credit rating systems varying between two and six. Overall, however, about 90% of the banks use a differentiated system (see chart 4). In addition it may be presumed that some of the banks that report using only a general system in

Chart 6 shows the typical borrower groups of the 18 RCSs that feature differentiated credit rating systems. The borrower group appearing most frequently in credit analysis systems is “corporates” followed by “retail.” One-third of the risk classification systems also include ratings from international rating agencies (“exter-

Chart 6



nal”), which are incorporated into risk classification directly, without prior conversion to an internal credit scale. The three RCSs featuring a “general” group use this category as a second system besides an external rating, which means that borrowers with an international rating are covered by the external rating while all other borrowers are rated by the “general” model. The use of separate rating models for SMEs is rare. The borrower group named “special” comprises systems used, e.g. for investments, SMEs, cross-border borrowers, agricultural businesses or tourism. Special rating procedures for start-up enterprises are likewise used only occasionally. More frequent are rules in corporate rating systems providing for newly founded enterprises not to be rated above a certain level.

With all banks, the problem of non-rated borrowers is one that seems to be negligible. On the one hand, this involves only certain groups of clients, such as securitized assets in the trading book or pass-through loans. A ma-

ior part of non-rated borrowers are in fact clients who have not been rated yet owing to incomplete documentation but who will be rated in the future.

3.4 Degree of Differentiation

The rating classes can be broken down into performing classes for active borrowers and nonperforming classes for clients who are defaulting or where a loss has been incurred already.

Chart 7 illustrates the 35 RCSs with only one single credit analysis system (general systems, no differentiation by borrower groups) broken down into performing (left) and nonperforming (right) classes.

A clear majority of banks with a general credit analysis system uses one to six performing and up to two nonperforming classes. Any further differentiation particularly of the nonperforming classes is not very common.

The 693 banks reporting differentiated credit analysis systems with several borrower groups show a clear bias

Chart 7

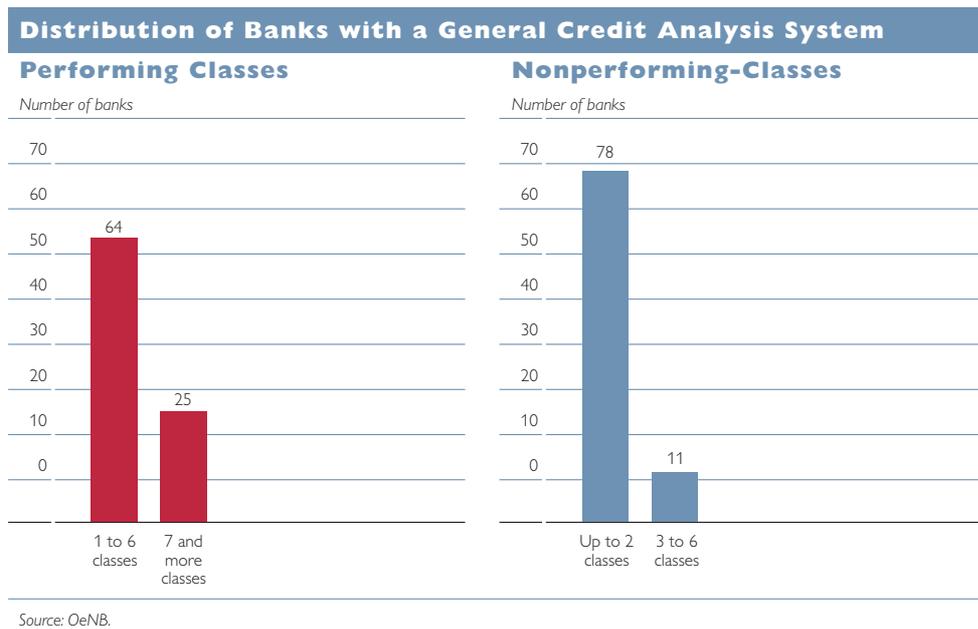
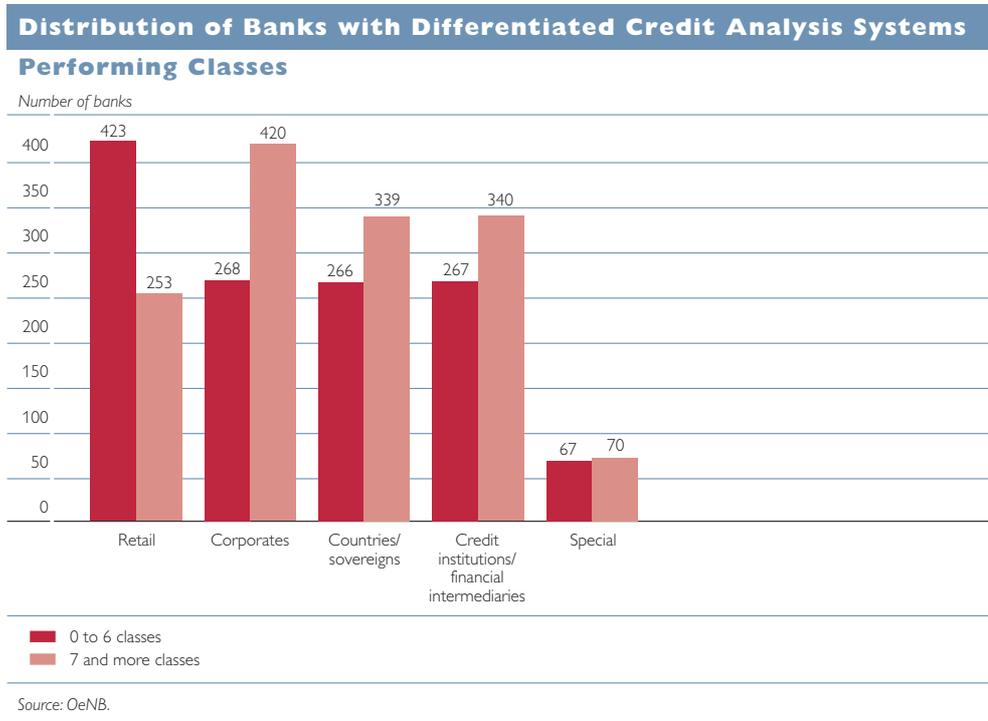


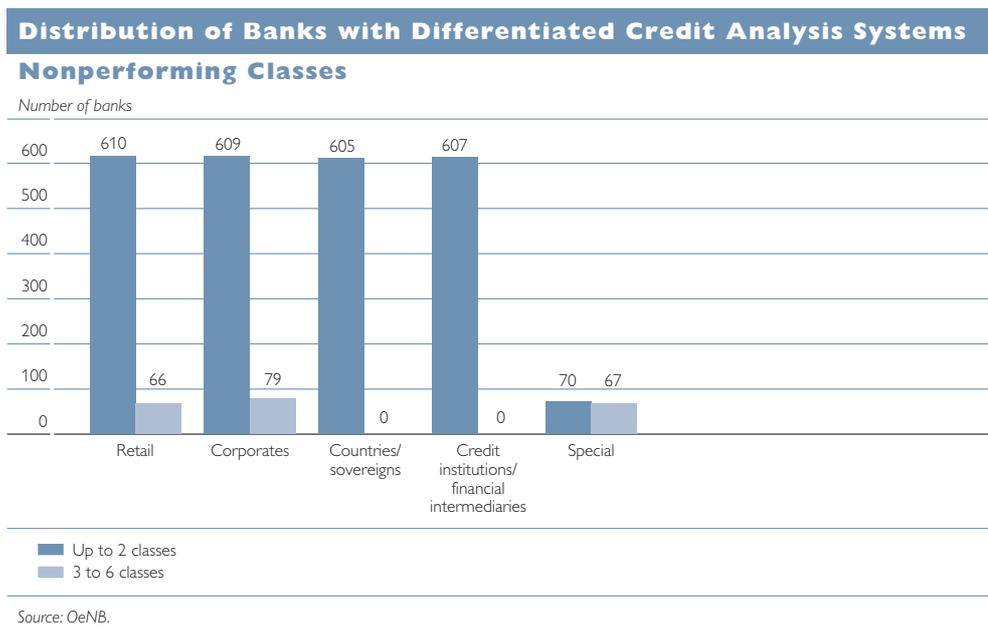
Chart 8



towards more differentiated systems in the performing classes (chart 8). Specifically the borrower groups “corporates,” “countries/sovereigns,” and “credit institutions/financial intermediaries” predominantly have rating scales comprising seven or more

levels. Scales with up to six levels predominate only in the “retail” exposures. With the nonperforming classes (chart 9) as with the general systems a less detailed subdivision (up to two levels) is the most common method.

Chart 9



3.5 Methodological Basis

Credit rating models are generally classified as statistical methods based on defined ratio analyses and standardized questions, expert systems based on individual analyses, and mixed systems comprising both standardized ratios and questions as well as individual analyses.

