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Contents

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Editorial

The Impact of the Financial Crisis on the Real Economy in Austria – Analytical Challenges from Exceptional Factors

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The financial crisis that had started to unfold in the summer of 2007 took on even greater urgency in the fourth quarter of 2008. After spreading from the U.S.A. to international financial markets, it spilled over to the global real economy. With some lag, the impact on economic activity is also being felt strongly in Austria. National and international forecasting institutions currently expect negative growth rates for Austria in 2009. One of the hallmarks of the prevailing situation is that developments are unusually fast-paced, making it difficult to keep track of them and capture the relevant data. The global integration of economic activity, which has increased strongly in the past decades, as well as the fact that financial market structures were the origin of the crisis are likely to be the reasons the crisis has proliferated so quickly. Overall, the unfolding of events in 2008 and 2009 seems to have been determined by a number of exceptional factors that have only little significance during "normal" business cycles.

This exceptional situation represents an enormous challenge to standard economic analysis and, in particular, real economic forecasting. Traditional macroeconomic forecasting models do not take account of such special factors, nor can they in fact do so in any meaningful or comprehensive fashion. After all, we are dealing with effects that occur only in certain rare situations. Hence, these special factors and their transmission channels to traditional macroeconomic aggregates must be analyzed separately. The findings of these analyses must then be duly considered in the forecasting process,

in a way complementary to standard models. To this end, the OeNB's latest economic outlook for Austria of December 2008 (in this issue) includes a variety of special factors: increased risk premiums for corporate and consumer loans; an additional dampening of corporate investment caused e.g. by a credit crunch; effects on consumer spending triggered by diminished household wealth in the wake of asset price losses; foreign trade effects as a consequence of a deterioration of the international environment; and confidence effects reflected in a higher saving ratio and a marked deterioration of export expectations. This approach was chosen to ensure that the OeNB economic outlook takes account of some specific key factors influencing the economy in the current exceptional economic conditions.

In fact, numerous transmission channels that could be relevant for the analysis of the current exceptional economic environment are conceivable and are being discussed in the economic literature. Some of the most important of these factors are outlined below.

Equity and liquidity of financial institutions
A heightened need for writedowns, a deteriorated risk structure of bank assets and/or a change in financial markets' risk perception make it necessary to increase capital requirements for financial institutions. Consequently, banks may restrict or even stop lending altogether (credit crunch). Preventing a credit crunch is one of the main motivations many governments had in mind when they included the provision of equity or equity-like funding in their

bank support plans. If lending restrictions cannot be fully averted, financing constraints for debt-financed demand components will result, which in turn have a negative impact on economic growth.

In the short term, such lending constraints may be due to liquidity bottlenecks that banks themselves experience under conditions that we have seen worldwide for several months: a frozen interbank money market, where banks no longer lend to each other or reduce interbank lending to a limited amount of unsecured short-term loans. To counteract a liquidity shortage-based credit crunch, central banks across the world have provided the banking system with generous liquidity facilities in recent months.

Corporate value and creditworthiness of borrowers
A further transmission channel capable of triggering a restriction of lending is a deterioration in the creditworthiness of borrowers. For one thing, (expected) corporate and household solvency takes a blow during a recession or an economic crisis, and for another, a more unfavorable outlook for sales and profits reduces corporate value. In the case of listed corporations, lower value also takes the form of lower stock market capitalization. Both effects prompt banks to exercise more caution in lending. This in turn can raise risk premiums for loans, making borrowing more expensive, but it may also induce banks to restrict the volume of loans.

Household consumption and household assets
Losses in household wealth – triggered by, e.g., falling stock or real estate prices – may affect consumption. Especially if these losses are expected to be permanent, they will diminish anticipated future disposable income or

prompt households that seek to hold a certain level of wealth to increase the saving ratio. And, much like in the case of the decline in corporate value described above, losses may reduce households' loan collateral and may thus raise the cost of borrowing or decrease its volume.

Confidence
Furthermore, an (expected) deterioration of the economic outlook may affect consumer and corporate confidence in various ways. The expectation that profits will decline may dampen the propensity to invest, and the fear of unemployment may induce consumers to save more. The massive slump on stock markets across the world in tandem with reports about the crisis may "indirectly" persuade even savers who have not suffered asset price losses to curtail spending.

This issue includes four studies designed to illustrate how such transmission channels may be taken into account in economic forecasting via specific analyses, even though they are not directly part of the model used. The main objective of these studies is to provide an analytical basis and a quantitative estimate of the factors causing these effects so that they may be considered in forecasting.

Waschiczek analyzes the statistical evidence of signs of a credit crunch in corporate lending in Austria. The Austrian results of the bank lending survey show that since the onset of the crisis in summer 2007, lending has suffered on the back of deteriorated refinancing conditions in the interbank market and has become more restrictive. Moreover, the credit standing of firms is expected to deteriorate in the near future owing to the economic downturn, which would also contri-

bute to a slowdown in lending. Consequently, the emergence of a credit crunch in Austria cannot be ruled out.

Jobst and Kwapil examine whether the financial market turbulence and the related greater difficulty and banks' risen refinancing costs in the money and capital markets have led to a change in the transmission mechanism of interest rates from the money market to customers. The authors find that – in contrast to conventional wisdom – interest rates on corporate and housing loans, with rate fixations of between one and five years, were lifted less than the historical evidence would have suggested. A possible explanation for this phenomenon is the prevalence of relationship banking in Austria, which protects banks' customers from excessive interest rate fluctuations. The study also reveals that banks distinguish clearly between groups of customers. Whereas banks pass interest rate changes on to some customers the same way as they ever have, they only partly pass on changes in market interest rates to corporate borrowers and customers with housing loans with a long-term rate fixation.

Fenz and Fessler find that Austrian households and self-employed persons have suffered valuation losses of some EUR 17 billion since the onset of the crisis in mid-2007. Simulation results based on the OeNB macroeconometric model, however, show that the effects of these valuation losses on private consumption and GDP growth in Austria are not very marked at –0.3% and –0.1%, respectively over a five-year period. Moreover, they occur with a substantial time lag. However, in light of the far-reaching nature of the current crisis, it cannot be ruled out that consumer spending may be impaired more strongly through confidence effects.

Finally, *Summer* shows that while a rich literature on financial crises and its mechanisms has been produced in recent years, it has not been integrated into the mainstream of economic thinking yet. Doubtless, the current crisis has given more weight and attention to these efforts. Against this background, crisis analysis is bound to be a "growth sector" in economics.

To sum it up, these studies are intended to represent a first contribution to understanding the current crisis better, and in particular to explaining some of the mechanisms and effects specific to the current situation. While we are no doubt standing at the beginning of our efforts to understand the current crisis, we hope that these analyses can provide some contribution to coping better with it.

In Focus:
Financial and Economic Crisis

Decline in National Product Albeit by a Smaller Margin than in the Euro Area. Sharp Drop in Inflation

Economic Outlook for Austria from 2008 to 2010 (December 2008)

Christian Ragacs, Klaus Vondra[1]

1 Summary: Austrian Economy Also Heading into Recession on the Back of Global Downturn

According to the December 2008 outlook of the Oesterreichische Nationalbank (OeNB), the Austrian economy is expected to enter into recession in 2009 as a result of the financial crisis and the global economic slump. On the strength of the buoyant first half of 2008, real GDP is projected to grow by 1.6% in 2008; in 2009, however, it will shrink by 0.3%. In 2010, the Austrian economy is expected to bounce back modestly, posting GDP growth of 0.8%. Compared with the OeNB June 2008 outlook, growth expectations for 2009 and 2010 were slashed by 2.0 and 1.6 percentage points, respectively. Owing to both commodity and oil price rises, inflation will reach a record annual high (since 1992) of 3.3% in 2008. In 2009 and 2010, however, it is expected to drop sharply to 1.4% and 1.6%, respectively.

The global financial crisis triggered by the U.S. subprime mortgage crisis is taking an increasingly heavy toll on the real economy. Although it was hoped only a few months ago that the negative effects would be concentrated mainly on the U.S.A., now, after a time lag of about one year, Western Europe and Japan are also affected. Likewise, the hitherto fast-growing Eastern European countries and emerging market

Chart 1
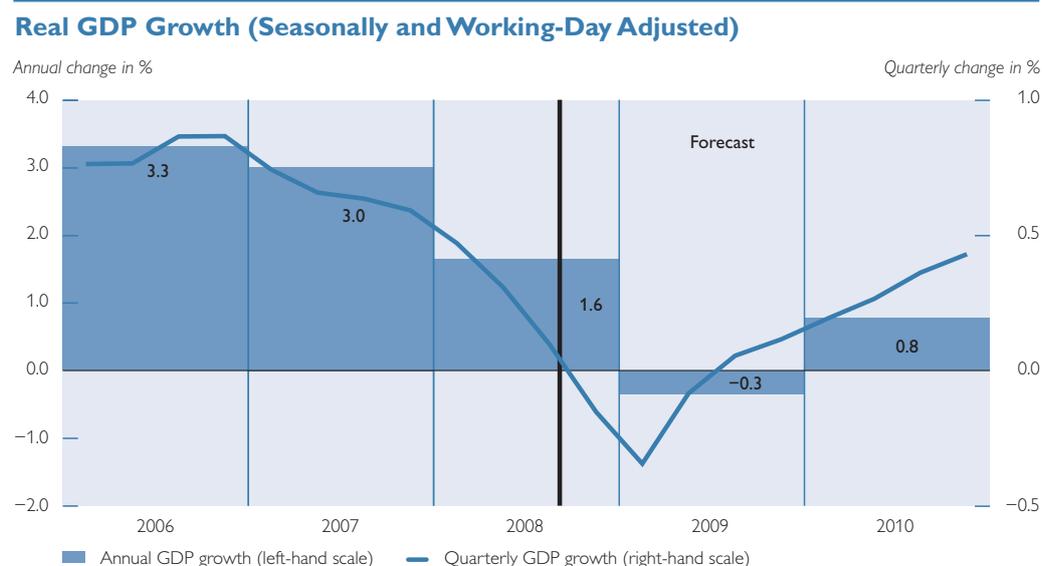
Real GDP Growth (Seasonally and Working-Day Adjusted)

Source: Eurostat, OeNB.

economies in Asia and Latin America are succumbing to a marked slowdown in growth. The economic downturn forecast in Austria is reflected in a slump in exports and a lower growth rate of domestic demand. While exports have consistently fueled growth in the past few years, they will shrink by 2.7% in 2009. The last time Austria registered negative export growth was in 1993. The growth contribution of net exports to real GDP is –0.3 percentage points. Despite a marked decline in gross fixed capital formation (–1.6%), which is presently being led by plummeting equipment investment, and a

Table 1

OeNB December 2008 Outlook for Austria - Key Results[1]

	2007	2008	2009	2010
Economic activity	*Annual change in % (real)*			
Gross domestic product	+3.0	+1.6	−0.3	+0.8
Private consumption	+0.9	+1.2	+0.5	+0.5
Government consumption	+1.8	+1.9	+1.0	+1.5
Gross fixed capital formation	+3.9	+2.7	−1.6	−0.4
Exports of goods and services	+8.5	+2.5	−2.7	+2.1
Imports of goods and services	+7.0	+1.6	−2.5	+1.6
Contribution to real GDP growth	*Percentage points of GDP*			
Private consumption	+0.5	+0.6	+0.3	+0.3
Government consumption	+0.3	+0.3	+0.2	+0.3
Gross fixed capital formation	+0.9	+0.6	−0.4	−0.1
Domestic demand (excluding changes in inventories)	+1.7	+1.6	+0.1	+0.4
Net exports	+1.2	+0.6	−0.3	+0.4
Changes in inventories (including statistical discrepancy)	+0.1	−0.6	−0.1	+0.0
Prices	*Annual change in %*			
Harmonised Index of Consumer Prices (HICP)	+2.2	+3.3	+1.4	+1.6
Private consumption expenditure (PCE) deflator	+2.3	+2.9	+1.4	+1.5
GDP deflator	+2.2	+2.7	+1.5	+1.8
Unit labor costs in the total economy	+0.9	+2.7	+3.0	+0.9
Compensation per employee (at current prices)	+2.2	+2.8	+2.6	+1.9
Productivity (whole economy)	+1.3	+0.1	−0.5	+1.0
Compensation per employee (real)	+0.0	−0.1	+1.2	+0.4
Import prices	+1.8	+3.3	+1.7	+1.2
Export prices	+1.8	+1.5	+2.0	+1.8
Terms of trade	+0.0	−1.7	+0.3	+0.6
Income and savings				
Real disposable household income	+2.1	+2.3	+1.3	+0.7
	% of nominal disposable household income			
Saving ratio	11.6	12.8	13.6	13.7
Labor market	*Annual change in %*			
Payroll employment	+2.2	+2.0	+0.2	−0.2
	% of labor supply			
Unemployment rate (Eurostat definition)	4.4	3.7	4.2	4.8
Budget	*% of nominal GDP*			
Budget balance (Maastricht definition)	−0.4	−0.7	−1.9	−2.5
Government debt	59.5	59.3	61.2	63.1

Source: 2007: Eurostat, Statistics Austria; 2008 to 2010: OeNB December 2008 outlook.

[1] *The outlook was drawn up on the basis of seasonally adjusted and working-day adjusted national accounts data. Therefore, the historical values for 2007 may deviate from the nonadjusted data released by Statistics Austria.*

downgraded growth outlook for private consumption (+0.5%) compared with the OeNB June 2008 outlook, domestic demand (excluding inventory changes) is still making a modestly positive growth contribution of +0.1 percentage points. Since real disposable household income will increase by 1.3% in 2009 due to inflation-induced high wage settlements, the saving ratio is projected to rise over the forecast horizon (13.6% for 2009). This uptrend – hitherto untypical in times of crisis – is based on two factors. First, it is assumed that the historical trend of an increasing saving ratio continues. Second, it is expected that households will react to the slowdown in growth and to rising unemployment by precautionary saving.

Employment growth will decline to 0.2% in 2009 while the number of unemployed will climb by a total of some 45,000 in 2009 and 2010. As a result, the (seasonally-adjusted) unemployment rate (Eurostat definition) will rise to 4.2% (2009) and 4.8% (2010). Fueled by energy and commodity price increases, HICP inflation peaked at 4.0% in June 2008. By end-2008, however, HICP inflation will be near the 2% mark, resulting in a rate of 3.3% for 2008 as a whole. It will continue to drop on the back of sharply falling energy and commodity prices until the second half of 2009, averaging 1.4% in 2009. In 2010, the OeNB expects HICP inflation to edge up slightly to 1.6%.

The general government budget balance (Maastricht definition) will deteriorate slightly to –0.7% of GDP in 2008 and will significantly worsen to –1.9% and –2.5% of GDP in 2009 and 2010, respectively. However, this outlook does not take into account the tax reform agreed by the new Austrian government and the latest economic stimulus package (their budget and growth effects are described in box 2), since it includes only measures that were approved in principle before the cutoff date for data (November 20, 2008) of the forecast.

2 Assumptions: Falling Money Market Rates, High Risk Premiums, Lower EUR Exchange Rates and Oil Prices

This forecast is the OeNB contribution to the Eurosystem's December 2008 projections. The forecast horizon ranges from the fourth quarter of 2008 to the fourth quarter of 2010. November 17, 2008, was the cutoff date for the assumptions on global growth as well as interest rates, exchange rates and crude oil prices. The OeNB used its macroeconomic quarterly model to prepare the outlook for Austria.

The key data source comprised seasonally and working day-adjusted national accounts data computed by the Austrian Institute for Economic Research (WIFO), which were fully available to the second quarter of 2008. The GDP flash estimate is available for the third quarter of 2008 but covers only part of the national accounts aggregates.

The underlying short-term interest rate is based on market expectations for the three-month EURIBOR. It is set at 4.7% (2008), 2.8% (2009) and 3.2% (2010), respectively. Long-term interest rates reflect market expectations for ten-year government bonds and are set at 4.4% (2008), 4.5% (2009) and 4.7% (2010), respectively. While an inverse yield curve was evident in 2008, the forecast horizon will see a normal trend in the yield curve. With the outbreak of the financial crisis, corporate loan spreads widened by 94 basis points

owing to high levels of uncertainty and mutual mistrust in the banking sector.[2] In addition, a spread of 72 basis points for loans to households[3] is assumed for the first time. The current OeNB outlook is based on the assumption that these spreads will remain constant over the entire forecast horizon. The exchange rate of the euro against the U.S. dollar is assumed to be constant at 1.27 USD/EUR. The projected trend in crude oil prices is based on futures prices. For 2008 to 2010, oil prices of USD 99.9, USD 67.3 and USD 76.6 per barrel (Brent) in each successive year are assumed. This signifies a revision of USD –50.4 (2009) and USD –39.0 (2010), compared with the OeNB June 2008 economic outlook. The prices of commodities excluding energy are also based on futures prices over the forecast horizon. Market participants expect a further drop in commodity prices by mid-2009, followed by a modest rise afterwards. The budget forecast includes only those measures that had been agreed and suitably specified at the time that the current OeNB outlook was prepared. In addition to the first economic stimulus package, these measures also include the frontloading of various projects by the 100% government-owned real estate company Bundesimmobilienge-sellschaft (BIG).[4] Similar to the front-loaded investments by the federal rail-road corporation ÖBB and ASFINAG, the state-owned highway construction and maintenance corporation, which were approved in the first economic stimulus package, the BIG's investments are also financed on an off-bud-

get basis. The income tax reform package set out in the new federal government's legislative agenda as well as the measures of the second economic stimulus package that affect the budget deficit or surplus are not included in this forecast.