A perusal of system descriptions revealed that the large banks use statistical methods for the majority of their borrowers, i.e. for the “bulk business.” These statistical methods rely on defined ratios and scores for information about the management. They are applied primarily to the client categories “retail” and “corporates.” Small institutions that do not employ a shared system within a group or a sector usually operate expert systems or mixed procedures combining fixed ratio valuations and free analyses.

Large banks likewise use, in addition to statistical methods, expert systems for an individual assessment of special businesses such as project or cross-border finance. For bank and country ratings, even larger banks frequently employ mixed systems utilizing external ratings along with individual analyses.

3.6 Information Content

The rating criteria used are of course highly heterogeneous and differ in detail among bank and client segments. Within the scope of this paper only a very general overview can be given.

As regards the approaches used for corporate credit analysis (SMEs and large enterprises), the majority of the credit rating systems analyzed rely on three different mechanisms: quantitative factors, qualitative factors, and warning signals/negative information.

With most banks, the quantitative factors considered are derived almost exclusively from an analysis of the annual financial statements, with the main focus being on the equity ratio and the debt structure. In addition, dynamic cash flow or EBITDA-based ratios are considered, such as EBITDA (earnings before interest, taxes, depreciation and amortization) versus bank liabilities or cash flow versus operating performance. Other inputs factored into the analysis include other ratios such as turnover ratio or credit periods.

In addition to analyzing the annual financial statements, some banks also examine account information such as use of overdrafts and credit lines, repayment periods and credit balances versus turnover.

For an assessment of the qualitative factors most of the statistical models use a questionnaire with a scoring system. In assessing soft facts, banks look primarily at questions relating to the management, the accounting system and the borrower’s market position. Particular attention is devoted to the quality of the management, succession rules, the enterprise’s position in the market, its geographical location, the quality of its accounting system, orders booked and the quality of the organization.

Very often current negative information and additional warning signals are taken into account in analyzing and rating enterprises. Such additional information is frequently rated in a standardized manner. Of interest are primarily delays in paying interest charges and redeeming principal, changes in the use of overdraft facilities or disputes with the management. With this type of data, the main focus is on the currency of the information.

Where the analysis of retail clients is concerned, the credit rating systems

studied are very similar. The main criteria are annual income, private wealth, type of occupation, trade references and an account analysis. The resulting scores are usually entered into a questionnaire in a semi-automated process to obtain a rating.

In the case of bank and country ratings, the internal credit analysis is very frequently based on external ratings supplied by international rating agencies. In addition, however, the banks often also conduct their own analyses, which frequently are modeled after expert systems or mixed systems.

3.7 Basis for Risk Assessment

Only a very small number of credit institutions quote probabilities of default for the individual rating classes in their system descriptions. It may be assumed, however, that more banks have estimates of credit losses or are about to compile time series as a basis for such estimates. On the other hand, many banks include into their system descriptions conversion factors for translating their own ratings into the scores of one or several external rating systems. With this type of conversion, however, some slight differences may arise when translating data for various rating systems used by external agencies.

4 Summary

A first analysis of credit rating systems based on system documentations provided to the OeNB to date by 782 credit institutions as part of major loan reporting yields the following preliminary findings:

- Almost all credit institutions operate a two-dimensional rating sys-

tem which assesses and measures borrower-specific risks and transaction-specific risks (loan agreement structure) separately.

- The majority of institutions also use credit rating systems that differentiate between different groups of borrowers. While separate systems for corporate and retail clients are the rule, about half of these RCSs also have separate credit rating systems for sovereigns and banks. With these exposure categories, external ratings are increasingly used for risk classification. It is pointed out in this context, however, that some banks have probably reported a “master scale” while in actual fact running differentiated systems.
- Assuming a minimum number of seven performing classes as currently required under Basel II and one default class¹) as a benchmark, one finds that the majority of the rating systems that differentiate by groups of borrowers would be deemed sufficiently differentiated. With the general credit rating systems, the number of rating levels is lower in most cases. Here reference is made again to the problem mentioned above, i.e. of banks using a “master scale.”
- The methodological basis is predominantly a mix between statistical methods and expert systems. In some groups, e.g. retail clients, statistical methods predominate while for other groups, such as sovereigns, banks or special lending, pure expert systems are used.
- Within the scope of this paper it is not possible to offer more than an overview of the rating criteria em-

¹ The definition of nonperforming classes used in most risk classification systems deviates from the definition of “default” employed in Basel II. Therefore, no direct comparisons are undertaken for this rating class.

ployed. No fundamental differences were found among the banks, however.

- A number of banks are in the process of developing risk measurement on the basis of credit rating systems. Translating internal credit classes into rating levels specified by external agencies seems to be a commonly used method, however. As already mentioned, the current proposals for Basel II are still open to modification prior to their implemen-

tation in 2006. Nonetheless, some important conclusions can already be drawn from this initial analysis of credit rating systems from a supervisory perspective. The credit rating systems of most Austrian credit institutions are basically ready to meet future supervisory requirements in terms of basic orientation, specialization and degree of differentiation and there is no need for fundamental adjustments.

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Credit Derivatives – Overview and Implications for Monetary Policy and Financial Stability

Martin Scheicher

I Introduction

Despite a variety of structural changes, the risk profiles of banks in the euro area are still dominated by the development of credit exposure. Credit risk measures potential losses arising from the default of a debtor, or, more generally, from the deterioration of its creditworthiness. According to a survey by Duffie and Singleton (2003), credit risk is defined as the loss associated with unexpected changes in credit quality. It is not only incurred through the issuance of loans, but also takes the form of positions in corporate bonds or transactions in over-the-counter (OTC) markets, which involve the risk of a counterparty's default.

Compared to equity markets, debt markets show a number of particular idiosyncrasies which complicate the management of credit risk and pose significant challenges to financial institutions. First and foremost, there are the problems of market imperfections – adverse selection and moral hazard – which academic literature has studied in detail.¹) As trading does not take place in an active and liquid market, the quality and dissemination of information is rather limited, its distribution asymmetric and its transparency low. Second, the holding period of assets is relatively long. Finally, the empirical distribution of credit risk is skewed because the probability that a debtor improves its creditworthiness is lower than the likelihood of a downgrade.

The credit markets and therefore also banks' activities have changed within the last few years owing to a number of parallel and interdependent developments:

- The increasing importance of capital markets: The growth in disintermediation and the larger role of investment banking activities have changed the structure of loan and credit markets.

- The development of the Single Market and the introduction of the euro: Together with disintermediation, the integration of capital markets in the euro area has led to strong growth in corporate bond markets. Credits have achieved the status of a separate asset class.
- Changes in the public debt markets: The reduced importance of government bonds as benchmark assets has made instruments that are not entirely free of default risks more important. A prominent example is bond issuance by agencies such as Freddie Mac and Fannie Mae.
- The LTCM crisis: The collapse of this highly leveraged market participant has increased the awareness for counterparty risk in over-the-counter markets.
- The impact of the Basel II process: Once introduced, a key objective of the new regulatory framework is to improve the treatment of credit risk by better aligning regulatory and economic capital. This process has pronounced effects on the pricing, trading and risk analysis of both private and public debt instruments.
- The growing use of securitization: Securitization is a transaction where a pool of assets is sold in the form of a tradable security. A common example is a large set of mortgages pooled in an asset-backed bond and then sold to investors from a bank's loan book. In parallel, syndicated loans and

¹ A discussion of these issues is offered in chapter one of Duffie and Singleton (2003).

the secondary market for loans have shown growth tendencies.

- The increasing frequency of defaults: Currently, we observe a rise in the number of insolvencies owing to the economic slowdown and the persistent decline in stock prices. Recently, there has also been an accumulation of very large cases of insolvencies, such as Enron and WorldCom in the U.S. and Rail-track or Swissair in Europe.
- Improvements in risk management methods: For a number of years, supervisory authorities have required banks to measure their exposure to market risk and to compute their capital requirements accordingly. For the modeling of market risk, the value at risk (VaR) concept has become generally accepted. The VaR predicts the amount of money a bank may lose on its trading activities over a certain time horizon. Applying the VaR concept has prompted the introduction of more sophisticated methods to measure market risk and to implement the corresponding risk management procedures.
- More research on measuring credit risk, both by academics and commercial providers.

In reaction to these conditions and to a general change in the overall environment, new financial products have emerged. The latest example of this process of innovation is the market for credit derivatives. For a number of years, this market segment has seen very high growth rates. The first respective transaction took place around ten years ago in the U.S., but strong activity has only been observed over the last five years.

The growing use of credit derivatives has contributed to structural changes in the credit markets since

credit derivatives facilitate the transfer of credit risk, which used to be very difficult and costly. Credit derivatives transfer the credit risk contained in a loan, interbank transaction or bond from the protection buyer to the protection seller without affecting the ownership of the underlying asset (the reference asset). Using financial/credit instruments to provide protection against default risk is not new. Letters of credit or bank guarantees have been applied for some time and also securitization is a commonly used tool. However, credit derivatives show a number of differences. First, their construction is similar to that of other financial derivatives. As it is the case with e.g. equity options, credit derivatives trading takes place separately from the underlying asset. Second, credit derivatives are regularly traded. This guarantees a regular marking to market of the relevant positions. Third, trading takes place via standardized contracts prepared by the International Swaps and Derivatives Association (ISDA), an association of market participants. Hence, there is no need to negotiate the terms on a case-by-case basis. Finally, the transaction has no impact on the legal relationship between debtor and protection buyer, as only the default risk is transferred. This characteristic of credit transfer instruments is of key importance because, in many countries, selling loans is difficult owing to the applicable tax regulations or the requirement for the borrower to agree to the sale. A transaction in the credit derivatives market has no impact in the relationship between debtor and creditor.

A key property of credit derivatives is that owing to their derivatives structure, they allow for the trading and diversification of credit risk. The

introduction of credit derivatives allows traders to package the risk inherent in a loan into two or three tradable components. The interest rate risk is thus isolated via interest rate swaps, the credit risk via credit derivatives, and if an exchange rate risk exists, it is taken out via foreign exchange derivatives. Given that risks that were formerly inseparable are now packaged into new components, they can be separately sold to those willing to bear them. According to microeconomic theory, this should result in an increase in allocational efficiency.

This nontechnical paper serves two purposes: First, we aim to provide a concise description of the credit derivatives market. Second, we attempt to analyze the aggregate effects of credit derivatives from a macroeconomic perspective. Given that credit derivatives are expected to have an impact on credit markets, we describe their implications for the financial system and the conduct of monetary policy.

The literature on credit derivatives can be separated into three groups, namely academic research, publications by market participants, and studies carried out at central banks. In the field of academe, most of the relevant publications have so far been published in mathematical finance or empirical finance. Overall, the literature mainly focuses on theoretical pricing models.¹⁾ Up to now, only two empirical studies have attempted to evaluate the information content of credit derivatives.²⁾ So far, however, there are only a few papers

that deal with the respective implications for the financial system.³⁾ Given this early stage of academic research, publications by market participants are an important source of information. A number of surveys by market practitioners describe the various products that are available in the market as well as their pricing, accounting and risk management. Two extensive overviews have been published by Deutsche Bank (1998) and JP Morgan (1999).⁴⁾ These publications will form the basis for section 2.1.

Last but not least, central banks have also investigated the market for credit derivatives. On the one hand, the BIS-based Committee on the Global Financial System (CGFS) has studied credit risk transfer in detail. The committee's exhaustive report first gives some background information on the market for credit risk transfers. It goes on to provide a detailed overview of the market, with particular emphasis on market concentrations and the valuation of the respective instruments. The report focuses on three critical areas, namely incentives, structural implications and policy issues. With a view to incentives, it studies potential changes in the relationship between borrower and lender. We will return to the policy issues raised by the CGFS in our conclusion. On the other hand, the Bank of England and the Federal Reserve have both published comprehensive studies on the subject.⁵⁾

The remainder of this paper is organized as follows: In section 2, we

- 1 For a recent example, see Jarrow and Yildirim (2002).
- 2 Cossin and Hricko (2002) investigate the determinants of credit risk in a unique sample of credit default swap transaction data; Houweling and Vorst (2002) perform an empirical evaluation of default swap pricing methods.
- 3 Some of the problems created by credit derivatives are studied in Morrison (2001).
- 4 See also Kasapi (1999) and Scott-Quinn and Walmsley (1998).
- 5 Federal Reserve System (Bomfim, 2002; Ferguson, 2002) and Bank of England (Rule, 2001a and 2001b; Marsh, 2002).

describe the various instruments, the size of the market and the market participants. A key question from a central bank perspective is how the development of the credit derivatives market may affect monetary policy and financial stability. As the market is still at an early stage of develop-

ment, any conclusions we draw can only be of a very tentative nature. These tentative implications are outlined in section 3. Since we focus on macroeconomic questions, regulatory issues are outside the scope of this paper.

Glossary

<i>Bank liability curve</i>	<i>Yield curve derived from interbank money market interest rates and interest rate swaps</i>
<i>Bond yield</i>	<i>Rate of return on bond investments (equates the market price to the present value of the expected future cash flows)</i>
<i>Call option</i>	<i>The right (but not the obligation) to buy a certain asset</i>
<i>Counterparty risk</i>	<i>Risk of loss occurring if a counterparty on the interbank market is unwilling/ unable to fulfill its contractual obligations</i>
<i>Credit derivative</i>	<i>Instrument which transfers the default risk from the protection buyer to the protection seller</i>
<i>Credit spread</i>	<i>Difference between the yield of a default-risky instrument and the yield on a government bond or interest rate swap</i>
<i>Credit risk</i>	<i>Risk of default and/or widening of credit spread</i>
<i>Default risk</i>	<i>Risk of loss owing to default</i>
<i>Derivative instrument</i>	<i>Instrument whose price depends on that of another instrument, e.g. forward contract, option or interest rate swap</i>
<i>Hedging</i>	<i>Transaction aimed to provide protection against a certain risk category</i>
<i>Liquidity risk</i>	<i>Risk of loss arising from failure to timely close a position in a trading portfolio</i>
<i>Mark to market</i>	<i>Valuation by means of the most recent price (as opposed to accounting valuation with a historical price or book value)</i>
<i>Market risk</i>	<i>Risk of loss arising in trading portfolios owing to large-scale price movements</i>
<i>Option</i>	<i>The right (but not the obligation) to buy or sell an asset within a given period of time at a price fixed today</i>
<i>Over-the-counter market</i>	<i>Trading of financial instruments outside organized exchanges</i>
<i>Protection seller</i>	<i>Market participant providing protection against credit risk</i>
<i>Put option</i>	<i>The right (but not the obligation) to sell a certain asset</i>
<i>Reference asset</i>	<i>Asset which serves as the underlying asset for a credit derivative</i>
<i>Strike price</i>	<i>The specified price of an option contract at which the contract may be exercised</i>
<i>Swap</i>	<i>Over-the-counter contract for the periodic exchange of payment flows between two counterparties</i>
<i>Value at risk</i>	<i>Potential portfolio loss caused by adverse price moves for a given holding period (typically one to ten days) and probability (e.g. 95%)</i>
<i>Yield curve</i>	<i>Relation between individual interest rates and their respective maturities</i>
<i>Underlying asset</i>	<i>Financial instrument on which a derivative is based, e.g. the interest rate, stock price or exchange rate</i>

2 Overview of the Credit Derivatives Market

2.1 Instruments

The continued market development makes it rather complicated to arrive at a common classification of all the available instruments. There is a considerable variety of instruments which are traded with varying frequencies. The following products are regularly used:

- (1) credit default swap (CDS)
- (2) total return swap (TRS)
- (3) credit spread option (CSO)
- (4) credit-linked note (CLN)
- (5) collateralized debt obligation (CDO)

Other instruments of increasing complexity result from the combination of the above types.

2.1.1 Credit Default Swap (CDS)

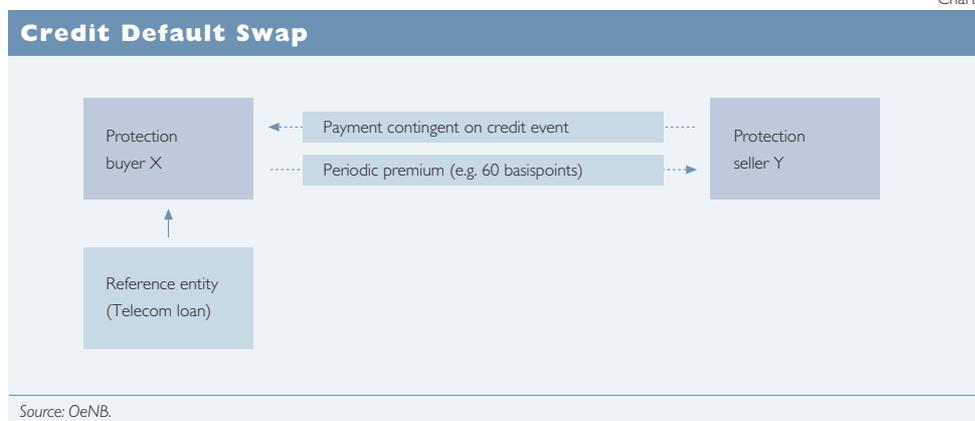
CDSs are the most commonly traded credit derivatives with an overall market share of around 67% (FSA, 2002). A CDS serves to transfer the risk that a certain entity defaults from the protection buyer to the protection seller, who receives a fee. In the CGFS terminology, the former is termed risk shredder and the latter risk taker. In case of a default, the seller fully compensates the buyer for the losses, but other risks, e.g. the impact of changing interest rates on the asset value, are not transferred and therefore remain with the debt owner. The details of the transaction are recorded in the CDS contract, which is commonly based on the ISDA Master Agreement. In particular, the contract provides the legal definition of situations in which the protection seller must compensate the protection buyer, i.e. the credit events. Commonly, credit events comprise five possible cases:

- the reference entity's failure to meet payment obligations when they are due;
- bankruptcy;
- repudiation;
- material adverse restructuring of debt;
- acceleration or default of obligation.