3 Financial Crisis Triggers Global Downturn

Since summer 2007, international financial markets have been shaken by various types of turmoil. The source of this turbulence came from products backed by U.S. subprime loans. In an initial wave, individual shocks spread to the money market, related mortgage loan segments and to the securitization market. After the erstwhile fourth-largest U.S. investment bank Lehman Brothers filed for bankruptcy protection under Chapter 11 of the United States Bankruptcy Code, the situation in the international financial markets further escalated in mid-September 2008 owing to the significant role Lehman Brothers played in credit derivative and swap market trading. In many cases counter-party risk occurred. The financial turmoil reached Europe at end-September 2008. Uncertainty about banks' own liquidity needs and heightened fears about counterparties' credit quality have led to banks lending money only on a very short-term basis and/or against collateral and to banks hoarding liquidity. As a result, liquidity for maturities exceeding one week in the unsecured money market was low and, for longer-term maturities, was completely dried up. Since the refinancing of banks via the money market is much

[2] The spread for corporate loans is defined as the difference between the average interest rate on corporate loans and the interest rate on ten-year government bonds.

[3] The spread for consumer loans is defined as the difference between the average interest rate on housing loans and the interest rate on ten-year government bonds.

[4] For further details on these economic measures, see box 2.

Chart 2

Real GDP Forecast 2008 to 2010

Annual change in %
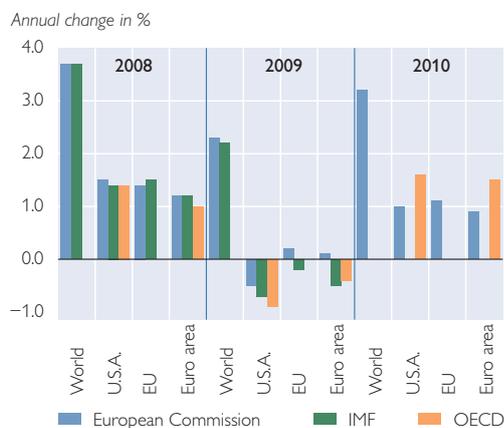
Source: European Commission, IMF, OECD.

Real GDP Growth in the Euro Area[1]

Annual change in %
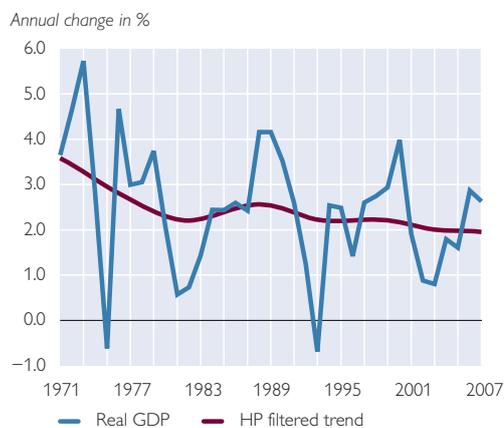
Source: OECD: Euro area-12.
[1] Until 1991 including Western Germany.

more difficult, banks' lending policy is commensurately tighter. In particular, corporate customers have been hit by the impact of the financial crisis. As a result, the crisis, which was originally limited to the U.S. subprime credit market, finally spilled over to the global real economy in the second half of 2008.

While until September 2008 the ECB – in addition to the World Bank, the OECD and the European Commission – still had expected the global economy to remain relatively robust in 2009, the effects of the financial crisis on the real economy resulted in a significant deterioration in the forecasts in fall 2008 (see graph on the left in chart 2). A recession is anticipated for the U.S.A., major European economies and Japan, and a marked slowdown in growth is expected in Eastern European and Asian emerging market economies.

3.1 U.S. Financial Crisis Spreads to World Economy

Based on tax refunds designed to strengthen private consumption and on healthy net exports, the *U.S.A.* regis-

tered positive GDP growth until the second quarter of 2008. However, the problems in the U.S. real estate sector brought about marked disruptions in the financial industry. The slump in the value of mortgages, substantial stock price losses on international stock exchanges and the failure of 17 U.S. banks to date are only some features of the current financial crisis. In 2008, the crisis spread to the real economy. Massive retail sales slumps in October 2008 (–2.8% on a monthly basis) correspond to the fall in private consumption in the third quarter of 2008 (–3.1% on a quarterly basis, annualized). This decline is the steepest since the second quarter of 1980 and is attributable to the development in the labor market where 600,000 jobs have been shed since early 2008 and the unemployment rate has exceeded 6%. While residential construction investment retreated for 11 quarters in a row, in recent quarters investment in equipment registered negative growth. Despite positive stimuli – from net exports – U.S. economic performance shrank by 0.5% in the third quarter of 2008 (against the previous quarter, on

an annualized basis). Additional problems in the financial markets (credit card debt) and the real economy (automotive industry) suggest a marked economic downturn in 2009. This prospect is also signaled by current leading indicators and confidence indicators.

Non-Japan Asia remains the driving force of the global economy. Compared with 2007, however, growth is flagging noticeably. China and India's economies remain the engines of growth in this region. By contrast, *Japan's* economic performance shrank for the second time in a row in the third quarter of 2008 (-0.1% on a quarterly basis), thereby finding itself in a technical recession (for the definition, see box 1). This situation is primarily attributable to weakening investment and exports whereas private consumption continues to contribute positively to GDP growth.

However, recently robust industrial production data and a stable construction sector suggest the country's economic performance will weaken only slightly in 2009.

The economic outlook for the *United Kingdom* is still determined by developments in its real estate and financial markets. The financial crisis hit the U.K particularly badly owing to London's position as a global financial centre. In the third quarter of 2008, British economic output contracted by 0.3%. The medium-term outlook indicates a sustained recession over several quarters.

Switzerland, too, was unable to decouple itself from the international financial crisis. UBS and Credit Suisse, the country's two major banks, have been particularly affected. The Swiss economy is expected to stagnate in 2009.

Table 2

Underlying Global Economic Conditions

	2007	2008	2009	2010
Gross domestic product	*Annual change in % (real)*			
World GDP growth outside the euro area	+5.1	+3.9	+2.4	+3.6
U.S.A.	+2.0	+1.4	−0.7	+0.9
Japan	+2.0	+0.5	−0.2	+1.1
Asia excluding Japan	+9.2	+7.4	+6.3	+7.5
Latin America	+5.4	+4.1	+2.5	+3.5
United Kingdom	+3.0	+0.8	−1.0	+0.8
New EU Member States[1]	+5.9	+4.9	+2.8	+3.1
Switzerland	+3.3	+1.7	+0.2	+1.6
Euro area[2]	×	+0.8 to +1.2	−1.0 to +0.0	+0.5 to +1.5
World trade (imports of goods and services)				
World economy	+6.5	+4.3	+2.2	+5.1
Non-euro area countries	+6.9	+5.0	+3.1	+5.7
Real growth of euro area export markets	+6.6	+4.7	+2.5	+5.0
Real growth of Austrian export markets	+6.6	+4.1	+1.4	+4.5
Prices				
Oil price in USD/barrel (Brent)	72.7	99.9	67.3	76.6
Three-month interest rate in %	4.3	4.7	2.8	3.2
Long-term interest rate in %	4.3	4.4	4.5	4.7
USD/EUR exchange rate	1.37	1.46	1.27	1.27
Nominal effective exchange rate (euro area index)	107.69	112.15	106.02	106.02

Source: Eurosystem.

[1] *New EU Member States still to introduce the euro: Czech Republic, Hungary, Poland, Romania, Bulgaria, Estonia, Latvia, Lithuania.*
[2] *Results of the Eurosystem's December 2008 projections. The ECB presents the result in ranges based upon average differences between actual outcomes and previous projections.*

The *new EU Member States* still to introduce the euro (Czech Republic, Hungary, Poland, Romania, Bulgaria, Estonia, Latvia, Lithuania), are expected to continue to post positive growth on average compared with the euro area over the forecast horizon, but developments and risk assessments vary widely from country to country. While recession looks inevitable for Hungary, Estonia and Latvia in 2009, continued growth of 3% or a rate well above this figure is projected for most of the other countries in this group.

3.2 Euro Area Expects Weakest GDP Growth since Its Creation

In the euro area, real GDP growth shrank by 0.2% on a quarterly basis in both the second and third quarter of 2008. In the second (third) quarter of 2008, *Germany's* economic performance shrank by 0.4% (0.5%) on a quarterly basis. Whereas the slump in the second quarter of 2008 is partly explicable as a reaction to the extremely buoyant first quarter, the decline in the second half of 2008 is attributable to the negative contribution by net exports to growth as well as to negative investment growth. Private consumption has been in decline since the fourth quarter of 2007. However, the sharpest fall in private consumption is projected for the fourth quarter of 2008. The extremely negative values of current leading indicators (ifo business climate index, economic sentiment indicator, ZEW economic expectations) were recently confirmed by a strongly negative order intake. In September 2008, the latter slimmed by 8.0% month-on-month and will be accompanied by further automobile plant Christmas shutdowns. In addition, the chemicals sector was hit by a significant slump in demand. This prompts the fear that the current problems besetting the real economy will spread far beyond the automotive industry. Despite these downbeat prospects, however, the labor market has posted favorable growth to date. In October 2008, the number of registered unemployed fell to just below 3 million (nonseasonally-adjusted) – the lowest level since 1992. In 2009 and 2010, however, the labor market will clearly mirror the further deepening economic downturn.

Furthermore, Austria's second-largest trading partner *Italy* posted negative growth in the second and third quarters of 2008. However, since very sluggish growth also marked the first quarter of 2008, a recession is anticipated for the entire year 2008, which will persist into 2009 as well.

After a negative second quarter in 2008, *France* unexpectedly registered modestly positive real GDP growth in the third quarter of 2008 (+0.1%). Recently, however, an anemic order intake signaled a more prolonged period of declining industrial production. France, therefore, is also expected to enter into recession in 2009.

In *Spain* and *Ireland,* the current downturn is being aggravated by the bursting of a real estate bubble. This is deepening the slump in investment and intensifying the negative momentum in the labor market. *Slovenia* and *Slovakia* both anticipate robust growth in 2009. The two countries are still in a "catch-up process" and are benefiting from exceptionally high domestic demand.

The Eurosystem anticipates GDP growth of +0.8% to +1.2% for 2008 and a slump to –0.1% to +0.0% for 2009; in 2010, GDP growth is expected to recover to +0.5% to +1.5%. As chart 2 (graph on the right) shows, such a prospect would signify the first recession in the euro area since the introduction of the euro. In particular, invest-

ment and exports had to be significantly downgraded on previous forecasts.

4 Global Downturn Also Spells Recession in Austria

4.1 International Financial Crisis Spreads to Austria

The Austrian economy succeeded in decoupling itself from some international developments well into 2008. Whereas its largest trading partners, Germany and Italy, have been in recession since the second quarter of 2008 already, Austrian real GDP growth remained mildly positive in the third quarter of 2008 (+0.1%). However, Austria has been severely hit by the financial crisis – at the very latest, since Lehman Brothers filed for bankruptcy. The crisis is taking its toll on the Austrian economy through various channels.

Austria's banking and insurance sectors have been affected by the crisis in several ways. First, current financing options in the interbank market are no longer, or only to a very limited extent, available. In recent weeks and months, these two sectors were also hit by heavy losses on stock exchanges, which may be attributable to the Austrian economy's exceptionally high exposure in Central, Eastern and Southeastern Europe as well as to its higher risk ratings. Since the start of the financial turmoil in 2007, bank lending to businesses and households has become increasingly tighter. The financing costs for businesses and households have increased gradually. Since business enterprises can currently only make use of bond and equity financing to a limited extent, corporate investment and the prefinancing of larger business transactions are subject to financing constraints.[5]

In addition, Austrian households face increasing financing costs. They have also been hit by losses in wealth owing to the slump in stock prices. Above all, foreign currency borrowers with bullet loans have been particularly adversely affected by repayment vehicle losses. Wealth effects have both a direct and indirect impact on private consumption via household income. Rising unemployment, too, will adversely affect private consumption, albeit with a time lag.

Typically, the economic downturn is evident in investment in equipment to a particularly pronounced degree. Decreasing, or absent, incoming orders are giving rise to lower profit expectations and the postponement of investment activity. Likewise, increased financing costs are dampening investment demand. In addition, the global decline in demand induced by the financial crisis is curtailing the demand for exports.

Although most of these effects on the Austrian economy will occur with a certain time lag, the downturn is already mirrored in the leading indicators. Chart 3 shows commonly used confidence indicators.[6] All these indicators are already trending significantly lower than their values seen at the time of the economic slump after the dotcom bubble burst in 2001.

On a monthly basis, underlying industrial production growth[7] has been

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[5] *It was not possible at the time of the current outlook's cutoff date for data to assess the "easing" effects of Austria's support package for its banking sector.*

[6] *Standardizing the index values helps to present the different indicators in uniform scale. Each data point was calculated as the difference between the index value and the mean value (January 1999 to November 2008) divided by the standard deviation (January 1999 to November 2008).*

[7] *ÖNACE sections C to F.*

Chart 3

Confidence Indicators
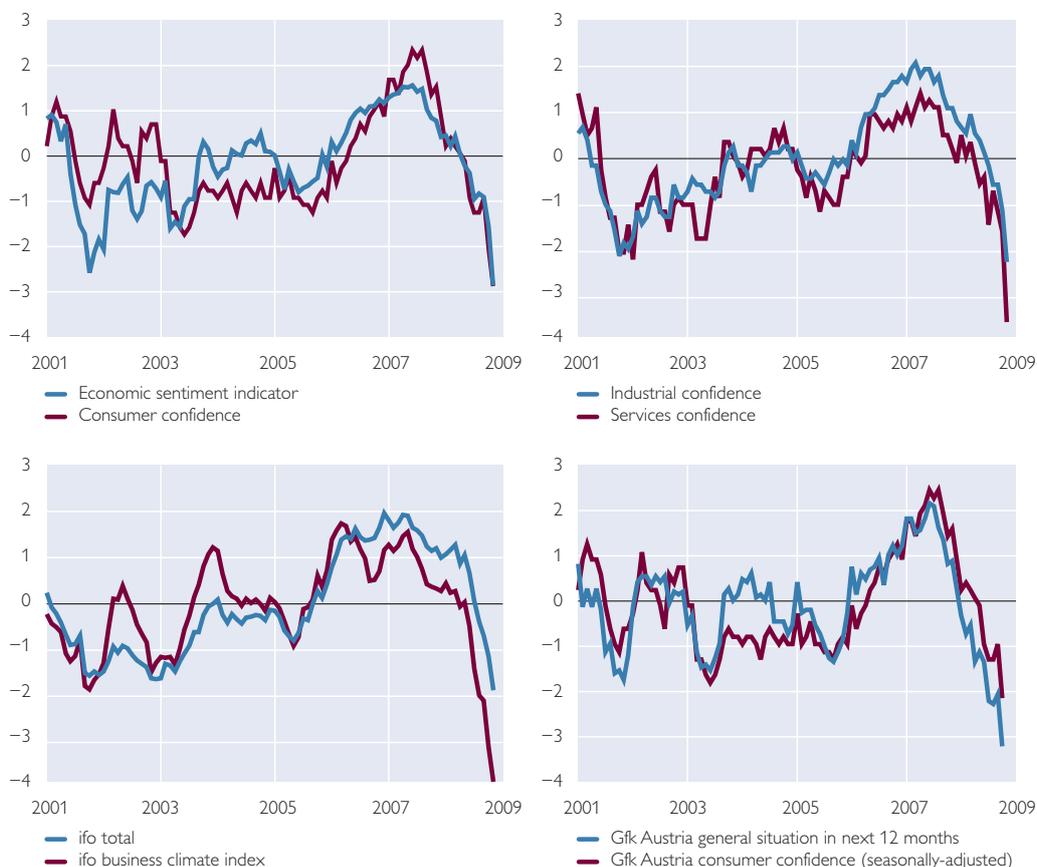
Source: European Commission, ifo, GfK Austria.

decreasing in Austria since April 2008 (chart 4). On an annual basis, the working-day adjusted production index posted negative growth for the first time in September 2008. Industrial production sentiment is not currently signaling any improvement over the next few months. Instead, the order books suggest a further decline in industrial production. This applies to all industrial categories, to consumer and capital goods, as well as to intermediate goods. To date, exports have been especially hit by the collapse of order intake. At 82.4% in the third

quarter of 2008, capacity utilization was however significantly higher than the levels seen at end-2002 (79.1%).

The initial release of the demand components in the GDP flash estimate revealed the financial crisis' negative impact on exports. Export growth was negative in the third quarter of 2008 (−0.3% on the previous quarter). By contrast, investment growth remained remarkably robust at +0.5% (on the previous quarter). In addition, private consumption was still not overly affected by the financial crisis in the third quarter of 2008.

Chart 4

Industrial Production in Austria

Monthly growth in % — *Monthly change (annual rate) in %*

- Industrial production, seasonally-adjusted trend (left-hand scale)
- Industrial production, nonseasonally-adjusted (right-hand scale)
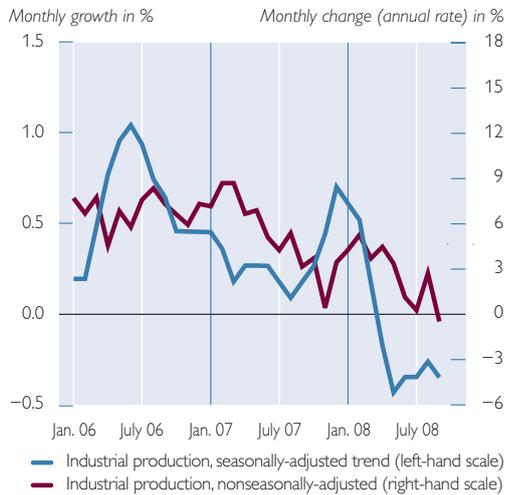
Source: Statistics Austria.