If any of the events described in the contract occurs, the compensation will be transferred. Here, we distinguish two mechanisms, namely credit risk transfer via cash settlement (i.e. the price difference between the current value and the nominal value of the reference asset) or physical settlement (i.e. the securities specified in the CDS contract are delivered from the protection buyer to the seller). Commonly, CDS transactions have a maturity of five years and average a nominal value of USD 25 million to USD 50 million. In the euro area, CDS for more than a hundred names are regularly traded.

A simple example can illustrate the way a CDS functions: A bank X has a considerable credit exposure to the telecom sector and intends to reduce its risks without selling the respective loans. Hence, via a broker, bank X starts a CDS with bank Y, which has so far focused its lending activities on Eastern Europe. Bank X transfers the default risk inherent in its telecom loans to bank Y, which is compensated with a fixed periodical fee for bearing the default risk. This periodical fee, or premium, is the price of default protection the broker quotes. It can be interpreted as a direct and regularly available indicator of the reference asset's credit quality. The details of the transaction are based on the ISDA Master Agreement which, among other essential details, also defines the credit event. As a

Chart 1



Source: OeNB.

result of the transaction, the risk shredder X has reduced its credit risk without changing the material composition of its loan book, while the risk taker Y receives the premium and has improved the performance of its portfolio given the diversification benefits of the two sectors. Under the assumption of correlated risks, the basis for this transaction is the comparative advantage both parties realize by trading with each other. Bank X has mitigated its credit risk and bank Y has improved the risk/return performance of its portfolio.

Two methods are available for the pricing of a CDS. CDS valuation can be based on a theoretical model for the default risk. As an alternative, one may use a replication approach, separating the product into synthetic components for which market prices can be observed. Hence, the CDS payment structure of the protection buyer can be approximated by taking a long position in the corresponding default-risky asset and short-selling the risk-free asset, i.e. taking a loan at the going money market rate. For a large sample of CDS quotes, Houweling and Vorst (2002) show that pricing on the basis of a reduced form model is superior to a replication approach based on the prices of corporate bonds.

2.1.2 Total Return Swap (TRS)

Similar to CDSs, a TRS is also a contract between two market participants; it is based on a reference asset, but the risk transfer is different from a CDS. As the name says, a TRS exchanges the total return from e.g. a loan against a contractually fixed payment irrespective of the occurrence of a credit event. Hence, all payments from a credit asset are transferred to the protection seller, who receives a fixed payment in compensation. Therefore, in addition to the default risk, the protection seller also takes on all other risks, in particular the interest rate risk.

2.1.3 Credit Spread Option (CSO)

A CSO is a derivative on the spread between the default-risky asset and the bank liability curve. Therefore, this instrument is aimed at providing protection against both the credit event and also any other changes in the spreads. This makes the contract simpler to specify, as compensation must be paid for any widening of the spread above a certain strike price, irrespective of a credit event. The options are most commonly put options and can be of the European or the American type, depending on the exercise features included in the contract.

The value of the option is determined by the difference between the current spread of the underlying asset and the predetermined strike price. If this spread is negative, i.e. if the option is in the money, the put position's current payoff is positive. When valuing option contracts, market participants use forecasts of the probability of different spread levels for the period until the derivative expires. Market participants' perception of the spread movement, in particular of the volatility or the probability density until expiry, is thus incorporated into the market price of put and call options in the process of trading.

2.1.4 Credit-Linked Note (CLN)

The above instruments are off-balance-sheet derivatives. They can be repackaged to create new tradable securities. One example is the CLN, a synthetic security composed of individual instruments. In the simplest case, a CLN combines a bond of medium maturity with a CDS. The bank seeking default protection issues a note whose payoff depends on the financial health of the reference entity. As a CLN is based on a CDS, the only risk transferred is the default risk. The protection seller, who in this case buys the note, makes its payment at the beginning of the transaction. Hence, the bank basically receives additional capital it can put aside to cover losses arising from the loan. Moreover, the default risk is spread across a multitude of protection sellers. At the maturity of the CLN, the issuer repays the nominal value minus any losses caused by the potential impact of credit events. Hence, a CLN can be interpreted as the creation of a new bond without the involvement of the original debtor.

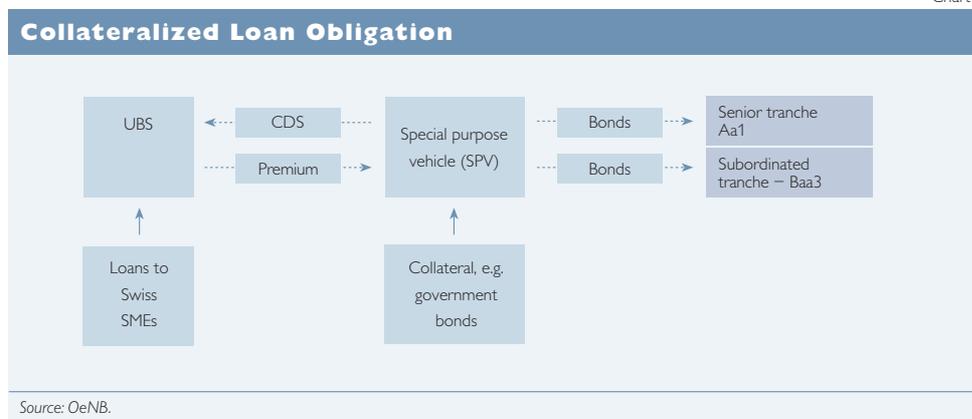
While these four instruments have been traded on the market for some time, other products for the transfer of credit risk are also gaining market share. One of these is the multi-name transfer of default risk. Such contracts do not serve as protection against the default of a single entity, but cover a portfolio or basket of debtors. The credit event is then triggered by the first default of a name contained in the basket. Another possibility is to use more complex, synthetic securities which repackage existing assets into new combinations in order to meet certain investor demands. Here, in particular, the degree of market and credit risk, the desired degree of leverage, maturity, tax characteristics and cash flow structure can be tailor-made. In the course of this development, the established instruments of securitization and the more recently introduced credit derivatives are applied simultaneously.

2.1.5 Collateralized Debt Obligation (CDO)

The use of CDOs has been observed to increase. A synthetic CDO resembles a securitized asset, i.e. a bond issue is covered by debt, e.g. high yield bonds, which remains on the balance sheet of the bank seeking protection. Depending on the form of the underlying asset, the CDO is applied in two forms, namely as a collateralized bond obligation or a collateralized loan obligation (CLO). The transfer of credit risk takes place via special purpose vehicles (SPVs) set up by the bank.

The pioneering transaction by UBS in 2000 can be seen as an example for the mechanisms behind a CLO (UBS, 2000). In June 2000, UBS performed a synthetic securitization of loans to Swiss small and medium-sized enterprises (SMEs), to the total notional amount of

Chart 2



Source: OeNB.

CHF 2.5 billion, by means of a CLO. Within this structure, the respective loans remain under the legal ownership of UBS, while the default risk is transferred via a debt issue and a special entity. The transfer of credit risk takes place by means of an SPV that functions as the protection seller to the bank, which is why this type of security is classified as a synthetic asset. Hence, the SPV serves as the counterparty in the risk mitigation process. The bond issued by the SPV consists of two components (tranches) with investment grade credit quality. The two tranches differ in their exposure to default risks. From the debt issue, government bonds are bought which serve as collateral to offset losses in the underlying loan portfolio. This collateral portfolio is deposited with the SPV. The repayment to the investors at maturity (i.e. after five years) is contingent on the size and frequency of credit events in the underlying loan portfolio and on the respective component of the bond issue the investors bought. CLO constructions frequently contain an equity component which remains with the issuer and serves as the first level of protection against defaults in the underlying assets, while the

subordinated and senior tranches provide the next levels of protection against defaults.

The valuation of CLOs is a complex task which has been given some attention in academic literature. In the risk analysis and market valuation, two factors are crucial: First, the value of the synthetic security is to a significant extent determined by the structure of the default time correlations. It is a considerable challenge for banks to precisely estimate the interdependence of defaults in their loan books. Second, the management and risk controlling of the collateral which the SPV acquires as a reserve for defaults has a considerable impact on the value of the CLO.

2.2 Comparison of the Size of Derivatives Markets

The size of a credit derivatives market can best be quantified using data provided by the Bank for International Settlements (BIS) in its Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity. The latest data set describes the global over-the-counter derivatives markets at the end of June 2001, with data covering banks and dealers in 50 countries. In contrast to other data sources, the BIS sample is more

Table 1

The Size of Derivatives Markets			
	Notional amount		
	June 1999 USD billion	June 2001	Growth %
Foreign exchange	22,055	20,434	– 7.35
Interest rate	48,124	75,890	+ 57.70
Equity	1,341	2,039	+ 52.05
Commodity	506	674	+ 33.20
Credit derivatives	108	694	+ 542.59
Other	10	23	+ 130.00

Source: BIS.

reliable because it eliminates a double-counting of positions.

Table 1 shows that the two largest segments of the derivatives markets by far are those based on interest rates and on exchange rates. The latter category is the only one for which the BIS statistics show a decline for the period from 1998 to 2001. This drop in the recorded notional amount is linked to the beginning of the Economic and Monetary Union (EMU), which has considerably reduced the trading activity by eliminating a number of active rates. Table 1 also shows that the credit derivatives market is still quite small. However, given its particularly pronounced growth of 542%, within the last three years, this market has already overtaken the commodity derivatives market. It has a long history and includes oil-related instruments, which show active trading.

Another view on the dynamic developments in the credit derivatives market is provided by the International Swaps and Derivatives Association's (ISDA) end-2002 market survey, which is based on data from 80 ISDA member institutions: From June to December 2002, the volume of credit default swaps increased by over 37%. According to this latest estimate, the total volume of CDS in the credit derivatives market now amounts to USD 2,150 billion.

2.3 Current Situation

Currently banks, investment funds, hedge funds, insurance companies and corporates are the main participants in the credit derivatives market. This shows that these instruments are also being used by nonfinancial firms, such as companies seeking to protect the default risk they have acquired in the course of vendor financing. Trading is concentrated in London and New York.

The incentives for trading credit derivatives are partly regulatory, but mostly economic in nature. Bearing this in mind, some current applications of credit derivatives are:

- *Management of economic capital:*
Credit risk portfolio management for banks, e.g. to reduce portfolio concentration. As can be seen from the example pertaining to CDS, the use of credit derivatives allows banks to apply portfolio optimization techniques to their loan books.
- *Management of counterparty risk:*
Reduction of the default risk of a counterparty in OTC markets. As the awareness of counterparty risk increased in the aftermath of the collapse of LTCM, demand has grown for insurance against the deteriorating credit quality of important counterparties.
- *Management of credit lines:*
Applied by banks willing to continue providing credit to a client

without increasing their exposure (e.g. based on the business strategy of relationship banks).

- *Management of regulatory capital:*
Banks aim to increase the efficiency of their use of scarce resource capital by means of risk mitigation. Here, the use of credit derivatives aims at utilizing the difference between a company's actual default risk and its capital requirement.¹⁾

- *Investment/diversification:*
A common example in this category is an institutional investor who has had no access to the credit markets so far or who desires to short-sell default risk. Creating synthetic assets composed of credit derivatives and other instruments provides access to these markets. This type of transaction has attracted an increasing number of insurers who wish to enhance the returns on their investments. Another trading strategy is to perform arbitrage between different markets, such as between corporate bonds, the secondary market for loans and credit derivatives.

- *Portfolio hedging:*
An investment bank with a limited amount of capital available wishes to hedge the spread risk in its corporate bond portfolio.

One difficulty in trading credit derivatives is the legal framework of the respective contracts. Frequently, the definition of the credit event is not sufficiently clear. This problem is also seen as a major obstacle by the CGFS (CGFS, 2003). To reduce the negative influence of transaction risk and to lower trading costs, the ISDA has made efforts to improve the definition

of bankruptcy and to reduce the need for legal questions to be decided in court. Currently, a number of court cases are pending which are based on different interpretations of whether a credit event actually occurred or not. Two typical examples are conglomerates within which only a lower-level entity defaulted or the question of how the merger of two companies affects the contractual arrangements for default protection.

3 Potential Implications

The ongoing dynamics of the process in question makes it difficult to arrive at definite conclusions regarding the potential implications of the use of credit derivatives. Our discussion is organized in two segments, one dealing with issues related to financial stability and the other with monetary policy issues.

Above all, the general question²⁾ is how the introduction of a derivatives market may affect the underlying credit markets. In the field of financial economics, many authors have studied the potential changes in the stability, liquidity and price formation process of securities markets after a corresponding derivatives market evolved. The comprehensive empirical literature, as surveyed e.g. by Mayhew (2000), has so far failed to prove that the introduction of derivatives trading has destabilized the corresponding underlying markets.

3.1 Financial Stability Issues

When analyzing the implications the credit derivatives market has on the banking system, the first contentious point is the degree of effectiveness of the risk transfer, which is based on

¹ For a discussion of risk mitigation, see BCBS (2001).

² A discussion of the incentive issues is provided by the CGFS (2003).

the reliability of the credit risk mitigation banks achieve through the transfer of credit risk. A number of recent large-scale defaults provide extensive material for analysis. According to market participants, the new instruments proved successful in the case of the defaults of Swissair and Railtrack (JP Morgan, 2001). With regard to Enron, the ISDA observed that while 800 contracts with an aggregate notional amount of USD 8 billion were outstanding, the settlement of open contracts proceeded without major difficulties (ISDA, 2002). Also, the Bank of England notes that for both Enron and the Argentine default, the CDS market did not experience large-scale disruptions (Bank of England, 2002). To judge the full effectiveness of risk transfer in more detail, it would be necessary to obtain data on the related consequences for risk takers. However, such information is currently not available. In addition, a number of questions about the exact implications of some contracts remain unsolved and will still have to be decided in courts. As legal disputes continue, the ISDA has a vital role as arbiter. Its task is to improve the master agreements and hence to reduce potential ambiguities, which should eliminate the need for arbitration. In some cases however, the legal framework has been found to be rather challenging, in particular regarding the differences between U.S. and European bankruptcy laws.

Taking a wider perspective, a key question is how credit derivatives affect the evolution of the banking sector. Credit derivatives have started to influence the methods banks use for the pricing, risk management, origination, distribution and accounting of credit risk. One remarkable result is the changed awareness and

pricing of credit risk. Given the nature of derivatives and the ease of trading, liquidity in the CDS market has been growing quickly, triggering changes in the process of price formation. As a consequence, CDS spreads have become price-determining factors for loans or bonds. In some cases, credit default swaps are now traded even before the corresponding bond has been issued into the primary market, which shows the increasing importance of CDS as a benchmark for some credit market segments.

If the development described above continues, it may at first sight seem to produce a dichotomy among debtors. For major debtors (such as companies in the Euro STOXX 50 index) or major emerging market borrowers, there is a unified market where the pricing of all credit instruments (bonds, loans or CDS) is based on a common estimation of default probabilities and the losses given default. Any price differences are then based on different exposures to liquidity risk or taxation. This market would show diminishing friction between the individual segments and a steadily increasing degree of integration. The remaining segment of the private debt market consists of smaller loans, e.g. loans to SMEs, which mostly remain with the originating bank, as is the case in Austria or Germany. Here, however, some changes have also been observed, as can be seen from the use of collateralized loan obligations by UBS described in section 2. Hence, the credit derivatives market will become increasingly important also for smaller banks because CDOs allow banks to manage the default risk in their portfolios. If these developments continue, they will influence the structure and competitive situation of the banking system. A related question is whether

these instruments lead to a change in the risk appetite of financial institutions. Hence, one danger is that banks may choose riskier strategies and leverage in the banking system may rise. Here, the evidence so far is not conclusive.

The continued growth of the credit derivatives market not only affects the banking system, but also bears on other components of the financial system. The overall effects on financial stability are of crucial importance for evaluating the impact of the credit derivatives market. The principal question is how credit risk is transferred within the financial system.¹⁾ The current data situation with respect to the migration of risk is not satisfying as only relatively little reliable information is available on the dispersion of default risk outside the banking sector. Hence, credit derivatives may reduce the transparency within the financial system regarding the allocation of risks. Although banks still report loans in their balance sheets, they have separated ownership from bearing the corresponding default risk. Currently, insurers seem to be quite active as sellers of protection with a market share of around 25% (FSA, 2002).