Export Expectations and Capacity Utilization of Industry

Index — *%*

- Export expectations in the next few months (left-hand scale)
- Capacity utilization (right-hand scale)
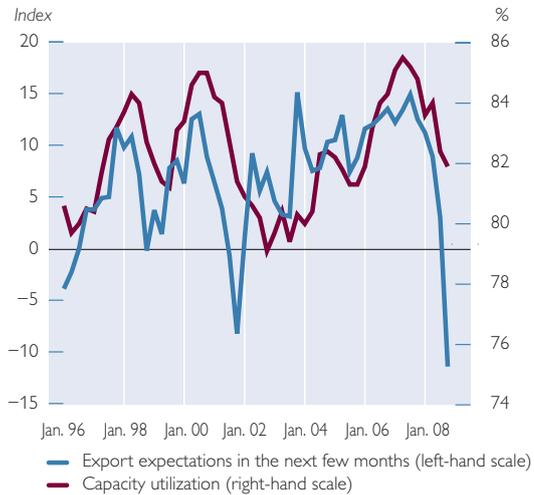
Source: European Commission.

Box 1

The Current GDP Forecast in a Historical Context

*The OeNB expects Austria to enter into recession in 2009. Recessions, historically speaking, are rare events. A **recession** is a phase of the economic cycle in which the real annual GDP growth of an economy is negative. A **"technical recession"** denotes negative quarterly real GDP growth over two successive quarters. This phenomenon does not necessarily signify negative annual growth.*

Austria's two previous downturns were triggered by the burst of the dot-com bubble (2001) and the aftermath of German reunification (1993). In both these periods, however, negative

Historical Development of Real GDP in Austria

1901 to 2010

%

1965 to 2010

%

- Real GDP
- HP filtered trend
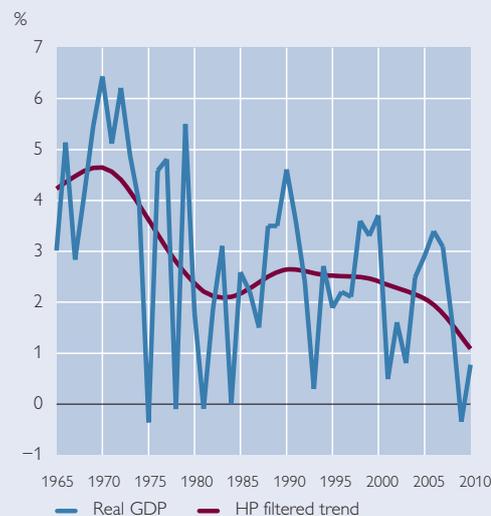
Source: OeNB, Statistics Austria, WIFO.

growth was registered in only a single quarter. Strictly speaking, therefore, these two down-turns were not accompanied by a (technical) recession. Austria's most recent "technical recession" occurred in 1984. At that time, however, positive annual growth was recorded for the year as whole. In 1981 (second oil crisis) and 1978, the Austrian economy moved between stagnation and recession, registering annual growth of around −0.1 % in both years. Since 1945, Austria has experienced a deep recession (−0.4%) only once − in 1975 in the wake of the first oil crisis.

The graph on the left in the chart shows the extreme depths of the economic crisis in the 1930s. These data from the early 20th century must, however, be considered with caution. Austrian GDP growth is estimated to have stood at −10.3% in 1932. Cumulated over the period from 1930 to 1933, Austria's economic output contracted by some 25% as a result of the Great Depression.

4.2 Exports Will Shrink in 2009

Austrian exports have enjoyed extraordinary success since 1995. From 1995 to 2007, they grew at an average rate of +7.3%. In this period, net exports made a contribution of +0.7 percentage points to average real GDP growth. By comparison, domestic demand made an average contribution of +1.6 percentage points to real GDP growth. The international financial crisis brought this boom period for exports to an end. The collapse in order intake will reduce growth in the expected demand for Austrian exports to a mere +1.4% in 2009. This situation will reflect, above all, the recessions in Germany and Italy as well as the marked slowdown in Central, Eastern and Southeastern Europe. Between 1995 and 2007, global demand grew by an average of +7.0%. Owing to renewed stronger demand in Austria's export markets in 2010, cumulated growth of global demand will still be +5.9% in 2009 and 2010. This rate will exceed the growth in global demand from 2001 to 2002 (dot-com crisis; cumulated growth of +4.1%).

Negative export growth is being fueled by flagging global demand, in particular. In view of the economic

Table 3

Growth and Price Developments in Austria's External Trade

	2007	2008	2009	2010
Exports	*Annual change in %*			
Competitor prices in Austria's export markets	+0.5	+2.4	+3.4	+1.3
Export deflator	+1.8	+1.5	+2.0	+1.8
Changes in price competitiveness	−1.4	+0.9	+1.5	−0.5
Import demand in Austria's export markets (real)	+6.6	+4.1	+1.4	+4.5
Austrian exports of goods and services (real)	+8.5	+2.5	−2.7	+2.1
Market share	+1.9	−1.6	−4.0	−2.4
Imports				
International competitor prices in the Austrian market	+0.6	+2.2	+2.8	+1.3
Import deflator	+1.8	+3.3	+1.7	+1.2
Austrian imports of goods and services (real)	+7.0	+1.6	−2.5	+1.6
Terms of trade	+0.0	−1.7	+0.3	+0.6
	Percentage points of real GDP			
Contribution of net exports to GDP growth	+1.2	+0.6	−0.3	+0.4

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook, Eurosystem.

Table 4

Austria's Current Account

	2007	2008	2009	2010
	% of nominal GDP			
Balance of trade	4.9	4.4	4.2	4.9
Balance on goods	0.5	−0.2	−0.2	0.2
Balance on services	4.4	4.5	4.4	4.8
Euro area	−0.1	−0.7	−1.3	−0.9
Non-euro area countries	5.0	5.1	5.5	5.8
Balance on income	−1.3	−1.3	−1.5	−1.4
Balance on current transfers	−0.4	−0.4	−0.4	−0.4
Current account	3.2	2.7	2.4	3.1

Source: 2007: OeNB; 2008 to 2010: OeNB December 2008 outlook.

outlook of Austria's largest trading partners and their order book valuations, export growth sentiment is very pessimistic. After +8.5% in 2007 and +2.5% in 2008, real exports are expected to shrink by 2.7% in 2009. For 2010, moderate real export growth is anticipated in the wake of the global economic recovery.

In both 2008 and 2009, slowing export growth will temporarily check the increase in the current account surplus, which has been evident for some time. The recession in 2009 will have an adverse effect primarily on the balance on goods, which will be in the red in 2008 and 2009. The services, income and transfers balance will remain largely stable over the forecast horizon.

4.3 Slump in Equipment Investment

According to the OeNB, gross fixed capital formation is likely to decline markedly in 2009 – the year when the Austrian economy will enter into recession. Investment decisions largely depend on both current and expected macroeconomic demand and profitability. Both these determinants are now visibly deteriorating for two reasons. First,

export demand is projected to fall sharply. According to OeNB estimates, a drop in export growth by 1 percentage point will result in a decrease in investment growth of some 0.5 percentage points. Second, private consumption growth is still flagging compared with 2007. This drop in demand caused by both domestic and international factors is triggering a notable cooling in investment activity.

Furthermore, recent months have seen a marked increase in corporate financing costs. Owing to the considerable uncertainty arising from the financial turmoil, corporate loan spreads have widened by 94 basis points since the outbreak of the crisis in mid-2007.[8] The current OeNB economic outlook is based on the assumption that this spread will be sustained over the entire forecast horizon. In 2009 and 2010, corporate investment activity will therefore be dampened by an additional 0.5 and 0.9 percentage points, respectively.

Although investment in the third quarter of 2008 grew by +0.5%, a survey of 1,278 companies commissioned by the Austrian Federal Economic

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[8] The spread for corporate loans is defined as the difference between the average interest rate on corporate loans and the interest rate on ten-year government bonds.

Table 5

Investment Activity in Austria

	2007	2008	2009	2010
	Annual change in %			
Total gross fixed capital formation (real)	+3.9	+2.7	−1.6	−0.4
of which: Investment in plant and equipment (real)	+4.1	+3.6	−4.8	−2.4
Residential construction investment (real)	+4.0	+1.1	+0.7	−0.5
Nonresidential construction investment and other investment	+4.7	+3.4	−0.1	+1.6
Government investment (real)	−3.2	−0.3	+0.7	+1.0
Private investment (real)	+4.3	+2.9	−1.7	−0.5
	Contribution to total gross fixed capital formation growth in percentage points			
Investment in plant and equipment (real)	+1.6	+1.4	−1.9	−0.9
Residential construction investment (real)	+0.8	+0.2	+0.1	−0.1
Nonresidential construction investment and other investment	+1.9	+1.4	−0.1	+0.7
Government investment (real)	−0.2	+0.0	+0.0	+0.0
Private investment (real)	+4.1	+2.7	−1.6	−0.4
	Contribution to real GDP growth in percentage points			
Inventory changes (real)	−0.1	+0.0	+0.0	+0.0

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

Chamber (carried out in the period from October 27, 2008, to November 3, 2008) highlights the currently difficult economic situation. According to the survey, respondents indicated that they would either cancel or shelve 25% of total planned investment because of the financial crisis. Of this total, investment in equipment accounting for some 40% of gross fixed capital formation is likely to be hardest hit. The OeNB projects a contraction in investment in equipment of 4.8% (2.4%) in 2009 (2010). This will result in an expected fall in gross fixed capital formation of 1.6% in 2009 and 0.4% in 2010.

By contrast, construction investment, which is less cyclically sensitive, will hold up better owing to two factors. First, the construction industry will continue to have healthy order books into the first half of 2009. Order problems will not emerge until the second half of 2009. Second, the bulk of the economic measures adopted (frontloaded investment by the ÖBB,

ASFINAG and BIG) is concentrated on government measures to support the construction sector. While the first economic stimulus package provided for frontloaded investment of about EUR 150 million p.a. by the ÖBB and ASFINAG, frontloaded investment of EUR 850 million by the BIG was announced for 2009 and 2010 in the second growth package. The latter investment was included in this outlook on the assumption that EUR 500 million and EUR 350 million will be invested in 2009 and 2010, respectively. This will generate GDP growth stimuli of around 0.1 percentage points in 2009. For further details the measures of the second economic stimulus package, see box 2 below.

4.4 Sluggish, Albeit Still Positive, Consumption Growth

2007 was marked by dynamic growth in total disposable nominal household income (+4.4%), which will be even further exceeded by a wide margin in

Table 6

Composition of Nominal Household Income in Austria

	2007	2008	2009	2010
	Annual change in %			
Employees	+2.2	+2.0	+0.2	−0.2
Wages per employee	+2.2	+2.8	+2.6	+1.9
Compensation of employees[1]	+4.4	+4.9	+2.7	+1.7
Mixed income and operating surplus, net[1]	+9.6	+5.4	+1.7	+1.8
Property income[1]	+5.7	+2.9	+1.3	+2.2
	Contribution to disposable household income in percentage points			
Compensation of employees	+3.6	+3.9	+2.2	+1.4
Mixed income and operating surplus, net	+1.3	+0.7	+0.2	+0.2
Property income	+1.1	+0.6	+0.3	+0.4
Net transfers minus direct taxes[1]	−1.4	+0.0	+0.2	+0.2
Disposable household income (nominal)	+4.4	+5.2	+2.7	+2.3

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

[1] *Negative values indicate an increase in (negative) net transfers minus direct taxes, positive values indicate a decrease.*

2008 (+5.2%), according to the OeNB economic outlook. This situation is attributable to very dynamic employment growth in 2007 and 2008. At +2.8%, nominal gross wages and salaries per person in payroll employment will increase more slowly in 2008, resulting – in combination with a projected inflation rate of 3.3% – in a real wage loss. Owing to both economic and employment factors, growth in nominal compensation of employees is expected to slow in 2009 and 2010 (+2.7% and a mere +1.7%, respectively). In 2009, real wage growth (+1.2%) will be fueled by a sharp drop in inflation.

Growth in mixed income of self-employed and in operating surpluses, as well as in investment income (the most cyclically-sensitive income component), will decline in 2009 only to recover slightly in 2010. Since the start of the financial crisis in the third quarter of 2007, losses suffered by the household sector arising from directly held tradable securities – corrected by foundations allocated to the household sector – have amounted to some

EUR 17 billion. Simulation results based on the OeNB macroeconometric model however show that the effects of changes in asset prices on private consumption and GDP growth in Austria are not very marked and occur only with a substantial time lag. On a cumulated basis over a period of five years, current losses of EUR 17 billion will dampen consumption by 0.3 percentage points as well as GDP by 0.1 percentage points.

Healthy income growth on the back of employment growth resulted in still relatively steady consumer demand in the first three quarters of 2008. In the first three quarters of 2008, real quarterly consumption growth amounted to +0.3% in each quarter. Therefore, an annual consumption growth rate of +1.2% can be expected for 2008 as a whole. The consumption forecast for 2009 and 2010 (+0.5% respectively) is marked by rapidly decelerating employment momentum owing to the crisis and thus by considerably weaker growth in compensation of employees. In addition, investment income is not expected to make a notable contribution to

Table 7

Private Consumption in Austria

	2007	2008	2009	2010
	Annual change in %			
Disposable household income (nominal)	+4.4	+5.2	+2.7	+2.3
Private consumption expenditure (PCE) deflator	+2.3	+2.9	+1.4	+1.5
Disposable household income (real)	+2.1	+2.3	+1.3	+0.7
Private consumption (real)	+0.9	+1.2	+0.5	+0.5
	% of nominal disposable household income			
Saving ratio	11.6	12.8	13.6	13.7

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

nominal household income growth. Furthermore, a further rise in the saving ratio, which will also dampen private consumption growth, is expected in 2009 and 2010. Owing to heightened job insecurity and given the uncertainties about the long-term sustainability of the public pension system and the resulting pension reforms, the saving ratio rose steadily in the period from 2003 to 2007. In addition, growth in real disposable household income in this period was driven to an above-average degree by investment income and mixed income accruing to self-employed households, which exhibit a below-average marginal propensity to consume. For 2009 and 2010, household confidence is expected to plummet owing to the accumulation of negative shocks for households (inflation shock in 2008, financial crisis, recession), which will give rise to further consumer restraint.

4.5 Crisis Induces Steep Rise in Unemployment

Economic developments fed through to the labor market already in November 2008. Although total employment growth was still very buoyant at +1.5%, it had slowed compared with the previous months. In November 2008, the number of registered unemployed rose for the first time since February 2006 (+0.9% year-on-year). By contrast, the second quarter of 2008 had seen unemployment figures drop by 6.4%. In November 2008, the number of reported vacancies fell significantly by −11.5%.

The labor market is likely to deteriorate significantly owing to the recession in 2009. Since employment follows on the heels of economic growth, the labor market slump and the rise in unemployment will not emerge until in 2009 and 2010. After +2% in 2008, employment growth will therefore move toward zero in 2009 and be negative in 2010 owing to lag effects. Since labor supply growth is also dependent on economic growth, it will fall from +1.3% in 2008 to only +0.6% in 2009. This will counter the rise in unemployment. This effect is primarily determined by less migration.[9] The unemployment rate will climb from 3.7% in

[9] *In addition to demographic factors, labor supply growth is determined by pension scheme reforms and child-care benefits. Over the forecast horizon, all three factors will continue to boost labor supply, which will be countered by cyclical components, however.*

Table 8

Labor Market Developments in Austria

	2007	2008	2009	2010
	Annual change in %			
Total employment	+1.7	+1.5	+0.1	−0.2
of which: Payroll employment	+2.2	+2.0	+0.2	−0.2
Self-employment	−0.6	−0.5	−0.4	−0.4
Public sector employment	−0.3	+0.0	+0.1	+0.1
Registered unemployment	−7.5	−1.9	+10.9	+9.0
Labor supply	+1.0	+1.3	+0.6	+0.2
	% of labor supply			
Unemployment rate (Eurostat definition)	4.4	3.7	4.2	4.8

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

2008 to 4.2% (2009) and 4.8% (2010).[10] After a drop in unemployment numbers by some 4,000 persons in 2008, this figure will rise by a total of some 45,000 persons in the years 2009 and 2010.

Box 2

Budgetary Developments to 2010 and Macroeconomic Effects of the Tax Reform and Bank Support Package[1]

The current slowdown in growth is only marginally reflected in the budgetary developments of 2008. Tax receipts partly lag behind the development of their respective tax bases (e.g. corporate income tax). Unusually benign employment growth in the first three quarters of 2008 and comparatively high inflation both favored an increase in tax receipts (withholding tax on wages and salaries, social security contributions and VAT) as well as tax increases already agreed in 2007 (increase in the petroleum tax from mid-2007, increase in health insurance contributions as of early 2008, etc.). The measures adopted in 2008 to mitigate the impact of inflation on disposable household income will, however, result in a slight deterioration in the 2008 budget balance.

Trend in the General Government Budget Balance to 2010

The current OeNB outlook (which is Austria's contribution to the Eurosystem projections) includes only those measures that were agreed and suitably specified as at November 20, 2008. The basic scenario therefore includes only the capital injection of EUR 2.7 billion provided to Erste Bank der oesterreichischen Sparkassen AG, and no other measures of the bank support package; also excluded are any liability charges for guarantees. Neither are included the tax reform, the set of measures to support families with children and the budgetary effects of the second economic stimulus package.

[1] Authored by Walpurga Köhler-Töglhofer (walpurga.koehler-toeglhofer@oenb.at) and Lukas Reiss (lukas.reiss@oenb.at).

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[10] *In 2008, Eurostat converted the method for calculating unemployment rates for Austria. This new method is already used in most peer group countries. As a result, Austria's unemployment rate was sharply downgraded. Provided comparable data based on the old calculation method are available, a sharp downtrend according to the old calculation method is evident in 2008 as well.*

Deficit and Debt Ratios: Basic Scenario and Scenario Including Reform

	2008	2009	2010
Gross domestic product	*Annual change in % (real)*		
Basic scenario	+1.6	−0.3	+0.8
Including tax reform and economic stimulus package	+1.6	+0.2	+0.9
General government net lending	*% of nominal GDP*		
Basic scenario	−0.7	−1.9	−2.5
Including tax reform and economic stimulus package	−0.7	−2.8	−3.4
General government debt			
Basic scenario	59.3	61.2	63.1
Including tax reform and economic stimulus package	59.3	61.9	64.5

Source: OeNB.

For 2009 and 2010, the basic scenario already projects a significant deterioration in the budgetary situation as a result of the severe slowdown in growth. Owing to the impact of the automatic stabilizers alone (decline in tax receipts, rise in unemployment benefit spending), the deficit is expected to increase by around 0.8% of GDP in 2009. The measures agreed in 2008 to mitigate inflationary effects, as well as the expected continuation of the strong trend growth in certain expenditure components (e.g. in the health segment), imply an additional (structural) deterioration of around ½% of GDP. An only marginally deficit-increasing effect can be expected from the first economic stimulus package (which was primarily geared to support SMEs). In 2010, the general government deficit will widen to around 2½% of GDP owing to the increasingly negative output gap. Sharply falling primary surpluses, together with an unfavorable interest-growth differential and the capital injection to Erste Bank der oesterreichischen Sparkassen AG, will result in the public debt ratio increasing to around 63% of GDP.

Effects of Tax Reform and Second Economic Stimulus Package

In the government program, the income tax reform including measures to support families with children − to take effect on January 1, 2009 − is estimated to cost EUR 2.7 billion. The measures announced in the second economic stimulus package (temporary degressive depreciation on movable assets, free final year at nursery, etc.) will increase the general government deficit by almost 0.2% of GDP in both 2009 and 2010.

As a result, the general government deficit ratio, based on a simulation using the OeNB macro model, will rise sharply. By 2010, the fiscal balance is expected to deteriorate to −3.4% of GDP. Compared with the basic scenario, the inclusion of these measures also implies a positive growth effect of roughly ½% of GDP in 2009.

Impact of the Bank Support Package

Government guarantees (deposit guarantees, guarantees for securities issued by Oesterreichische Clearingbank AG and for ongoing interbank business transacted through the latter) will only have an effect on the Maastricht deficit and the Maastricht debt if they are called in.

Potential capital injections to financial institutions by the FIMBAG, the newly created stock corporation for financial market investments of the Federal Republic of Austria, will have to be financed by government bonds, thereby resulting in higher public debt. The legally stipulated maximum amount of EUR 15 billion for such measures roughly corresponds to 5.3% of GDP. The resulting additional interest payments per year would be approximately ¼% of GDP. Any income from these financial interests (government revenues) would have to be offset against this higher interest burden (government expenditures). The time, type and amount of the expected income depend on the still outstanding specific form of the financial interests.

Table 9

Price and Cost Indicators for Austria

	2007	2008	2009	2010
	Annual change in %			
Harmonised Index of Consumer Prices (HICP)	+2.2	+3.3	+1.4	+1.6
HICP energy	+4.0	+11.6	−5.0	+0.9
HICP excluding energy	+2.0	+2.5	+2.1	+1.7
Private consumption expenditure (PCE) deflator	+2.3	+2.9	+1.4	+1.5
Investment deflator	+3.0	+3.1	+1.6	+1.2
Import deflator	+1.8	+3.3	+1.7	+1.2
Export deflator	+1.8	+1.5	+2.0	+1.8
Terms of trade	+0.0	−1.7	+0.3	+0.6
GDP at factor cost deflator	+2.2	+2.7	+1.5	+1.8
Unit labor costs	+0.9	+2.7	+3.0	+0.9
Compensation per employee	+2.2	+2.8	+2.6	+1.9
Labor productivity	+1.3	+0.1	−0.5	+1.0
Collectively agreed wage settlements	+2.5	+3.1	+3.0	+2.6
Profit margins[1]	+1.3	+0.0	−1.5	+1.0

Source: 2007: Eurostat, Statistics Austria; 2008 to 2010: OeNB December 2008 outlook.

[1] *GDP deflator divided by unit labor costs.*

4.6 Sharp Fall in Commodity and Energy Prices Induces Drop in Inflation

HICP inflation reached record levels of 4% in June 2008 and has since been falling sharply. It had been driven primarily by surging oil and commodity prices in the international market. These prices are now subject to dampening coming specifically from the base effect of the steep energy price hikes seen since October 2007 and from the current fall in oil prices. For 2008, the OeNB therefore projects an inflation rate of 3.3%. 2009 and 2010 should see decelerating inflation due to strongly decreasing international commodity and energy prices. HICP inflation will decline to 1.4% in 2009 and increase slightly to 1.6% in 2010.

The sharp rise in international commodity prices resulted in a pronounced deterioration in the terms of trade in 2008. By contrast, a slight improvement is expected in 2009 and 2010. Wage negotiations for 2009 are currently influenced by three factors: first,

inclusion of the healthy profit situation in 2008; second, compensation for high inflation in 2008 and, third, the bleak economic expectations for 2009. The OeNB projects an increase in collectively bargained wages of 3%. Collective wage agreements for 2010 are expected to be significantly lower owing to narrowing profit margins in 2009 and to the economic crisis (2.6%).

5 Unusually High Risks to Growth and Inflation Outlooks

The current OeNB outlook is subject to a large number of unusually high risks. The source of these risks remains the future development of the international financial crisis and its transmission to the real economy. Both the scale and duration (lending, credit pricing and credit costs, confidence trend) of the financial crisis are currently extremely uncertain and represent a significant downside risk.

Of the *external assumptions*, on which this outlook is based, the projected growth trend of Austria's trad-

ing partners exhibits the greatest degree of uncertainty. The latter relates to both the scale of the recession in 2009 and to its duration. At the same time, a number of countries are drawing up measures to stabilize their economies in order to soften the impact of the imminent recession or, in some cases, to prevent it altogether. It was not possible to gauge the impact of the type and scale of these measures at the cutoff date for data of this publication. Compared with previous outlooks, all other external assumptions of this outlook (oil prices, interest rates, etc.) are far more heavily dependent on real economic developments. The price of oil depends on expectations about future economic developments and is therefore subject to similar risks. This could have an effect on the assumed oil price expectations for both 2009 and 2010.

The largest *upside risks* to the growth outlook are, first, the economic aid measures that are currently being discussed at an EU level and, second, the national economic aid measures and the planned tax reforms. On the basis of the aforementioned simulations using the OeNB macro model, the inclusion of these national measures would generate a positive growth effect of around ½% of GDP in 2009, compared with the basic outlook. In addition, economic aid measures in other EU countries might alleviate the economic downturn. A major *domestic downside risk* is continued lending restraint.

Overall, the risks to the growth outlook do not clearly point in one direction. Since inflation risks are closely related to real economic ones, a clear upside or downside risk does not exist.

6 Growth and Inflation Outlook Massively Downgraded against June 2008

Since the OeNB June 2008 outlook, real external macroeconomic conditions have deteriorated significantly. Growth in Austrian export demand has slowed very rapidly. Compared with the June 2008 economic outlook, it will decline by 3.8 percentage points to only +1.4% in 2009. External price assumptions have however improved considerably since June 2008. The assumptions for the future development of oil prices were sharply corrected down. Oil prices are assumed to be USD 50 lower in 2009 and USD 39 lower in 2010. The U.S. dollar appreciated against the euro and, in both 2009 and 2010, the short-term interest rate will be well below the relevant projections in the June 2008 outlook.

The effects of these new external assumptions were simulated using the OeNB macroeconomic model. The three years of the forecasting period will see significantly negative effects of –0.6 (2008), –2.0 (2009) and –1.6 percentage points (2010) on GDP growth. The favorable developments on the economy's price front are clearly too sluggish to counter the negative real economic effects.

Table 11 lists the reasons for revising this outlook in detail. In addition to the effects of the new external assumptions, this revision is explained by the effects of new data and by the item "Other". The influence of new data includes the effects of the revisions of both the historical data already available at the time of the previous OeNB economic outlook (i.e. data to the first quarter of 2008) and the forecasting errors of the previous outlook for the periods now published for the first time (i.e. data for the second and third quarters of 2008). The item "Other" in-

Table 10

Change in the External Environment since the June 2008 Outlook

	December 2008			June 2008			Difference		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
	Annual change in %								
Growth of Austria's export markets	+4.1	+1.4	+4.5	+5.2	+5.2	+6.3	−1.1	−3.8	−1.8
Competitor prices in Austria's export markets	+2.4	+3.4	+1.3	+0.7	+1.8	+1.3	+1.7	+1.6	+0.0
Competitor prices in Austria's import markets	+2.2	+2.8	+1.3	+1.3	+1.8	+1.4	+0.9	+1.0	−0.1
	USD								
Oil price per barrel (Brent)	99.9	67.3	76.6	113.3	117.7	115.6	−13.4	−50.4	−39.0
	Annual change in %								
Nominal effective exchange rate (exports)	−0.4	+1.4	+0.0	−1.0	−0.1	+0.0	+0.6	+1.5	+0.0
Nominal effective exchange rate (imports)	+0.2	+0.7	+0.0	−0.3	+0.0	+0.0	+0.5	+0.7	+0.0
	%								
Three-month interest rate	4.7	2.8	3.2	4.9	4.3	4.2	−0.2	−1.5	−1.0
Long-term interest rate	4.4	4.5	4.7	4.4	4.7	4.8	+0.0	−0.2	−0.1
	Annual change in %								
U.S. GDP (real)	+1.4	−0.7	+0.9	+1.0	+1.2	+2.6	+0.4	−1.9	−1.7
	USD/EUR								
USD/EUR exchange rate	1.46	1.27	1.27	1.54	1.54	1.54	−0.08	−0.27	−0.27

Source: Eurosystem.

cludes new expert assessments regarding the development of domestic variables such as government consumption or wage settlements, as well as any changes to the model.

The downgrade of the 2008 growth outlook by −0.6 percentage points is explicable on three grounds: first, sharp downgrades of historical data (−0.4 percentage points); second, positive effects of external assumptions (+0.3%); and, third, a new expert assessment (−0.4 percentage points). The downgrade for 2009 proved to be particularly severe (−2.0 percentage points). It is essentially based on deteriorated external assumptions (−0.8 percentage points) relating to Austrian export demand and on a new expert assessment (−1.2 percentage points). The latter basically includes the special effects of the financial crisis, mostly comprising a new assessment of both export and investment activities. The similarly sharp downgrade for 2010 (−1.6 percentage points) is based in equal measure on new expert assessments and new external assumptions.

The revision of the inflation outlook for 2008 was largely influenced by higher realized inflation rates in 2008. The extent to which inflation rose had not been predicted. The downgrades for 2009 and 2010 are explicable by new data (2009) and revised external conditions. These downgrades are largely influenced by the new oil price assumptions. Owing to the great openness of the Austrian economy, however, the huge implosion of domestic demand will have only a relatively mild effect on the trend in inflation.

A comparison of the current forecasts for Austria (table 18 in the appen-

Table 11

Breakdown of Forecast Revisions

	GDP			HICP		
	2008	2009	2010	2008	2009	2010
	Annual change in %					
December 2008 outlook	+1.6	−0.3	+0.8	+3.3	+1.4	+1.6
June 2007 outlook	+2.2	+1.7	+2.4	+3.1	+2.4	+1.9
Difference	−0.6	−2.0	−1.6	+0.2	−1.0	−0.3
	Percentage points					
Due to:						
External assumptions	+0.3	−0.8	−0.8	+0.1	−0.6	−0.3
New data	−0.5	−0.1	×	+0.2	−0.8	×
of which: Revision of historical data until Q1 08	−0.4	x	x	+0.0	x	x
Projection errors for Q2 08 and Q3 08	−0.1	−0.1	x	+0.2	−0.8	x
Other[1]	−0.4	−1.2	−0.8	−0.1	+0.2	+0.0

Source: OeNB June 2008 and December 2008 outlooks.

[1] *Different assumptions about trends in domestic variables such as wages, government consumption, effects of tax measures, other changes in assesment and model changes.*

dix of tables) shows clear differences in the forecast results. The forecasts correlate with the time of publication; an exceptionally strong tendency to downgrade is evident. With its growth outlook for 2009 (−0.3%), the OeNB is at the bottom end of the forecast spectrum. However, the OECD also expects a recession in 2009 (−0.1%). By contrast, expectations for 2010 are largely identical (OeNB: +0.8% and WIFO: +0.9%), whereas the European Commission and the Institute for Higher Studies and Scientific Research (IHS) anticipate a stronger recovery.

As for its inflation outlook, the OECD is conspicuously at the bottom end of the forecast spectrum at +1.1% for 2009 and +0.8% for 2010. Except for the OeNB (+1.4% for 2009 and +1.6% for 2010), the forecasts of all the other institutions exceed the OECD's projections by a wide margin. The OeNB December 2008 outlook differs from the others also in terms of the composition of growth, as it projects a decline in both exports and imports in 2009 and negative investment growth in 2010.

Box 3

CESEE not Spared from Global Downturn
Momentum Moderating, but Growth Differential to the Euro Area Remains
Considerable; Risks Tilted to the Downside[1]

Following a prolonged period of economic expansion which lasted well into the first half of 2008, clear signs of economic moderation became visible in the Central, Eastern and Southeastern Countries (CESEE)[2] in the third quarter. In line with weaker external demand, especially owing to the slowdown of economic activity in the euro area, and tighter external financing conditions, important leading indicators have deteriorated sharply since the end of the

[1] *Authored by Josef Schreiner (josef.schreiner@oenb.at).*

[2] *The aggregate CESEE contains Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Slovenia and Turkey.*

second quarter, pointing to a pronounced deceleration of growth in the second half of 2008 and in 2009. Expectations of moderate growth are very much in line with the forecasts for Western industrialized countries; as a result of the ongoing catching-up process, the region's growth differential is likely to remain substantial, however.

Industrial output growth was still robust in the first half of 2008 (+5.5% year-on-year on average for the region), but turned negative in August (−0.7% year-on-year on average for the region) and recovered only marginally in September. First indications of this steep decline had already appeared in May, when industrial confidence, as measured by the European Commission's Business and Consumer Survey, began to decrease noticeably in a number of CESEE countries. By November, industrial confidence reached especially low levels in the Central European countries. Besides industrial output and industrial confidence, recent changes in the growth of credit to nonfinancial corporations and changes in capacity utilization also point to weakening industrial dynamics. The level of capacity utilization, however, remains comparatively high by historical standards.

Export orders recently fell below long-term average levels, which clearly documents a worsening of external demand conditions. According to data collected in the course of the European Commission's Business and Consumer Survey, export expectations for the fourth quarter of 2008 declined as well, and in the Czech Republic, Hungary and a number of other CESEE countries a majority of exporters already expects export orders to decline over the coming months. A quick recovery of external demand therefore seems highly improbable.

When compared with the first half of 2008, growth rates of retail sales also declined. This drop, however, was less pronounced than the decrease in industrial output, as retail sales in the CESEE countries still grew at a positive rate (3.7% year-on-year on average) in October. However, consumer sentiment deteriorated substantially over the past months and stood at especially low levels in Hungary and some other CESEE countries. This should be seen against the backdrop of a slower expansion of consumer credit and less favorable labor market prospects than in the past. All these factors are expected to weigh on consumer spending in the near future.

Recent projections of economic growth for important CESEE countries clearly reflect the worsening consumer and industry sentiment and leading indicators. In 2008, the Czech Republic, Poland and Russia are expected to grow at a substantially slower pace than in 2007. This moderation is anticipated to extend well into 2009, with some recovery by year-end. Forecasts are somewhat different for Hungary: Growth is seen to accelerate slightly in 2008, albeit from a very low level. According to the most recent forecasts, however, growth will weaken considerably in 2009 and possibly turn negative. Generally, the deterioration of economic conditions in these countries is reflected more clearly now than in previous forecasts, as projected growth rates were mostly (and in some cases considerably) revised downward. However, it has to be kept in mind that compiling forecasts takes several weeks, and therefore the most recent (mainly negative) global developments are not considered.

Weaker growth forecasts reflect diminishing capital inflows into the region as well as lower expected demand from Western Europe, which in turn is seen to dampen exports and investment. Moreover, the deteriorating labor market situation and debt servicing of households will cut into consumption. The latter applies in particular to those countries with a high share of foreign currency lending that recently experienced a sizeable appreciation of the nominal exchange rate.

Despite these factors, growth in the CESEE region will remain in positive territory in 2009. The growth differential to the euro area will amount to around 3 percentage points, which is roughly the same value as in the preceeding years. Catching-up of the region will therefore continue also in 2009.

Risks to the growth outlook are significant and tilted to the downside. The main risks include a further deterioration of external financing conditions in the wake of the international financial turmoil, a larger-than-expected weakening of external demand and the possibility of disruptive exchange rate developments in the case of adverse changes to risk perceptions.

Real GDP Growth in the Three CEE EU Member States and Russia

				Forecast			Previous forecast	
		2006	2007	2008	2009		2008	2009
		Annual change in %						
Czech Republic	Historical data	6.8	6.0	..	..			
	European Commission (November 2008)			4.4	3.6	European Commission (April 2008)	4.7	5.0
	IMF (October 2008[1])			4.0	3.4	IMF (April 2008)	4.2	4.6
	wiiw (November 2008)			4.6	3.5	wiiw (July 2008)	4.7	5.0
	Consensus Forecasts (November 2008)			4.0–4.8	−1.0–5.2	Consensus Forecasts (April 2008)	3.8–5.5	3.2–6.0
Hungary	Historical data	4.1	1.1	..	..			
	European Commission (November 2008)			1.7	0.7	European Commission (April 2008)	1.9	3.2
	IMF (October 2008[1])			1.9	2.3	IMF (April 2008)	1.8	2.5
	wiiw (November 2008)			1.3	−1.0	wiiw (July 2008)	2.5	3.4
	Consensus Forecasts (November 2008)			1.1–1.8	−1.7–2.0	Consensus Forecasts (April 2008)	1.5–2.7	2.5–3.6
Poland	Historical data	6.2	6.7	..	..			
	European Commission (November 2008)			5.4	3.8	European Commission (April 2008)	5.3	5.0
	IMF (October 2008[1])			5.2	3.8	IMF (April 2008)	4.9	4.5
	wiiw (November 2008)			5.4	3.8	wiiw (July 2008)	5.5	5.3
	Consensus Forecasts (November 2008)			3.0–5.4	2.8–4.3	Consensus Forecasts (April 2008)	4.7–5.8	4.1–5.5
Russia	Historical data	7.3	8.1	..	..			
	European Commission (November 2008)			7.1	6.0	European Commission (April 2008)	7.7	7.3
	IMF (November 2008)			6.8	3.5	IMF (April 2008)	6.8	6.3
	wiiw (November 2008)			7.0	5.2	wiiw (July 2008)	7.3	6.8
	Consensus Forecasts (November 2008)			6.2–7.5	1.5–5.8	Consensus Forecasts (April 2008)	6.5–7.8	6.0–7.6

Source: European Commission, Consensus Forecasts, IMF, wiiw.