Given the differences in the regulatory framework valid for banks and for the new class of market participants, the question arises as to whether the latter's methods of valuation and management of credit risk are sufficiently well developed. In many cases, the reporting of positions held by insurers is quite difficult given their location in offshore financial centers such as the Bermudas. The issue has even more weight in policy discussions because insurers are becoming more

and more important as providers of investment opportunities. An example for the stronger role of insurers is the growth in savings instruments such as life insurance or pensions. The potential problems insurers have with credit derivatives are particularly relevant in the case of highly complex instruments such as CDOs. The increasing use of CDOs has caused quite some controversy in recent years. The U.K. Financial Services Authority (FSA) mentioned potential dangers arising from these instruments in the context of cross-sector risk transfers (FSA, 2002). Some regulators are concerned that CDO buyers lack sufficient knowledge for pricing and hedging these complex instruments. A number of investors were surprised by sudden large-scale losses from their CDO positions. The FSA concludes that some problems have been solved due to the fact that the entities of "naïve capacity" is no longer active as sellers of protection. Other problems that emerged with CDOs were related to Enron. In this case, the accounting and public reporting of transfer instruments were severely underdeveloped. This was particularly true for the use of SPVs to lower the degree of leverage in the balance sheet.

Another area of concern is partly related to the strong growth of the credit derivatives market. The rapid development, in parallel with continuing consolidation in the banking industry, has led to a very high concentration of market makers in the area of credit derivatives. In 2001, the top three banks had a market share of 94% in the U.S. credit derivatives market (BIS, 2002). This high degree of concentration considerably increases counterparty risk because, as

1 This issue is frequently discussed, see e.g. Rule (2001a and b), FSA (2002), IMF (2002) or BIS (2002).

a consequence, very few traders are responsible for the functioning of the market. Additionally, the provision of liquidity and risk-bearing capacity can become quite difficult in times of crises. In the event that one of the most active market participants suffers problems, the entire market may be shaken so that systemic risk seems a realistic concern. The high concentration also shows in the fact that the quotes for buying protection are volatile and hence the market is not yet deep enough to cope with sudden increases in demand.

Other potential consequences of the growth of credit derivatives relate to the management of bankruptcy. The key question here is whether banks tend to monitor credit quality less extensively if parts of the default risk are transferred.

3.2 Monetary Policy Issues

The credit market plays a central role in the transmission of monetary policy actions to the real economy. A key question is whether the transfer of credit risk within the financial system has changed the transmission mechanism of monetary policy. A detailed survey of the current state of research on the functioning of the transmission mechanism can be found in Kuttner and Mosser (2002).

A particularly important question for central banks is how the transmission mechanism is affected by the migration of credit risk from banks to other market participants. Currently, research does not provide a clear-cut answer from empirical literature on the consequences of credit derivatives.

However, we can draw on the more general discussion of the effects of financial innovation on the monetary transmission mechanism (Federal Reserve Bank of New York, 2002).

The transfer of credit risk, which we have so far discussed from the perspective of credit derivatives, can also be achieved by securitization. In this case, the risk is transferred by selling the debt from a bank's balance sheet. Securitization has become an established technique in the capital markets of both the U.S.A. and the euro area. It involves the issuance of new securities which are backed by a pool of financial or nonfinancial assets. The most common application is for household or corporate mortgages. These assets are transferred under the legal control of the new investors via an SPV created especially for this transaction. In the euro area, the creation of securities from existing claims is an established feature in the pfandbrief segment.

Estrella (2001 and 2002) discusses the effects of the growing use of securitization in the U.S.A on the transmission mechanism. He identifies the credit channel and the interest rate channel as the two components most likely to be affected. In an empirical evaluation of a sample comprising macroeconomic variables and the volume of mortgages, he finds a significant negative change in the interest rate elasticity of the output gap. Estrella concludes that the growing use of the balance sheet-based transfer of credit risk has reduced the efficacy of monetary policy. His explanation is that this change is rather traceable to effects within the credit channel (i.e. liquidity and credit volume) than to the interest rate channel. This evidence from the U.S. indicates that the growing use of credit derivatives may strengthen the effects outlined above. Therefore, it seems conceivable that the ongoing increase in the transfer of credit risk, both on and off banks' balance sheets, may over

time reduce the impact of monetary policy actions.

Another issue arising in the course of the discussion is the effect of risk transfers on the data used in the analysis of monetary policy. Here, the increasing use of credit derivatives may lower the information content of monetary policy indicators. One example is the growth of loans to the private sector. If banks transfer part of the default risk on their balance sheets to other institutions outside the banking sector, figures indicating the total exposure of the banking sector lose their information content as a measure for financing conditions.

4 Summary

Given the early stage of developments, it is difficult to assess the implications of the introduction of credit derivatives in detail. In this paper, we have outlined several potential implications. Regarding financial stability, a key question is the degree of effectiveness of the risk transfer. Some preliminary evidence is positive, but an overall assessment is currently difficult given the lack of transparency. Other implications relate to the mechanism of risk transfer within the financial system and to the question of how the functioning of credit markets is affected by the new products. Particularly, the migration of risks outside the banking sector has raised substantial concerns about potential weaknesses in the risk management capacity of the new risk takers, e.g. insurers. In the context of monetary policy, the central question is how

the transfer of credit risk within the financial system changes the transmission mechanism of monetary policy. Here, preliminary analysis on the impact of securitization in the U.S.A. indicates that the enhanced transfer of credit risk may reduce the impact of monetary policy actions.

With a view to providing an overall conclusion, the detailed analysis undertaken by the G 10 central banks within the CGFS finds that “(i)nnovation in financial markets, and within that the development of new financial instruments such as credit derivatives, is generally to be welcomed as increasing market efficiency, enabling better diversification of portfolios and providing a wider range of techniques for risk management. However, there are a number of aspects of credit risk transfer which raise policy issues and which, at least in some cases, might point to the need for a policy response.”¹⁾ In this context, market transparency, the role of rating agencies, market concentration, contract design, risk management, accounting and regulation are key issues for discussion and analysis.

Among these key issues, two seem to be of particular importance. First, it is necessary to improve the regulatory framework and the accounting rules that apply when nonbank financial institutions hold credit risk transfer instruments. Second, the high concentration of active operators in the market for credit risk transfer may pose a sizeable problem in times of market turbulence.

1 See CGFS (2003), p. 2.

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Cutoff date for data: April 29, 2003

Table A1

Exchange Rates

	1998	1999	2000	2001	2002
	Annual average (per 1 EUR)				
U.S. dollar	×	1.0668	0.9240	0.8956	0.9449
Japanese yen	×	121.4300	99.5300	108.7300	118.0600
Pound sterling	×	0.6592	0.6095	0.6219	0.6288
Swiss franc	×	1.6004	1.5577	1.5104	1.4672
Czech koruna	×	36.8800	35.6030	34.0570	30.8150
Hungarian forint	×	252.7400	259.9900	256.6200	242.8900
Polish zloty	×	4.2269	4.0078	3.6700	3.8535
Slovak koruna	×	×	43.3810	43.3010	42.6800
Slovenian tolar	×	194.4215	206.6200	217.9652	225.9672

Source: Datastream.

Table A2

Key Interest Rates

	1998	1999	2000	2001	2002
	Year-end, %				
Euro area	×	3.00	4.75	3.25	2.75
U.S.A.	4.75	5.50	6.50	1.75	1.25
Japan	0.50	0.50	0.50	0.10	0.10
United Kingdom	6.25	5.50	6.00	4.00	4.00
Switzerland ¹⁾	×	×	3.00–4.00	1.25–2.25	0.25–1.25
Czech Republic	9.50	5.25	5.25	4.75	2.75
Hungary	4.00	14.50	11.00	9.80	8.50
Poland	18.25	19.00	21.50	14.00	7.50
Slovak Republic	8.80	8.80	8.80	8.80	6.50
Slovenia	10.00	8.00	10.00	11.00	10.00

Source: WIIW (The Vienna Institute for International Economic Studies), Datastream, Bloomberg, national sources.

¹⁾ SNB target range for three-month LIBOR.

Table A3

Short-Term Interest Rates

	1998	1999	2000	2001	2002
	Three-month rates, annual average, %				
Euro area	×	2.96	4.39	4.26	3.32
U.S.A.	5.56	5.41	6.53	3.78	1.80
Japan	0.77	0.28	0.29	0.16	0.09
United Kingdom	7.35	5.44	6.10	4.97	4.05
Switzerland	1.56	1.40	3.08	2.94	1.17

Source: Datastream.

Table A4

Long-Term Interest Rates

	1998	1999	2000	2001	2002
	<i>Ten-year rates, annual average, %</i>				
Euro area	4.70	4.66	5.44	5.03	4.92
U.S.A.	5.26	5.64	6.03	5.00	4.61
Japan	1.29	1.76	1.76	1.32	1.27
United Kingdom	5.60	5.01	5.33	5.02	4.91
Switzerland	3.05	3.04	3.93	3.38	3.20

Source: WIIW, Datastream, Bloomberg, national sources.