[1] *In its update of November 6, 2008 the IMF reduced its forecast for Emerging Europe considerably from 4.5% to 4.2% in 2008 and from 3.4% to 2.5% in 2009. Individual country forecasts have not been released.*

Annex: Detailed Result Tables

Table 12

Demand Components (Real Prices)

Chained volume data (reference year = 2000)

	2007	2008	2009	2010	2007	2008	2009	2010
	EUR million				Annual change in %			
Private consumption	127,249	128,743	129,389	130,006	+0.9	+1.2	+0.5	+0.5
Government consumption	42,933	43,745	44,174	44,831	+1.8	+1.9	+1.0	+1.5
Gross fixed capital formation	54,125	55,592	54,725	54,515	+3.9	+2.7	−1.6	−0.4
of which: Investment in plant and equipment	*21,565*	*22,340*	*21,266*	*20,748*	*+4.1*	*+3.6*	*−4.8*	*−2.4*
Residential construction investment	*10,782*	*10,901*	*10,977*	*10,921*	*+4.0*	*+1.1*	*+0.7*	*−0.5*
Investment in other construction	*21,959*	*22,706*	*22,678*	*23,042*	*+4.7*	*+3.4*	*−0.1*	*+1.6*
Changes in inventories (including statistical discrepancy)	2,258	902	549	515	×	×	×	×
Domestic demand	226,565	228,981	228,838	229,866	+1.9	+1.1	−0.1	+0.4
Exports of goods and services	148,750	152,501	148,423	151,478	+8.5	+2.5	−2.7	+2.1
Imports of goods and services	134,245	136,457	133,074	135,269	+7.0	+1.6	−2.5	+1.6
Net exports	14,505	16,045	15,349	16,209	×	×	×	×
Gross domestic product	241,070	245,026	244,186	246,075	+3.0	+1.6	−0.3	+0.8

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

Table 13

Demand Components (Current Prices)

	2007	2008	2009	2010	2007	2008	2009	2010
	EUR million				Annual change in %			
Private consumption	143,821	149,681	152,483	155,567	+3.2	+4.1	+1.9	+2.0
Government consumption	49,313	51,602	53,151	54,804	+4.3	+4.6	+3.0	+3.1
Gross fixed capital formation	60,046	63,575	63,567	64,079	+7.0	+5.9	+0.0	+0.8
Changes in inventories (including statistical discrepancy)	1,761	2,530	1,398	1,472	×	×	×	×
Domestic demand	254,941	267,387	270,599	275,921	+4.1	+4.9	+1.2	+2.0
Exports of goods and services	161,105	167,701	166,433	172,903	+10.5	+4.1	−0.8	+3.9
Imports of goods and services	145,123	152,317	151,022	155,307	+8.9	+5.0	−0.9	+2.8
Net exports	15,983	15,384	15,411	17,597	×	×	×	×
Gross domestic product	270,924	282,771	286,010	293,517	+5.3	+4.4	+1.1	+2.6

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

Table 14

Deflators of Demand Components

	2007	2008	2009	2010	2007	2008	2009	2010
	2000 = 100				*Annual change in %*			
Private consumption	113.0	116.3	117.8	119.7	+2.3	+2.9	+1.4	+1.5
Government consumption	114.9	117.9	120.3	122.2	+2.5	+2.7	+2.0	+1.6
Gross fixed capital formation	110.9	114.4	116.2	117.5	+3.0	+3.1	+1.6	+1.2
Domestic demand (excluding changes in inventories)	112.9	116.1	117.9	119.7	+2.5	+2.9	+1.5	+1.5
Exports of goods and services	108.3	110.0	112.1	114.1	+1.8	+1.5	+2.0	+1.8
Imports of goods and services	108.1	111.6	113.5	114.8	+1.8	+3.3	+1.7	+1.2
Terms of trade	100.2	98.5	98.8	99.4	+0.0	−1.7	+0.3	+0.6
Gross domestic product	112.4	115.4	117.1	119.3	+2.2	+2.7	+1.5	+1.8

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

Table 15

Labor Market

	2007	2008	2009	2010	2007	2008	2009	2010
	Thousands				*Annual change in %*			
Total employment	4,163.4	4,227.5	4,232.7	4,222.7	+1.7	+1.5	+0.1	−0.2
of which: Private sector employment	*3,644.4*	*3,708.6*	*3,713.4*	*3,702.9*	*+2.0*	*+1.8*	*+0.1*	*−0.3*
Payroll employment (national accounts definition)	3,482.1	3,552.3	3,558.5	3,551.0	+2.2	+2.0	+0.2	−0.2
	% of labor supply							
Unemployment rate (Eurostat definition)	4.4	3.7	4.2	4.8	×	×	×	×
	EUR per real output unit x 100							
Unit labor costs (whole economy)[1]	64.8	66.6	68.6	69.2	+0.9	+2.7	+3.0	+0.9
	EUR thousand per employee							
Labor productivity (whole economy)[2]	57.9	58.0	57.7	58.3	+1.3	+0.1	−0.5	+1.0
	EUR thousand							
Real compensation per employee[3]	33.2	33.2	33.6	33.7	+0.0	−0.1	+1.2	+0.4
	At current prices, EUR 1,000							
Gross compensation per employee	37.5	38.6	39.6	40.3	+2.2	+2.8	+2.6	+1.9
	At current prices, EUR million							
Total gross compensation of employees	130,725	137,081	140,845	143,232	+4.4	+4.9	+2.7	+1.7

Source: 2007: Eurostat; 2008 to 2010: OeNB December 2008 outlook.

[1] *Gross wages divided by real GDP.*
[2] *Real GDP divided by total employment.*
[3] *Gross wages per employee divided by the private consumption expenditure (PCE) deflator.*

Table 16

Current Account

	2007	2008	2009	2010	2007	2008	2009	2010
	EUR million				*% of nominal GDP*			
Balance of trade	13,214.0	12,301.0	12,051.8	14,455.6	4.9	4.4	4.2	4.9
Balance on goods	1,250.0	−548.0	−525.0	461.0	0.5	−0.2	−0.2	0.2
Balance on services	11,964.0	12,849.0	12,576.8	13,994.6	4.4	4.5	4.4	4.8
Euro area	−318.0	−2,071.6	−3,575.8	−2,617.8	−0.1	−0.7	−1.3	−0.9
Non-euro area countries	13,532.0	14,372.6	15,627.6	17,073.4	5.0	5.1	5.5	5.8
Balance on income	−3,621.0	−3,651.2	−4,174.4	−4,234.2	−1.3	−1.3	−1.5	−1.4
Balance on transfers	−1,033.0	−1,053.4	−1,076.0	−1,136.0	−0.4	−0.4	−0.4	−0.4
Current account	8,560.0	7,596.5	6,801.4	9,085.4	3.2	2.7	2.4	3.1

Source: 2007: OeNB; 2008 to 2010: OeNB December 2008 outlook.

Table 17

Quarterly Outlook Results

	2008	2009	2010	2008				2009				2010			
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Prices, wages and costs	*Annual change in %*														
HICP	+3.3	+1.4	+1.6	+3.2	+3.7	+3.6	+2.7	+1.9	+1.3	+0.9	+1.6	+1.5	+1.6	+1.6	+1.7
HICP (excluding energy)	+2.5	+2.1	+1.7	+2.3	+2.5	+2.7	+2.6	+2.3	+2.1	+1.9	+1.9	+1.6	+1.7	+1.7	+1.7
Private consumption expenditure (PCE) deflator	+2.9	+1.4	+1.5	+3.4	+3.2	+2.6	+2.2	+1.5	+1.3	+1.3	+1.4	+1.5	+1.5	+1.5	+1.6
Gross fixed capital formation deflator	+3.1	+1.6	+1.2	+2.9	+3.1	+3.4	+3.0	+2.5	+1.8	+1.1	+1.0	+1.0	+1.1	+1.3	+1.4
GDP deflator	+2.7	+1.5	+1.8	+2.7	+2.9	+2.9	+2.4	+1.9	+1.4	+1.3	+1.5	+1.7	+1.8	+1.9	+1.9
Unit labor costs	+2.7	+3.0	+0.9	+1.8	+2.3	+3.1	+3.7	+4.0	+3.6	+2.7	+1.9	+1.2	+1.0	+0.8	+0.5
Nominal wages per employee	+2.8	+2.6	+1.9	+2.4	+2.7	+2.9	+3.0	+2.9	+2.7	+2.4	+2.2	+2.1	+2.0	+1.9	+1.8
Productivity	+0.1	−0.5	+1.0	+0.7	+0.5	−0.1	−0.6	−1.0	−0.9	−0.3	+0.3	+0.8	+1.0	+1.0	+1.2
Real wages per employee	−0.1	+1.2	+0.4	−0.9	−0.5	+0.3	+0.8	+1.4	+1.4	+1.2	+0.8	+0.5	+0.4	+0.3	+0.2
Import deflator	+3.3	+1.7	+1.2	+2.6	+3.1	+3.7	+3.6	+2.7	+1.9	+1.2	+1.0	+1.0	+1.1	+1.2	+1.4
Export deflator	+1.5	+2.0	+1.8	+1.2	+1.4	+1.6	+1.9	+2.0	+1.9	+2.1	+1.9	+1.9	+1.7	+1.7	+1.9
Terms of trade	−1.7	+0.3	+0.6	−1.3	−1.7	−2.1	−1.6	−0.7	+0.0	+0.9	+1.0	+0.9	+0.6	+0.5	+0.5
Economic activity	*Annual and/or quarterly changes in % (real)*														
GDP	+1.6	−0.3	+0.8	+0.5	+0.3	+0.1	−0.2	−0.3	−0.1	+0.1	+0.1	+0.2	+0.3	+0.4	+0.4
Private consumption	+1.2	+0.5	+0.5	+0.3	+0.3	+0.3	+0.2	+0.1	+0.0	+0.0	+0.1	+0.1	+0.2	+0.2	+0.3
Government consumption	+1.9	+1.0	+1.5	−2.3	+2.5	−1.0	+6.2	−3.8	+0.2	+0.2	+0.2	+0.5	+0.5	+0.4	+0.5
Gross fixed capital formation	+2.7	−1.6	−0.4	+0.7	+0.8	+0.5	−0.6	−0.8	−0.7	−0.5	−0.2	+0.0	+0.1	+0.2	+0.3
of which: Investment in plant and equipment	+3.6	−4.8	−2.4	+1.2	+0.9	+0.5	−1.3	−1.7	−2.0	−1.7	−1.3	−0.8	+0.1	+0.6	+1.2
Residential construction investment[1]	+1.1	+0.7	−0.5	+0.3	+0.3	+0.2	+0.1	+0.4	+0.1	+0.0	−0.1	−0.2	−0.2	−0.1	+0.0
Exports	+2.5	−2.7	+2.1	+0.6	+0.3	−0.3	−1.1	−1.2	−0.9	−0.1	+0.4	+0.6	+0.8	+1.0	+1.1
Imports	+1.6	−2.5	+1.6	−0.7	+0.5	−0.2	+0.9	−2.3	−1.1	−0.4	+0.3	+0.6	+0.8	+0.9	+0.9
	Contribution to real GDP growth in percentage points														
Domestic demand	+1.6	+0.1	+0.4	−0.1	+0.8	+0.1	+1.0	−0.8	−0.1	−0.1	+0.0	+0.1	+0.2	+0.2	+0.3
Net exports	+0.6	−0.3	+0.4	+0.7	−0.1	+0.0	−1.2	+0.5	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1
Changes in inventories	−0.6	−0.1	+0.0	−0.2	−0.4	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0	+0.0
Labor market	*% of labor supply*														
Unemployment rate (Eurostat definition)	3.7	4.2	4.8	4.0	3.8	3.3	3.6	3.9	4.1	4.4	4.6	4.7	4.8	4.8	4.9
	Annual and/or quarterly changes in %														
Total employment	+1.5	+0.1	−0.2	+0.4	+0.3	+0.5	+0.1	+0.0	−0.2	−0.2	−0.1	+0.0	+0.0	+0.0	+0.1
of which: Private sector employment	+1.8	+0.1	−0.3	+0.4	+0.3	+0.5	+0.2	+0.0	−0.2	−0.2	−0.1	−0.1	+0.0	+0.0	+0.1
Payroll employment	+2.0	+0.2	−0.2	+0.6	+0.5	+0.4	+0.2	+0.0	−0.2	−0.2	−0.1	+0.0	+0.0	+0.1	+0.1
Additional variables	*Annual and/or quarterly changes in % (real)*														
Disposable household income	+2.3	+1.3	+0.7	+2.2	+0.7	−0.2	−0.2	+0.9	+0.4	+0.3	+0.0	+0.2	+0.2	+0.3	−0.1
	% of real disposable household income (saving ratio) and % of real GDP (output gap)														
Household saving ratio	12.8	13.6	13.7	12.2	13.3	12.3	13.2	13.2	13.6	13.9	13.8	13.8	13.8	13.8	13.5
Output gap	0.4	−1.7	−2.8	0.9	0.7	0.4	−0.3	−1.1	−1.6	−2.0	−2.3	−2.6	−2.8	−2.8	−2.8

Source: OeNB December 2008 outlook (based on seasonally and working day adjusted data).

[1] Excluding other investment in construction and other investment.

Comparison of Current Economic Forecasts for Austria

Indicator	OeNB			WIFO		IAS		OECD			IMF[3]		European Commission		
	December 2008			October 2008		October 2008		November 2008			Oct./Nov. 2008		November 2008		
	2008	2009	2010	2008	2009	2008	2009	2008	2009	2010	2008	2009	2008	2009	2010
Key results	*Annual change in %*														
GDP (real)	+1.6	−0.3	+0.8	+2.0	+0.9	+2.0	+1.2	+1.9	−0.1	+1.2	+2.0	+0.8	+1.9	+0.6	+1.3
Private consumption (real)	+1.2	+0.5	+0.5	+1.0	+1.2	+1.1	+1.3	+0.9	+0.2	+1.2	×	×	+1.1	+1.0	+1.2
Government consumption (real)	+1.9	+1.0	+1.5	+2.5	+1.0	+2.5	+0.3	+1.7	+0.9	+0.7	×	×	+2.6	+1.9	+1.7
Gross fixed capital formation (real)[1]	+2.7	−1.6	−0.4	+2.2	+0.0	+2.6	+1.2	+1.9	−3.1	+1.0	×	×	+2.4	−0.5	+0.7
Exports (real)	+2.5	−2.7	+2.1	+4.3	+3.0	+4.5	+4.2	+3.8	+1.0	+3.3	×	×	+3.6	+1.7	+4.1
Imports (real)	+1.6	−2.5	+1.6	+3.9	+3.0	+4.3	+4.3	+3.2	+0.6	+3.2	×	×	+3.3	+2.2	+4.1
GDP per employee	+0.1	−0.5	+1.0	+0.3	+0.6	−0.5	+0.8	×	×	×	×	×	+0.2	+0.4	+1.0
GDP deflator	+2.7	+1.5	+1.8	+2.9	+2.2	+2.5	+2.2	+2.6	+1.7	+1.1	×	×	+2.8	+2.3	+1.8
CPI	×	×	×	+3.4	+2.2	+3.4	+2.3	×	×	×	+3.5	+2.3	×	×	×
HICP	+3.3	+1.4	+1.6	+3.4	+2.2	×	×	+3.3	+1.1	+0.8	×	×	+3.4	+2.1	+1.9
Unit labor costs	+2.7	+3.0	+0.9	+3.0	+2.7	×	×	×	×	×	×	×	+2.7	+2.5	+1.5
Payroll employment	+1.5	+0.1	−0.2	+2.4	+0.5	+2.5	+0.4	×	×	×	×	×	+1.8	+0.2	+0.3
	% of labor supply														
Unemployment rate[2]	3.7	4.2	4.8	3.9	4.2	4.1	4.4	4.9	5.7	6.0	4.2	4.4	3.9	4.2	4.5
	% of nominal GDP														
Current account	2.7	2.4	3.1	2.8	2.6	×	×	3.6	3.7	4.0	2.8	2.4	3.1	2.7	2.8
Government surplus/ deficit	−0.7	−1.9	−2.5	−0.6	−1.0	−0.6	−1.0	−1.0	−2.7	−3.5	×	×	−0.6	−1.2	−1.4
External assumptions															
Oil price in USD/barrel (Brent)	99.9	67.3	76.6	105.0	90.0	110.0	95.0	60.0	60.0	60.0	99.8	68.0	104.0	85.7	90.4
Short-term interest rate in %	4.7	2.8	3.2	4.8	4.7	4.9	4.2	4.7	2.7	2.6	4.5	3.0	4.6	3.5	4.1
USD/EUR exchange rate	1.46	1.27	1.27	1.50	1.40	1.50	1.40	1.25	1.25	1.25	1.52	1.50	1.48	1.36	1.36
	Annual change in %														
Euro area GDP (real)	+0.8 to +1.2	−1.0 to +0.0	+0.5 to +1.5	+1.2	+0.7	+1.5	+1.0	+1.0	−0.6	+1.2	+1.2	−0.5	+1.2	+0.1	+0.9
U.S. GDP (real)	+1.4	−0.7	+0.9	+1.7	+0.9	+1.8	+1.8	+1.4	−0.9	+1.6	+1.4	−0.7	+1.5	−0.5	+1.0
World GDP (real)	+3.4	+1.9	+3.2	+4.0	+3.2	×	×	×	×	×	+3.7	+2.2	+3.7	+2.3	+3.2
World trade	+4.3	+2.2	+5.1	+4.8	+4.0	+4.8	+4.5	+4.8	+1.9	+5.0	+4.6	+2.1	+5.0	+2.2	+4.1

Source: OeNB, WIFO, IAS, OECD, IMF, European Commission.

[1] For IAS: Gross investment.

[2] Eurostat definition; for OECD: OECD definition.

[3] IMF outlook of October 2008; partial revision of November 5, 2008 (data in italics).

Are There Signs of a Credit Crunch in Austria?

Walter Waschiczek[1]

This study examines the existing statistical evidence on corporate loan growth for signs of a credit crunch in Austria. With regard to banks' loan supply, the Austrian results of the bank lending survey show that since the onset of the crisis in summer 2007 lending has been affected by deteriorated refinancing conditions in the interbank market and has become more restrictive. Loan demand, which in the first half of 2008 was still fairly brisk based on expanding investment and a sound earnings situation in the corporate sector, is likely to sag in the near future as a decrease in the willingness to invest is to be expected. The credit standing of firms is expected to deteriorate for cyclical reasons in the near future, too, which would also contribute to a slowdown in lending. As it seems to be relatively likely that loan supply will decline more strongly than loan demand, the emergence of a credit crunch cannot be ruled out in Austria.

The international financial crisis has significantly impaired the capital and liquidity positions of Austrian banks. Given the resulting high preference for liquidity among banks and the potential refinancing problems this may entail, there is a risk that banks cut down their loan supply to the real economy sectors. Such a decline in bank credit supply that is larger than a contraction caused by a cyclical weakening of credit demand or the deterioration of borrowers' creditworthiness and that is due to refinancing constraints is called a "credit crunch" according to Bernanke and Lown (1991).[2]

This tightening can impact businesses and households. The latter may encounter in particular problems in real estate financing in countries where real estate prices soared in recent years. In Austria, however, there was no real estate bubble and real estate prices rose very moderately (with a few exceptions, such as prices of top locations in Vienna). Therefore, this paper focuses on the effects of the crisis on corporate financing and, within this segment, on the impact on borrowing from banks, which has remained the most important form of corporate financing in spite of the structural shifts observed in recent years.

Specifically, this study examines the existing statistical evidence on corporate loan growth to see whether there are already signs of a credit crunch and in how far the effects of the current financial crisis on economic growth (or the economic downturn already expected before the current aggravation of the crisis) affect loan demand and/or borrowers' creditworthiness (and thus the ability of companies to take out loans).

With regard to the effects of the financial crisis, this paper concentrates on the extent to which they have led or could still lead to quantitative restrictions in bank lending. Supplementing this analysis, the paper by Jobst and Kwapil (2009) in this issue seeks to give

an assessment of the further development of loan costs.

At the cutoff date of this issue, data on corporate loan growth were available up until the November 2008 reporting date. These data only incompletely reflect the intensification of the financial crisis in September and October 2008.

As a result, the effects of the crisis can only be indirectly assessed for the time being. One option is to draw provisional conclusions from developments since the onset of the financial market turbulence in summer 2007 and apply them to the intensification of the crisis in fall 2008. The crisis dramatically escalated in September 2008, but all in all the turmoil in global financial markets triggered by the U.S. subprime crisis has now persisted for more than one year. The question is whether these tensions have already resulted in changes in the supply and demand patterns in the credit market and, hence, could have provided a hint on potential patterns emerging during the intensification of the financial crisis in fall 2008.

The Austrian results of the euro area-wide bank lending survey (BLS) play a key role in this study. In this quarterly survey, senior loan officers of leading banks are asked to give their assessment of lending conditions in the previous quarter and an outlook for the current quarter.[3] These questions permit a (qualitative) analysis of the supply and demand situation in the loan market. In addition, the BLS questionnaire has regularly included ad hoc questions since fall 2007 that specifically address the consequences of the turmoil in the

global financial markets for bank lending. The most recent round of the BLS was conducted in the first half of October 2008, i.e. when the crisis peaked.[4]

This study is structured as follows: Section 1 presents the structure of corporate financing in Austria. Section 2 examines current macro data for any signs of a slowdown in loan growth. Sections 3, 4 and 5 discuss the potential impact on loan growth of its determining factors – loan supply, loan demand and the creditworthiness of enterprises. Section 6 contains the conclusions.

1 The Structure of Corporate Financing

Data on the structure of corporate financing in Austria are provided by the financial accounts.[5] They show that external financing flows in absolute terms have moved more or less in tandem with overall economic growth since the mid-1990s (left-hand panel of chart 1). Moreover, they highlight that, after a decline in 2002 (essentially caused by a strong decrease in corporate investment), financing by banks remained relatively stable in the following years. While the lion's share of bank financing was provided in the form of loans, banks also acquired bonds and shares of nonfinancial corporations. The financing by the nonfinancial sectors (enterprises, households, public sector), which was dominated by equity financing, was considerably more volatile. Funds raised abroad were rather stable in absolute terms between 2000 and 2006, but more than doubled in 2007. The data available do not permit a breakdown of capital raised abroad by

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[3] In total, around 110 leading banks from all countries of the euro area are surveyed, including five from Austria (Waschiczek, 2003).

[4] The completed questionnaires were returned to the Oesterreichische Nationalbank between October 6, and October 14, 2008.

[5] Financing stock data have been available since end-1995 and financing flows since 1996.

economic sectors or financial instruments; therefore is it not possible to specify the extent to which foreign banks funded Austrian enterprises. At any rate, foreign direct investment was a major factor in the strong rise of external funding.

Overall, the composition of financial flows has fluctuated very strongly in recent years.[6] Since 2001, the share of bank loans in total financing flows has been smaller than their share in financing stocks every year, with only one exception, so that the share of bank funding continuously decreased in that period. From a regional perspective, domestic sources have always recorded a smaller share in financing flows than

in financing stocks while it has been the other way round for foreign sources since 2001.

Because of these shifts in financing flows, the contribution of (domestic) banks to the external financing stocks of nonfinancial corporations (in the form of loans as well as through bonds and shares held by banks) fell from more than 50% in the mid-1990s to less than one-third at the end of 2007. While the importance of bank funding decreased, the significance of funds raised abroad increased as their contribution rose from one-eighth to more than one-third in the same period.

Broken down by financing instrument, bank loans[7] remain the most im-

Chart 1

External Financing Flows of the Corporate Sector
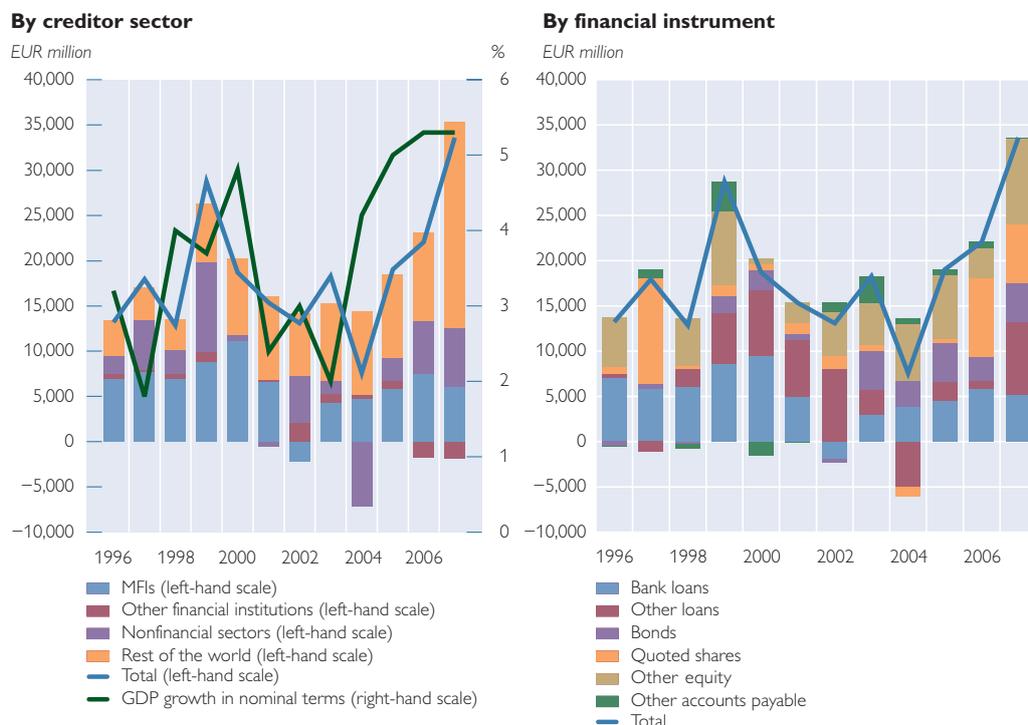
Source: OeNB (financial accounts).

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[6] In the past ten years, for example, the share of bank loans in annual financing flows ranged from 51% (in 2000) to −14% in 2002, when loans declined in absolute terms. The fluctuation reached similar levels for bonds and stocks.

[7] Lending by domestic banks.

Chart 2

External Financing of the Corporate Sector

By creditor sector

%

By financial instrument

%

Legend by creditor sector:
- MFIs
- Nonfinancial sectors
- Other financial institutions
- Rest of the world

Legend by financial instrument:
- Bank loans
- Bonds
- Other equity
- Other loans
- Quoted shares
- Other accounts payable
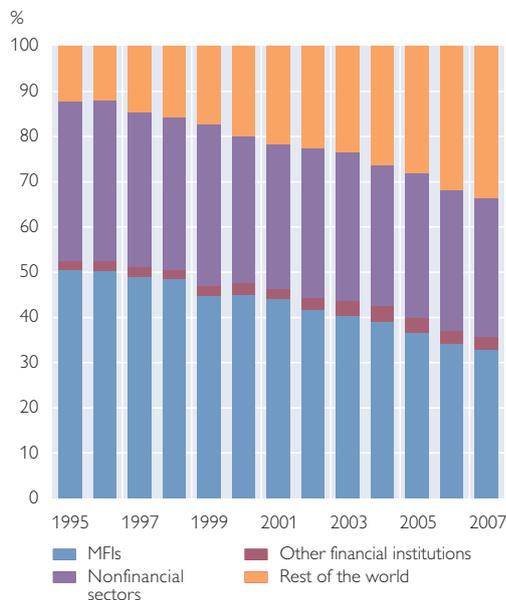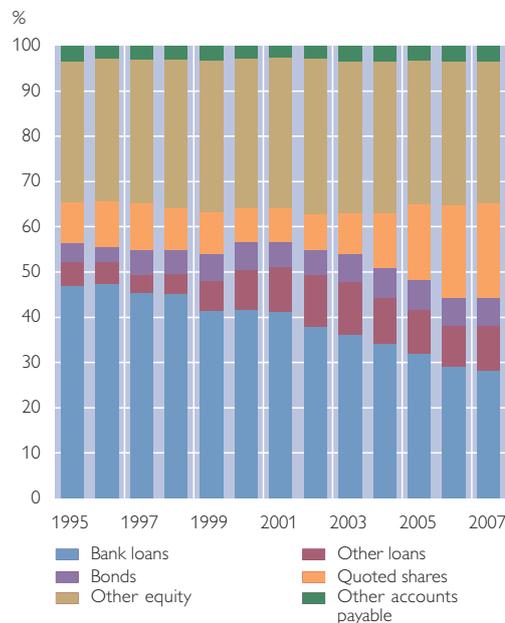
Source: OeNB (financial accounts).

portant source of external financing for Austrian enterprises even though capital markets noticeably gained significance during the past years. At the end of 2007, around 28% of external financing came from bank loans, clearly surpassing the contribution made by quoted shares (21%) and bonds (around 6%). In 1995, the percentage of bank loans still stood at 47%, whereas the contribution of quoted shares merely amounted to 9%.

In view of this financing structure, an analysis of potential effects of the current financial crisis on corporate financing should essentially concentrate on three aspects: bank loans, funds raised abroad and equity financing. As the majority of equity capital is raised by enterprises abroad (on average more than 60% in the years from 2005 to 2007 and even significantly higher percentages in other years), the focus of a first analysis can be equity financing, in

particular funding through the stock markets, which were hit particularly hard by the financial crisis. In addition, loans constitute another key element of corporate financing.

2 Recent Loan Growth Trends

Bank lending to the corporate sector expanded at an annual rate of 6.1% in 2006 and 8.7% in 2007. The turbulence in global financial markets that started in summer 2007 did not dampen loan growth initially. Quite to the contrary, in the first months after the financial turmoil had begun, the annual growth of lending by Austrian banks to the corporate sector even accelerated, reaching its peak at 9.8% in April 2008. Subsequently, loan growth slowed down, but at 8.6% in November 2008 continued to be higher than in mid-2007 before the financial crisis erupted.

The amount of loans outstanding rose by 1.7% on the previous month

(adjusted for exchange rate effects and other changes not related to transactions), after contracting by 1.2% in October. Euro-denominated loans to enterprises expanded by 1.7%, and foreign currency loans, which, however, play only a minor part in the corporate sector, advanced by 1.6% after (adjusted for exchange rate effects). All in all, the monthly rates of change varied strongly over the past few years and therefore do not allow inferences about underlying trends.

In order to smooth out these strong monthly fluctuations while ensuring that the analysis of annual growth rates also takes into account the developments of the past few months, chart 3 presents the quarterly growth rates of loans to enterprises. It shows that after slowing in September and October 2008, loan growth picked up in November.

The relative growth differentials observed in lending by major banks and the decentralized sectors have persisted until now. The savings bank sector, whose quarterly growth rates had dropped sharply since summer 2008, recorded brisker loan growth in November. In the Raiffeisen sector the growth rate has decreased only slightly up to now. The five largest banks[8] posted lower growth rates than the entire banking sector over most of the period under review; in November, lending by the five major banks expanded by 1.0%.

Another way to early identify potential shortages of credit is to analyze loan growth by maturities. Frequently, banks start to introduce loan restrictions by granting more short-term loans, while acting cautiously when it comes to longer-term loans. The data available until November 2008 do not

Chart 3

Loans to Enterprises

By banking groups

Quarterly change in %
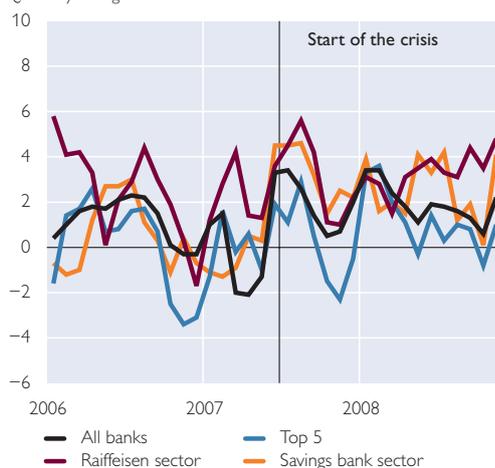
By maturities

Quarterly change in %
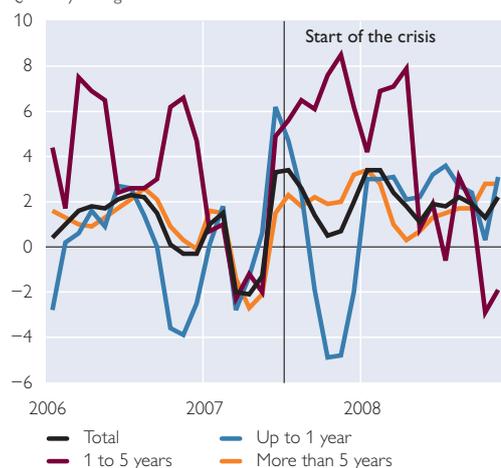
Source: OeNB.

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[8] *UniCredit Bank Austria AG, Erste Bank der oesterreichischen Sparkassen AG, BAWAG P.S.K. Bank für Arbeit und Wirtschaft und Österreichische Postsparkasse AG, Raiffeisen Zentralbank Österreich AG and Oesterreichische Kontrollbank AG.*

indicate such a trend, however. Short-term loans (up to one year), which had contracted in 2007, in fact posted a higher quarterly growth rate (3.1%) than the other two maturity categories, but the difference between this rate and the growth rate of loans with a maturity of more than five years was fairly small. Only loans with a maturity of one to five years have contracted quarter-on-quarter since October 2008.

The currently available MFI balance sheet statistics data on the growth of loans to enterprises do not yet indicate a credit crunch (but do not rule it out either). In order to better assess corporate lending growth in the period for which data are not yet available and to gain insights into changes in banks' lending behavior, the following sections analyze the results of surveys of lenders and borrowers.

3 The Lending Behavior of Banks

3.1 The Bank Perspective − Credit Standards and Credit Terms and Conditions According to the BLS

According to the regular questionnaire of the BLS, banks have acted more cautiously in their lending business since the beginning of the financial turmoil. In the third quarter of 2008, credit standards[9] were slightly tightened for the fifth time in a row. This more cautious orientation of lending policy had a stronger effect on loans to big companies than on those to small and medium-sized enterprises (SMEs) and affected long-term loans more than short-term ones.[10]

This is essentially in line with the responses to the ad hoc questions on the consequences of the turmoil in the global financial markets, which have been regularly included in the BLS since the third quarter of 2007. These answers show that, according to the assessment of the senior loan officers surveyed, the refinancing conditions of Austrian banks considerably deteriorated because of the financial crisis. Borrowing in the money market and refinancing through debt securities have been particularly impaired.