Table A5

Corporate Bond Spreads

	1998	1999	2000	2001	2002
	<i>Annual average, percentage points</i>				
Euro corporate bond spreads against euro benchmark	x	x	1.00	1.17	1.20
U.S. dollar corporate bond spreads against U.S. dollar benchmark	2.57	3.35	4.26	5.48	5.50

Source: Datastream.

Table A6

Stock Indices¹⁾

	1998	1999	2000	2001	2002
	<i>Annual averages</i>				
Euro area: Euro STOXX	280.45	325.80	423.94	336.29	259.97
U.S.A.: S&P 500	1,085.26	1,327.24	1,426.55	1,193.78	995.34
Japan: Nikkei 225	15,338.37	16,829.89	17,161.59	12,114.46	10,119.31
Austria: ATX	751.44	662.95	623.64	627.30	628.61
Czech Republic: PX50	440.21	455.31	550.48	411.17	437.62
Hungary: BUX	7,059.89	6,728.74	8,742.13	6,901.30	7,760.46
Poland: WIG	14,812.59	15,451.96	18,984.80	14,375.73	14,431.27
Slovak Republic: SAX16	118.98	83.46	82.62	102.34	116.60
Slovenia: SBI20	1,663.48	1,826.15	1,718.60	1,890.08	2,846.78

Source: Datastream.

¹⁾ Euro STOXX: December 31, 1986 = 100, S&P 500: December 30, 1964 = 100, Nikkei 225: March 31, 1950 = 100, ATX: January 2, 1973 = 100, PX50: April 6, 1994 = 100, BUX: January 2, 1991 = 100, WIG: April 16, 1991 = 100, SAX16: September 14, 1993 = 100, SBI20: January 3, 1994 = 100.

Table A7

Gross Domestic Produkt

	1998	1999	2000	2001	2002
	Annual change, %				
Euro area	2.9	2.8	3.5	1.5	0.8
U.S.A.	4.3	4.1	3.8	0.3	2.5
Japan	-1.1	0.1	2.8	0.4	0.3
Austria	3.9	2.7	3.5	0.7	1.0
Czech Republic	-1.0	0.5	3.3	3.1	2.0
Hungary	4.9	4.2	5.2	3.8	3.3
Poland	4.8	4.1	4.0	1.0	1.3
Slovak Republic	4.0	1.3	2.2	3.3	4.4
Slovenia	3.8	5.2	4.6	2.9	3.2

Source: Eurostat, WIIW.

Table A8

Current Account

	1998	1999	2000	2001	2002
	% of GDP				
Euro area	1.0	0.6	0.0	0.3	0.9
U.S.A.	-2.3	-3.0	-4.1	-3.8	-4.7
Japan	3.0	2.6	2.5	2.1	2.8
Austria	-2.3	-3.0	-2.6	-2.2	-0.7
Czech Republic	-2.3	-2.9	-5.3	-4.6	-5.3
Hungary	-4.9	-4.4	-3.2	-2.1	-4.3
Poland	-4.4	-8.1	-6.3	-3.0	-3.6
Slovak Republic	-9.7	-5.7	-3.6	-8.5	-8.0
Slovenia	-0.6	-3.5	-3.0	0.2	1.8

Source: Eurostat, WIIW, OeNB.

Table A9

Inflation Rate

	1998	1999	2000	2001	2002
	Annual change, %				
Euro area	1.2	1.1	2.3	2.3	2.2
U.S.A.	1.5	2.2	3.4	2.8	1.6
Japan	0.7	-0.3	-0.7	-0.6	-0.9
Austria	0.8	0.5	2.0	2.3	1.7
Czech Republic	10.7	2.1	3.9	4.7	1.8
Hungary	14.3	10.0	9.8	9.2	5.3
Poland	11.8	7.3	10.1	5.5	1.9
Slovak Republic	6.7	10.6	12.0	7.1	3.3
Slovenia	8.6	6.6	10.9	9.4	7.5

Source: Eurostat, WIIW.

Financial Intermediaries in Austria

Table A10

Total Assets and Off-Balance-Sheet Operations

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Total assets	480,859	524,635	562,700	587,741	573,268
thereof total domestic assets	370,127	393,317	404,908	431,415	417,962
thereof total foreign assets	110,738	131,318	157,792	156,326	155,306
Interest rate contracts	296,195	487,663	611,150	946,631	1,144,052
Currency-related contracts	135,527	165,290	160,650	157,512	240,261
Other derivatives	2,401	3,489	15,184	5,737	3,814
Derivatives total	434,123	656,442	786,984	1,109,880	1,388,127

Source: OeNB.

Table A11

Profitability

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Interest receivable and similar income	22,971	22,381	27,508	26,814	23,426
Interest payable and similar charges	16,627	16,093	20,773	19,725	16,346
Net interest income	6,344	6,288	6,735	7,090	7,080
Income from debt securities and participating interests	1,385	1,357	1,817	1,935	1,771
Net commissions income	2,396	2,730	3,203	3,062	3,012
Net profit/loss on financial operations	661	429	487	521	570
Other operating income	1,259	1,283	1,282	1,423	1,284
Operating income	12,045	12,087	13,523	14,054	13,717
Staff costs	4,247	4,399	4,479	4,681	4,780
Other administrative expenses	2,578	2,701	2,930	3,151	3,138
Other operating charges	788	818	940	974	851
Operating expenses	8,200	8,539	9,004	9,476	9,500
Operating profit	3,845	3,548	4,520	4,577	4,217
Expected operating profit/loss for the year	3,846	3,477	4,395	4,533	4,181
Expected profit/loss on ordinary activities	2,141	1,966	2,876	3,151	2,069
Expected profit/loss for the year after tax	1,627	1,652	2,324	2,688	1,443

Source: OeNB.

Table A12

Loans to Domestic Nonbanks

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Nonfinancial enterprises	112,432	119,685	128,126	131,597	129,191
Households	48,795	54,042	59,224	62,805	66,960
General government	30,083	28,015	28,728	28,275	28,333
Other financial intermediaries	10,324	10,451	10,459	11,893	12,771
Total	201,599	212,194	226,537	234,570	237,256

Source: OeNB.

Table A13

Foreign Currency-Denominated Claims on Domestic Nonbanks

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Nonfinancial enterprises	17,230	20,228	23,983	25,167	24,833
Households	4,956	9,767	12,611	14,555	16,765
General government	1,291	1,661	1,904	1,362	1,395
Other financial intermediaries	1,150	1,572	1,114	1,336	1,466
Total	24,627	33,228	39,613	42,420	44,459

Source: OeNB.

Table A14

Foreign Currency-Denominated Claims on Euro Area Non-MFIs

	1998	1999	2000	2001	2002
	% of total claims on euro area non-MFIs ¹⁾				
Swiss franc	81.0	69.8	58.7	50.4	55.0
Japanese yen	8.4	22.3	33.9	41.9	37.2
U.S. dollar	9.1	6.3	6.0	7.1	6.8
Other foreign currencies	1.6	1.6	1.4	0.6	1.0

Source: OeNB.

¹⁾ The indicated figures refer to claims of monetary financial institutions (MFIs, ESA definition) against euro area non-MFIs. Given the differences in the definition of credit institutions according to the Austrian Banking Act and of MFIs according to ESA and differences in the number of borrowers, comparability to "Claims on Domestic Nonbanks" is limited. Due to rounding errors, figures do not add up to 100.0% for every year.

Table A15

Specific Loan Loss Provisions for Loans to Nonbanks

	1998	1999	2000	2001	2002
	Year-end, % of claims				
Specific loan loss provisions	3.2	3.0	2.9	3.1	3.3

Source: OeNB.

Table A16

Market Risk¹⁾

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Interest rate risk Capital requirement for the position risk of interest rate instruments in the trading book	460.3	680.1	853.3	393.0	414.8
Exchange rate risk Capital requirement for open foreign exchange positions	108.5	126.7	71.4	64.0	80.4
Equity price risk Capital requirement for the position risk of equities in the trading book	43.0	69.5	59.7	28.1	20.3

Source: OeNB.

¹⁾ The calculation of capital requirements for the market risk is based on a combination of the standardized approach and internal value at risk (VaR) calculations. The latter use previous day's prices without taking account of the multiplier. Capital requirements for interest rate instruments and equities are computed by adding up both general and specific position risks.

Table A17

Liquidity Risk

	1998 ¹⁾	1999	2000	2001	2002
	Year-end, %				
Liquidity of the first degree: 5% quantile of liquidity ratio ²⁾	x	8.8	6.1	5.9	6.1
Liquidity of the second degree: 5% quantile of liquidity ratio	x	27.8	26.3	27.3	26.1

Source: OeNB.

¹⁾ Due to amendments in the applicable law, data are only comparable as of 1999.

²⁾ The liquidity ratio relates liquid assets to the corresponding liabilities. Article 25 of the Austrian Banking Act defines a minimum ratio of 2.5% for liquidity of the first degree (cash ratio) and of 20% for liquidity of the second degree (current ratio). The 5% quantile indicates the liquidity level surpassed by 95% of banks on the respective reporting date and is thus an indicator of poor liquidity.