At first, these adverse effects mainly influenced lending conditions. Up to the second quarter of 2008, the banks stated that changed refinancing conditions had a stronger impact on margins than on the amount of loans granted. In the third quarter of 2008, however, this relation was reversed, i.e. the impact on loan quantity was considered to be significantly stronger than the effects on margins (left-hand panel of chart 4). The senior loan officers surveyed expected this trend to continue in the fourth quarter of 2008. Thus, at least according to the BLS, the financial crisis probably will not only have price effects but also quantitative consequences for loans granted in the near future.

Broken down by firm size, loans to large companies were more strongly affected than finance for SMEs. A differentiation by loan purpose shows that credit standards were tightened above all for mergers and acquisitions (M&As) as well as corporate restructuring, but in the third quarter of 2008, loans for fixed investment were also impacted. From today's perspective, this means that a reduced willingness to lend would predominantly affect financial transactions (such as M&As), but increasingly also real economy projects (fixed investment).

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[9] *Credit standards are the internal written and unwritten criteria defining the types of loan a bank considers desirable.*
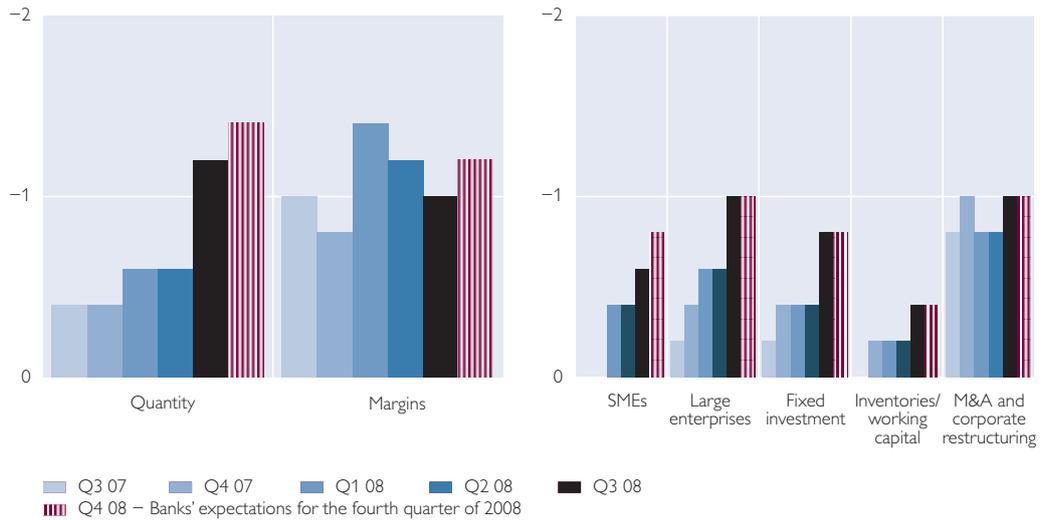
[10] *Waschiczek (2009).*

Chart 4

Effects of the Financial Turmoil on Loans to Enterprises

Effects of banks' changed refinancing conditions on quantity and margins of loans granted

Impact on credit standards by borrower group and purpose

0 = basically no impact / −1 = some impact / −2 = considerable impact

■ Q3 07   ■ Q4 07   ■ Q1 08   ■ Q2 08   ■ Q3 08
▒ Q4 08 − Banks' expectations for the fourth quarter of 2008

Source: OeNB (bank lending survey).

Chart 5

Conditions and Terms for Approving Loans to Enterprises

Changes over the past three months

1 = tightened considerably / 2 = tightened somewhat / 3 = remained basically unchanged / 4 = eased somewhat / 5 = eased considerably

Margins

Other terms and conditions

—— Average loans
—— Riskier loans

—— Non-interest rate charges   —— Loan size
—— Collateral requirements   —— Maturity
—— Covenants
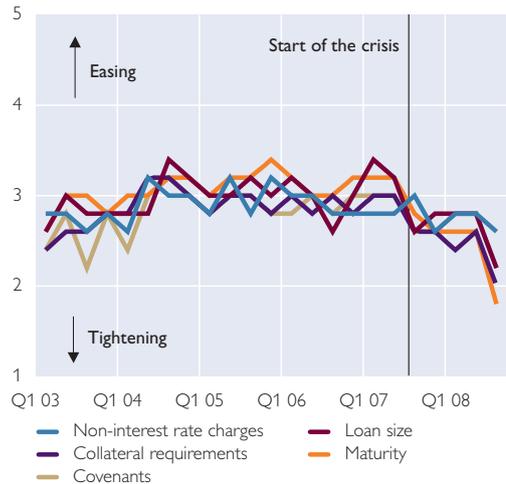
Source: OeNB.

At the same time, banks have continuously tightened their credit conditions and terms[11] since the beginning of the financial market tensions. Interest margins for riskier loans and – somewhat less – for borrowers with average credit ratings were raised for the fifth time in a row in the third quarter of 2008. Likewise, all other conditions and terms for lending to enterprises that are covered by the questionnaire, such as collateral requirements, size and maturity of the loans granted, loan covenants[12] and non-interest rate charges, have been tightened as well in all reporting periods since mid-2007 (with the exception of non-interest rate charges in the third quarter of 2007).

Even though these restrictions are not yet reflected in the data reported (so far, there were hardly any shifts in the maturity of the loans granted, and the interest margin between retail rate and interbank rate changed only slightly), they are very much likely to have effects on lending in the future (chart 5).

3.2 The Corporate Perspective – The Results of Enterprise Surveys

While the BLS offers aggregate and/or systematized bank responses on their lending behavior over time, information on the borrower perspective is not available in a similar form.

Two surveys conducted in fall 2008, however, addressed enterprises' experience in taking out loans. On the one hand, business information service provider Creditreform included several questions on the development of financing conditions for enterprises in its biannual survey on the economic situation of SMEs (Creditreform, 2008).[13]

On the other hand, the Austrian Federal Economic Chamber (WKÖ) carried out a survey in October and November 2008 that specifically focused on the changes in borrowing over the past year (Wirtschaftskammer Österreich, 2008). Because of different questions (and different survey dates), the results of the two surveys diverge slightly, but their findings are basically similar.

When interpreting the results of the surveys, one has to bear in mind that the two surveys did not explicitly ask about the effects of the crisis and covered loans taken out over a very long period (the past year in each case). Even though a high number of factors influences borrowing decisions made over a period of one year, the turmoil in global financial markets has significantly affected banks' lending practices since as early as the third quarter of 2007. Therefore, the results of the surveys are probably very heavily influenced by the financial crisis.

In both surveys, the enterprises responding reported that their financing conditions had worsened compared with 2007. In the WKÖ survey, 16% stated that the borrowing situation had become more difficult for their own enterprise, while one-third of respondents did not supply information. According to the Creditreform survey, financing conditions deteriorated or considerably deteriorated against the previous year for almost half (49%) of the enterprises surveyed in fall 2008, while this percentage stood at 30% in spring 2008. In both surveys, the percentage of respondents reporting no changes in borrowing against the previous year stood at almost 50%.

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[11] Credit conditions and terms refer to the specific obligations agreed upon by the lender and the borrower.

[12] Covenant: an agreement or stipulation laid down in loan contracts under which the borrower pledges to take certain action or to refrain from taking certain action.
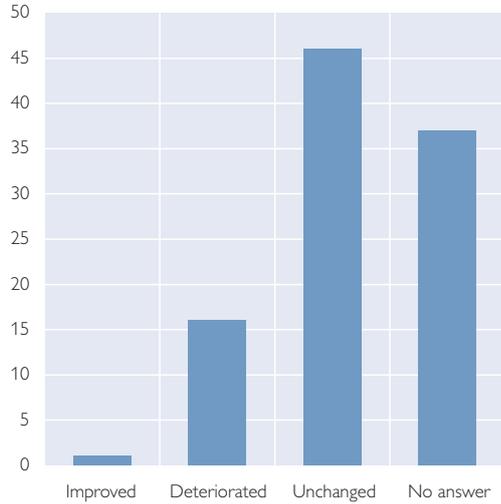
[13] These questions were also asked in spring 2008.
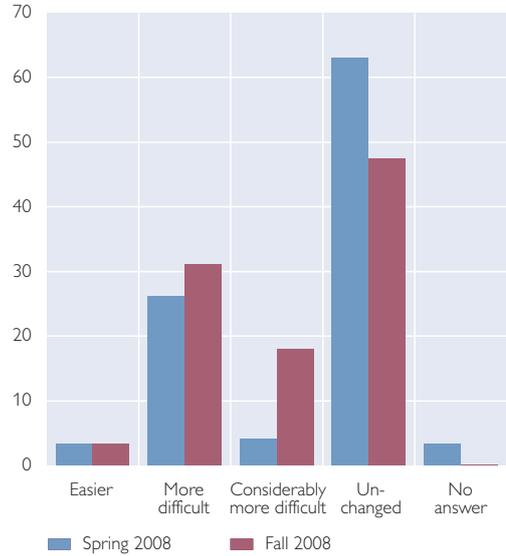
Chart 6

Access to Finance/Credit

Austrian Federal Economic Chamber

Annual change, % of respondents

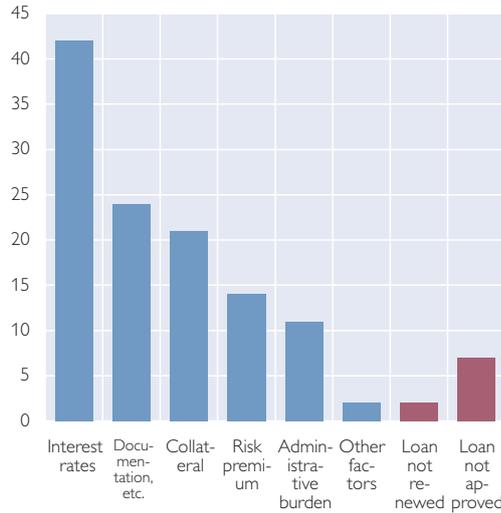**Creditreform**

Annual change, % of respondents

Source: Austrian Federal Economic Chamber, Creditreform.

Chart 7
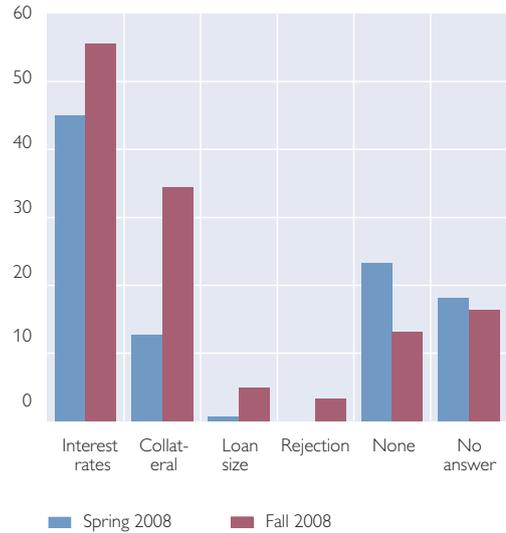
Changes in Credit Terms and Conditions

Austrian Federal Economic Chamber

Increased requirements, % of respondents

Creditreform

Tightened terms and conditions, % of respondents

Source: Austrian Federal Economic Chamber, Creditreform.

Both surveys also contained questions on changes in credit terms and conditions. 42% (plus an additional 14% stating that they paid a higher risk premium) in the WKÖ survey and 56% in the Creditreform survey pointed out that interest rates had risen. In addition, one out of four responding enterprises indicated that banks had raised their risk assessment requirements and 21% reported that banks' collateral requirements had increased. 3% had faced problems in loan renewals. Finally, 7% (WKÖ) and 3% (Creditreform) of respondents answered that they had problems getting any loans at all.

3.3 Summary

Banks have undoubtedly become more restrictive in approving loans since the beginning of the financial crisis in summer 2007. This is indicated both by the answers given by banks in the BLS and the responses provided by enterprises in surveys.

With regard to the effects of the financial crisis on bank lending, too, the results of the enterprise surveys broadly correspond to those of the BLS. So far, the effects of the financial crisis have been reflected primarily in higher interest rates, which essentially stem from higher money market rates. Other credit terms and conditions have been adjusted, too, e.g. collateral requirements have been increased. To date, quantitative restrictions have been reflected rather by smaller loan sizes than by the rejection of loan applications.

It can be expected, however, that the tightening of lending will lead to lower loan growth rates although, given the unique nature of the current crisis situation and the relatively short period covered by the BLS, there are no historical data that indicate how long it takes until more restrictive lending behavior actually translates into slower credit growth. Empirical studies for the U.S.A., where the Federal Reserve System has conducted the Senior Loan Officer Opinion Survey since the 1960s, indicate that the growth of loans to enterprises responds to changes in credit standards with a lag of several quarters in the U.S.A.[14] If these experiences are taken as a yardstick, the tightening of credit standards should result in a slowdown in loan growth in the near future.

4 Corporate Loan Demand

4.1 Corporate Investment

Demand for loans to enterprises was fairly robust in the first half of 2008, mostly thanks to the strong growth in investment until mid-2008. As chart 8 (left-hand panel) shows, gross fixed investment has moved quite in tandem with loan growth since the early 1990s. Even before the current intensification of the financial crisis, forecasts for the rest of 2008 as well as for 2009 predicted that investment demand would weaken. The aggravation of the international financial crisis has further deteriorated the investment outlook.[15] Accordingly, it is to be expected that financing needed for investment will grow less in the next few quarters and, hence, related loan demand will cool down.

The BLS also confirms this correlation. According to the senior loan offi-

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[14] For the 1990s, Lown, Morgan and Rohatgi (2000) found a high correlation between credit standards and the growth of loans to enterprises that was strongest for a 4-quarter lag (but also significant for shorter lags). Similarly, Lown and Morgan (2006) show in a variance decomposition analysis inter alia that the influence of credit standards on loan changes increases over time and that the correlation is strongest for a 12-quarter lag.
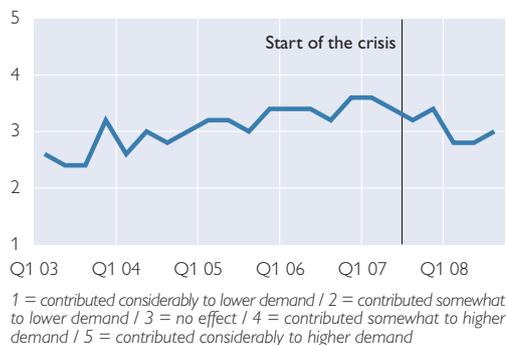
[15] Ragacs and Vondra (2009).

Chart 8

Loans and Investment

Real growth of loans to enterprises and investment

Annual change in real terms (%)

— MFI loans — Gross fixed capital formation
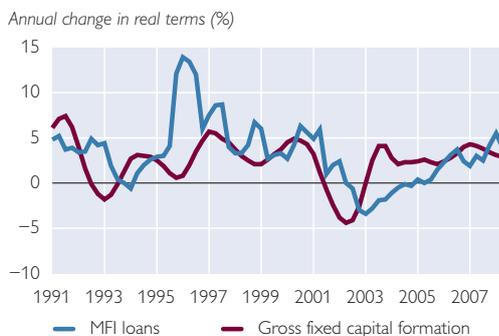
Fixed investment as a factor contributing to the demand for loans to enterprises in the BLS

Start of the crisis

1 = contributed considerably to lower demand / 2 = contributed somewhat to lower demand / 3 = no effect / 4 = contributed somewhat to higher demand / 5 = contributed considerably to higher demand

Source: OeNB, Eurostat.

cers surveyed, financing of fixed investment played a (in part significant) role in higher demand in 2006 and 2007. In the first two quarters of 2008, however, this factor contributed to a decrease in demand – albeit to a very small extent –, while fixed investment had no net effect in the third quarter (right-hand panel of chart 8).

4.2 Mergers and Acquisitions

Another factor influencing the demand for loans to enterprises was the funding of mergers and acquisitions (M&As) in the period from 2005 to 2007. In recent years, the M&A market expanded rapidly (left-hand panel of chart 9). Figures are not available for 2008 as yet, but the pace of M&A growth in Austria is likely to have weakened as it has done at the international level.[16]

This tendency, too, is reflected by the BLS (right-hand panel of chart 9). For more than three years, the banks surveyed reported that M&As and corporate restructuring had constituted a

significant factor driving loan demand. Since the beginning of the crisis, however, the contribution of M&A activity to growth has dwindled and recorded a sudden drop in the third quarter of 2008. Thus, it is not unlikely that the decreasing demand for funding needed to finance M&A deals will very quickly contribute to lower loan growth rates – to an even larger extent than finance for real economy investment projects.