Table A18

Solvency

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Total tier 1 capital (core capital)	22,805	23,790	24,652	27,440	26,841
Total tier 2 capital (supplementary capital)	9,862	10,769	12,659	13,492	13,486
Tier 3 capital ¹⁾	x	x	1,575	2,413	2,324
	Year-end, eligible capital as a percentage of risk-weighted assets				
Capital adequacy ratio ²⁾	13.5	13.1	13.3	13.7	13.3

Source: OeNB.

¹⁾ Due to amendments to the applicable law, data are available only as of 2000.

²⁾ In this context the capital adequacy ratio refers to the capital eligible as credit risk cover under the Austrian Banking Act (i.e. tier 1 capital plus tier 2 capital minus deduction items) as a percentage of the assessment base. As tier 3 capital is subordinated capital that may only be allocated against market risk, it was not included here so as to produce a conservative capital adequacy assessment.

Table A19

Assets Held by Austrian Insurance Corporations

	1998	1999	2000	2001	2002 ¹⁾
	Year-end, EUR million				
Cash, demand deposits	616	539	719	757	687
Other deposits at Austrian banks	457	306	332	1,425	932
Domestic debt securities	9,924	8,627	8,245	7,712	7,731
Equity securities and other domestic securities	8,048	10,269	11,847	13,127	15,023
Lending	12,877	11,973	11,147	8,769	8,055
Domestic equity interests	1,790	2,017	2,257	2,511	3,358
Premises	3,345	3,394	3,428	3,494	3,556
Foreign assets	5,620	9,044	11,248	14,397	15,739
Custody account claims on reinsurers	1,528	1,728	1,805	1,854	..
Other assets	2,889	2,970	3,105	3,426	3,215
Total assets	47,093	50,867	54,134	57,471	..

Source: OeNB.

¹⁾ Preliminary figures; annual accounts data are not yet available.

Table A20

Assets in Austrian Mutual Funds

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Domestic securities	28,746	33,580	34,908	36,068	35,951
thereof federal Treasury bills and notes	1,377	589	424	27	28
thereof debt securities	24,944	26,470	24,302	23,235	22,519
thereof equity securities	2,425	6,521	10,182	12,806	13,404
Foreign securities	22,998	41,287	51,210	57,324	60,711
thereof debt securities	14,579	25,154	30,336	34,717	43,200
thereof equity securities	8,419	16,133	20,874	22,607	17,511
Other assets	3,926	5,474	5,856	5,341	6,047
Total assets	55,670	80,341	91,973	98,733	102,712
thereof foreign currency	25,604	19,169	22,415	24,346	22,455

Source: OeNB.

Table A21

Assets Held by Austrian Pension Funds

	1998	1999	2000	2001	2002
	Year-end, EUR million				
Domestic securities	4,002	5,910	7,070	7,245	7,200
thereof federal Treasury bills and notes	33	25	0	0	0
thereof debt securities	169	12	31	63	57
thereof mutual fund shares	3,797	5,865	7,030	7,163	7,125
thereof other securities	3	8	9	19	18
Foreign securities	273	464	523	534	353
thereof debt securities	41	32	41	49	44
thereof mutual fund shares	227	426	478	451	279
thereof other securities	5	5	4	34	30
Deposits	61	103	95	164	171
Lending	93	69	71	39	42
Other assets	253	594	89	67	110
Total assets	4,681	7,141	7,848	8,049	7,876
thereof foreign currency	262	342	302	303	195

Source: OeNB.

Table A22

Financial Investment of Households

	1998	1999	2000	2001 ¹⁾	2002
<i>Transactions in EUR million</i>					
Currency and deposits	×	5,040	2,139	4,009	..
Securities other than shares	×	- 1,595	1,829	- 479	..
Loans	×	25	44	- 53	..
Shares and other equity	×	5,963	5,672	3,874	..
Insurance technical reserves	×	5,916	4,186	3,512	..
Other accounts receivable	×	42	145	0	..
Total financial assets	×	15,391	14,015	10,863	..

Source: OeNB.

¹⁾ Preliminary data.

Table A23

Household Income, Savings and Credit Demand

	1998	1999	2000	2001	2002
<i>Year-end, EUR billion</i>					
Net disposable income	118.22	122.03	127.65	130.74	132.05
Savings	9.99	10.35	10.66	9.69	9.90
<i>%</i>					
Saving ratio ¹⁾	8.4	8.5	8.3	7.4	7.5
<i>Year-end, EUR billion</i>					
Loans to households	48.76	54.04	59.22	62.81	66.96

Source: OeNB, Statistics Austria, SNA; data last revised in December 2002.

¹⁾ Saving ratio: savings / (disposable income + increase in accrued occupational pension benefits).

Table A24

Debt-Equity Ratio of Nonfinancial Corporations

	1998	1999	2000	2001 ¹⁾	2002
<i>Transactions in EUR million</i>					
Securities other than shares	×	2,328	2,116	602	..
Loans	×	14,082	18,033	9,892	..
Shares and other equity	×	3,245	4,361	8,960	..
Other accounts payable	×	1,911	- 2,544	- 289	..
Total debt	×	21,566	21,966	19,166	..

Source: OeNB.

¹⁾ Preliminary data.

Table A25

Selected Financial Ratios of the Manufacturing Sector

	1998	1999	2000	2001	2002
	<i>Median, %</i>				
Self-financing and investment ratios					
Cash flow, as a percentage of turnover	7.44	7.68	7.56	6.67	..
Cash flow, as a percentage of investment	162.35	203.42	193.63	202.82	..
Reinvestment ratio ¹⁾	69.09	57.63	67.36	62.64	..
Financial structure ratios					
Equity ratio	10.92	10.23	13.60	17.80	..
Risk-weighted equity ratio	17.14	16.82	18.04	23.98	..
Bank liability ratio	45.19	45.06	43.96	39.77	..
Government debt ratio	10.14	9.89	10.28	9.34	..

Source: OeNB.

¹⁾ Investment × 100 / credit write-offs.

Table A26

Insolvency Indicators

	1998	1999	2000	2001	2002
	<i>Year-end, EUR million</i>				
Default liabilities	2,609	2,798	2,674	3,503	3,401
	<i>Number</i>				
Number of defaults	2,887	2,790	2,567	2,939	2,864

Source: Kreditschutzverband von 1870.

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
ATX	Austrian Traded Index	IATX	Immobilien-Austrian-Traded-Index (real estate Austrian Traded Index)
BIS	Bank for International Settlements	IFS	International Financial Statistics
BWG	Bankwesengesetz (Banking Act)	IHS	Institut für Höhere Studien (Institute for Advanced Studies)
CEECs	Central and Eastern European Countries	IMF	International Monetary Fund
CDO	collateralized debt obligation	IPO	initial public offerings
CDS	credit default swap	ISDA	International Swap and Derivatives Association
CLN	credit linked note	LLP	loan loss provision
CLO	collateralized loan obligation	LTCM	Long-Term Capital Management
CSO	credit spread option	NASDAQ	National Association of Securities Dealers Automated Quotation System
CPA	certified public accountant	NEMAX	stock price index on Frankfurt's Neuer Markt
CPI	consumer price index	OECD	Organisation for Economic Cooperation and Development
DAX	Deutscher Aktienindex (German Stock Index)	OeKB	Oesterreichische Kontrollbank (specialized bank for export financing, central depository for securities)
DJIA	Dow Jones Industrial Average	OeNB	Oesterreichische Nationalbank
EBRD	European Bank for Reconstruction and Development	P/E ratio	price/earnings ratio
EC	European Community	ROA	return on assets
ECB	European Central Bank	ROE	return on equity
EEC	European Economic Community	SPV	special purpose vehicle
EMU	Economic and Monetary Union	TARGET	Trans-European Automated Real-time Gross settlement Express Transfer
EONIA	Euro OverNight Index Average	TRS	total return swap
ESCB	European System of Central Banks	VAG	Versicherungsaufsichtsgesetz (Insurance Supervision Act)
EU	European Union	VaR	value at risk
EURIBOR	European Interbank Offered Rate	ViDX	Vienna Dynamic Index
Eurostat	Statistical Office of the European Communities	WIFO	Österreichisches Institut für Wirtschaftsforschung (Austrian Institute of Economic Research)
FMA	Finanzmarktaufsichtsbehörde (Financial Market Supervisory Authority)		
FOMC	Federal Open Market Committee		
FSLIC	Federal Savings and Loan Corporation		
GDP	gross domestic product		
GNP	gross national product		
GFCF	gross fixed capital formation		
HGB	Handelsgesetzbuch (Commercial Code)		
HICP	Harmonized Index of Consumer Prices		