4.3 Substitution of Capital Market Financing

Part of the lively credit expansion recorded until summer 2008 may be explained by the fact that enterprises took out loans to a higher extent given the difficulties in raising funds in the stock market. Since the start of the turmoil in the financial markets in summer 2007, new issuance on the Vienna stock exchange has declined markedly. In the period from January to September 2008, new issues by nonfinancial corporations listed on the Vienna stock

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[16] For information on the euro area, see for example the box "Recent developments in M&A activity by euro area non-financial corporations" in ECB (2008).
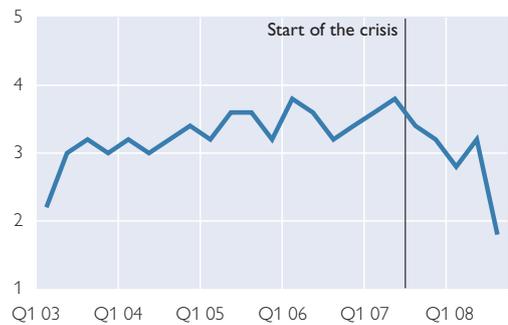
Chart 9

Mergers & Acquisitions and Loans to Enterprises

M&A transactions in Austria
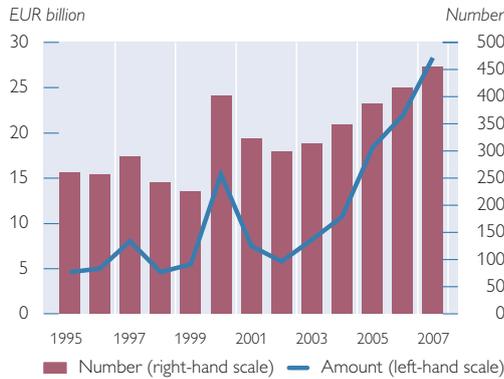
Mergers/acquisitions and corporate restructuring as a factor contributing to the demand for loans to enterprises

1 = contributed considerably to lower demand / 2 = contributed somewhat to lower demand / 3 = no effect / 4 = contributed somewhat to higher demand / 5 = contributed considerably to higher demand

Source: Moschner, M. (several volumes), Österreichisches Bank-Archiv; OeNB (bank lending survey).

exchange amounted to EUR 0.4 billion, down from EUR 7.0 billion in the corresponding period in 2007. Their contribution to the external financing of the corporate sector fell from 25.9% in the first half of 2007 to 1.7% in the first half of 2008 according to financial account data. Shifts from funding through shares to loans may well push up the growth rate of loans to enterprises. As share issuance is primarily relevant for a relatively small number of mainly large firms, this development also concerns predominantly big enterprises.

The net issuance of corporate bonds has decreased less significantly in the course of the crisis up until now, so that this segment probably was less affected by substitution effects.[17] If tensions persist, however, the bond market's capacity for new issues may go further down so that shifts from the bond market to the loan market could occur to a higher

degree. In this case, too, larger companies are primarily affected even though bond issuance (in particular, private placements) requires smaller enterprise sizes than issues in the stock market.

The results of the BLS also reflect developments in capital market financing. While the issuance of shares and debt securities slightly dampened loan demand until mid-2007, it (in particular debt securities) contributed somewhat to increasing demand according to the senior loan officers surveyed (right-hand panel of chart 10).

On the one hand, these substitution effects mean that the current market situation for loans to enterprises may be somewhat overstated by these special factors and that the actual financing amount is already slightly lower than the lending figures would suggest. On the other hand, they clearly show that because of the reduced capacity of the capital market to absorb new issues

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[17] *Money market issues (e.g. commercial paper), which would be hit particularly hard by the current crisis, hardly play a role in corporate financing in Austria. In mid-2008, the outstanding volume amounted to EUR 91 million or 0.016% of total liabilities based on financial account data.*

Chart 10

Funds Raised by Enterprises in the Capital Market

Net issuance of quoted shares and bonds

Annual change in %[1]
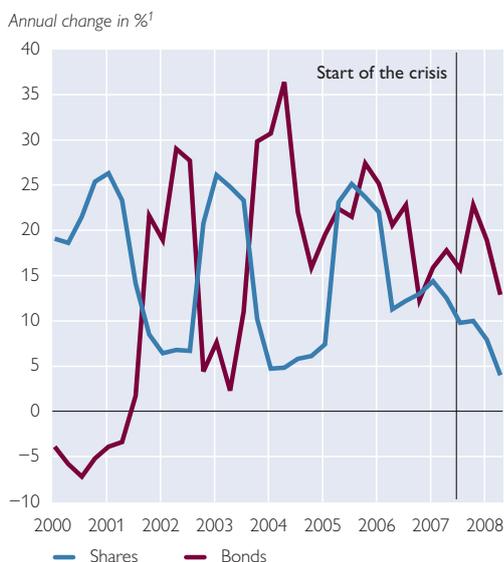
Capital market financing as a factor contributing to the demand for loans to enterprises
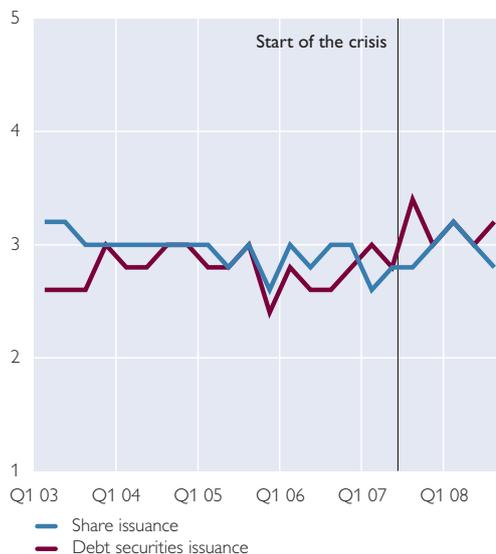
Shares — Bonds

Share issuance —
Debt securities issuance —

1 = contributed considerably to lower demand / 2 = contributed somewhat to lower demand / 3 = no effect / 4 = contributed somewhat to higher demand / 5 = contributed considerably to higher demand

Source: ECB.

[1] *Percentage change against the previous year on the basis of changes in transactions, i.e. adjusted for reclassifications, revaluations, exchange rates and other nontransaction changes.*

in recent quarters, the relative significance of bank loans has, overall, increased in the financing mix of enterprises, so that it is all the more important to maintain this financing source.

4.4 Summary

Loan demand had been high until recently, resulting from relatively buoyant investment and possibly from the effects of the substitution of capital market funding until mid-2008. At the latest since the intensification of the financial crisis in fall 2008 and the related economic slowdown, loan demand and, hence, loan growth in the corporate sector has been likely to weaken independently of supply-side

restrictions, with loan demand falling in the field in which supply declines as well: primarily M&As, but increasingly also fixed investment.

5 Creditworthiness of Enterprises

5.1 Financial Strength

Another factor contributing to high loan growth until summer 2008 was enterprises' good financial health. The earnings situation of enterprises was good in the first half of 2008, and the insolvency statistics still reflected the economic boom years 2006 and 2007.[18] The balance sheet structure of enterprises developed positively. Although corporate debt had grown slightly faster

[18] *According to Kreditschutzverband von 1870, the number of corporate bankruptcies observed in the first three quarters of 2008 was lower by 1.6% than in the same period of the previous year. In nominal terms, estimated default liabilities remained unchanged against the same period of the previous year.*

than corporate profits[19] on account of the rather rapid expansion of debt financing since the second half of 2007, it was still considerably lower than the values observed during the previous economic downturn at the beginning of the decade as Austrian companies had not followed the euro area-wide trend of sharply increasing debt in the second half of this decade. The debt/equity ratio was also relatively stable.

Through its impact on the international economy, however, the financial crisis is also likely to impair the creditworthiness of the corporate sector. The imminent slowdown in growth has deteriorated the sales and profit prospects of enterprises. Moreover, the higher interest rate burden raised costs for enterprises and thus reduced their profits. In this environment, corporate insolvencies – typically a lagging economic indicator – are expected to rise in the near future.

However, falling profits of the corporate sector would not only lead to a corresponding deterioration of credit ratings, but also to a decline in the internal financing potential. Even if less internal financing could be compensated by a stronger reliance on borrowing (loans), the debt ratio would rise so that credit ratings would worsen further.

In the course of 2008, banks started to downgrade enterprises' credit ratings. Since the start of the crisis, the banks covered by the BLS have reported that industry or firm-specific factors prompted them to tighten their credit standards somewhat (right-hand panel of chart 11).
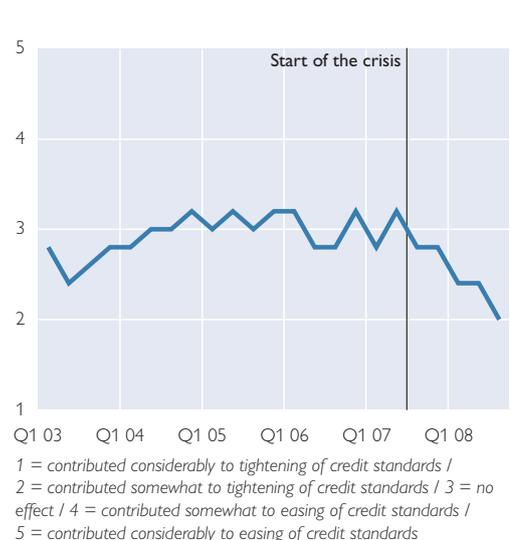
Chart 11

Financial Strength of the Corporate Sector

Corporate sector debt[1]

— % of gross operating surplus[2] (left-hand scale)
— % of equity capital (right-hand scale)
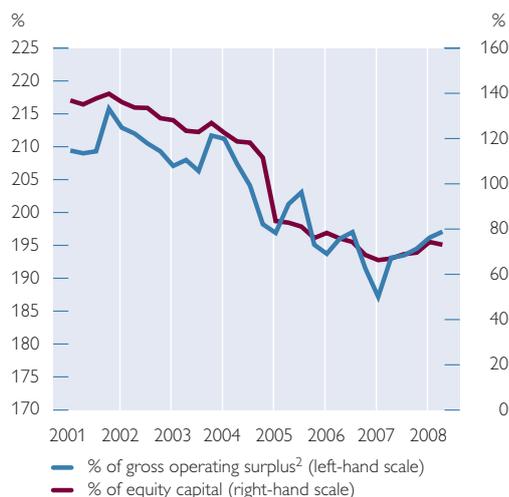
Impact of industry or firm-specific factors on banks' credit standards

Start of the crisis

1 = contributed considerably to tightening of credit standards / 2 = contributed somewhat to tightening of credit standards / 3 = no effect / 4 = contributed somewhat to easing of credit standards / 5 = contributed considerably to easing of credit standards

Source: ECB, OeNB.

[1] Short-term and long-term loans, money market and capital market instruments.
[2] Including mixed income of the self-employed.

[19] Measured by the gross operating surpluses of companies (including mixed income of the self-employed).

5.2 Decreasing Value of Collateral

Another transmission mechanism is the impact of the crisis on the value of assets that companies can use as collateral for loans. This affects primarily securities eligible as collateral for lombard loans. Although shares do not constitute the most significant collateral instrument in the loan business, there may be adverse effects on loan growth.

As in the financial sector, the declining values of equity holdings, which in many cases constitute major corporate assets, implied higher write-downs and, as a consequence, income losses also for companies. Austrian nonfinancial corporations held quoted shares valued at EUR 39 billion as at June 2008 according to financial account data. From mid-2007 to the end of September 2008, Austrian companies suffered aggregate valuation losses of around EUR 12 billion from those equities.[20]

5.3 Summary

All in all, the credit standing of enterprises is (still) good. This may be the reason why, overall, the corporate sector experienced only few restrictions in borrowing from banks in the first half of 2008. As the economic downturn develops, however, profits and, hence, the acquisition of internally financed capital assets has to be expected to decline. In parallel, equity investment from outside sources is hampered because of the sluggish stock market. The credit standing of Austrian enterprises, therefore, is likely to deteriorate in the near future, which could make access to loans more difficult.

6 Conclusions

The indicators currently available for banks' loan supply as well as the demand for loans to enterprises and their credit-worthiness point to a slowdown in the growth of loans to enterprises, which had remained high until recently.

On the supply side, the financial market turmoil has increasingly affected banks' willingness to lend. At the same time, corporate loan demand is likely to go down for cyclical reasons, with part of this decrease also being caused by the financial crisis through its negative effect on the international economy and thereby on the export outlook for Austrian companies. In other words, part of the slowdown in loan growth would also reflect a decline in demand.

It is difficult to anticipate at present whether loan supply will decrease more than loan demand as both affect primarily the segments M&As and fixed investment. According to the BLS results, however, this seems to be quite probable. In line with the definition given at the outset of this paper, this development would correspond to a credit crunch. It is difficult to estimate from today's perspective how severe it will be and how long it will last. This also depends on how long liquidity will remain tight in the money market and how fast the aid measures taken by the Austrian government and the OeNB will start to show effects.

Not all borrowers seem to be equally affected by banks' tighter lending standards. Large enterprises are likely to be hit harder than small ones. Already up to now, big companies have been affected to a higher extent, since first, it is them who primarily issue shares and second, banks tend to take greater caution in lending to big enterprises. Because of banks' currently tight liquidity positions, it is likely that borrowing will continue to be more difficult the larger the size of the desired

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[20] Price and exchange rate effects.

loan. Given that a correlation between company size and loan size is not implausible (on average, big enterprises take out higher loans than small businesses), this means that financing constraints would predominantly hit larger companies.

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The Interest Rate Pass-Through in Austria – Effects of the Financial Crisis

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Claudia Kwapil[1]

Lending rates are a key element in the transmission of monetary impulses to the real economy, even more so in bank-based financial systems such as the Austrian one. This article examines whether the turbulence in the financial markets and the – according to banks – resulting difficulties in raising funds in money and capital markets has led to a change in the pass-through of money market interest rates to retail interest rates. This study finds that there has been a statistically significant temporary change in the relationship between market and lending rates since July 2007 for some loan categories. However, contrary to expectations, lending rates (for business and housing loans with rate fixation periods of one to five years) were increased less than the historical correlation would have suggested. One possible explanation for this is the prevalence of relationship banking in Austria, which results in banks protecting their customers from too much volatility in interest rates. Overall, however, we do not ascertain any significant deviation from the historical pattern.

In order for monetary policy to effectively influence aggregate demand and price developments, changes in key interest rates must be transmitted to the economy. The mechanism through which monetary policy decisions are passed on is called the transmission mechanism. The first element in this chain of cause and effect links the key interest rate to a wide range of money market interest rates. Subsequently, changes in money market rates are transmitted to those interest rates that determine economic agents' spending and investment. Since the financial system of the euro area (and in particular of Austria) has been traditionally dominated by banks (Allen and Gale, 2000; ECB 2002, 2007), the relevant interest rates are above all the lending rates of banks. Therefore, it is important for central banks to know how changes in the key interest rate are transmitted to bank interest rates in order to be able to estimate the effects of monetary policy decisions on the economy.

The crisis gripping global financial markets since July/August 2007 potentially represents a shock to the transmission mechanism.[2] Problems in the interbank market and the results of the bank lending survey (see Waschiczek in this issue), in which banks indicate that it has become more difficult to raise funds in money and capital markets, can be interpreted as an indication of such a shock. Therefore, this article presents the financing structure of Austrian banks as well as recent trends in financing costs and subsequently analyzes how the lending rates of banks have changed since the beginning of the

financial crisis and whether a change can be ascertained in the pass-through.

1 Financing Structure of Banks and Determinants of Lending Rates

In their core function as financial intermediaries, banks broker between creditors and debtors. In addition to financial and tangible assets, there are above all loans on the asset side of bank balance sheets. Obligations to depositors, as well as debt instruments and bonds issued by the bank are presented on the liability side.

The categories of liabilities differ in the costs and – generally speaking – the risk that providers of capital will withdraw these funds from the bank in the future; i.e. withdraw the deposit or not renew a maturing bond. If bank liabilities are presented in a pyramid by their short-term availability (chart 1), the base is comprised of capital that is at the bank's disposal for an unlimited period of time – consisting of subscribed shares and reserves. Financing via bonds with long maturities is also very stable. Securities issued with shorter maturities must be renewed often and are therefore less certain to be available from the bank's perspective. Customer deposits may in principle be withdrawn at any time, but are in fact quite stable. The risk for banks consists of a sudden loss of confidence and large withdrawals. In Austria, the recently increased deposit guarantees should, however, prevent such behavior. Government guarantees – along with the unattractiveness and uncertainty associated with alternative forms of investment – have even led to shifts toward deposits since last year. The most flexible component of liabilities is the raising of funds in the money market, with which short-term fluctuations in assets or other liabilities can be compensated.
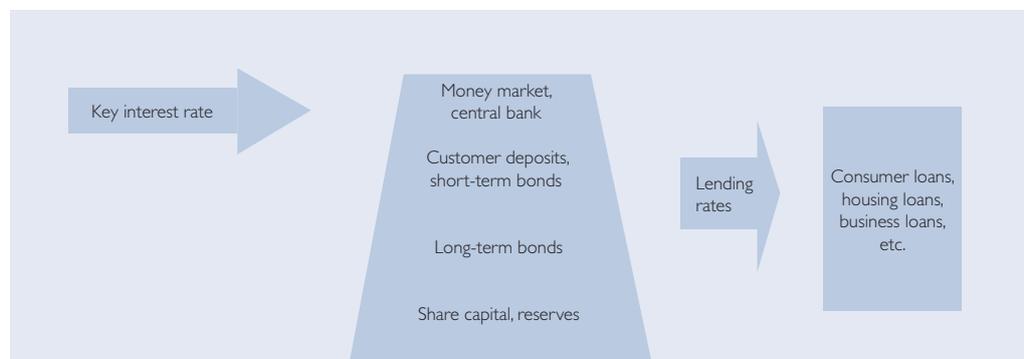
Of course, in addition to the costs of raising capital, other factors also play a role in the structure of lending rates (De Bondt, 2005). These include, for instance, credit risk premiums and other risk premiums, the interest rate risk, the regulation of and competition in various market segments, implicit and explicit agreements between banks and their customers or the administrative costs of changing interest rates. Some of these factors, such as risk premiums, are subject to cyclical fluctuations, whereas others are determined structurally and change slowly if at all.

Assuming this, and given a relatively stable structure of equity, securitized liabilities, and deposits, the costs of financing in the money market represent banks' effective marginal costs, i.e. the basis of calculation when deciding on a new loan. In this case, it does not seem to be necessary to differentiate between sources of financing to be able to forecast lending rates, since they can be estimated based solely on money market rates.

This, however, only applies as long as the structural relationships remain stable, as is the case in periods of calm. In times of crisis such as now this is not ensured. In recent surveys such as the bank lending survey, banks have repeatedly pointed to difficulties in raising funds in both capital and money markets. Assuming that banks aim for a certain proportionality between the components (i.e. based on maturities) when managing their liabilities, diverging cost developments may result in marginal costs no longer being represented by money market rates alone. Therefore, the costs of other sources of financing may influence banks' pricing policy in the retail business.

In order to analyze this question, section 2 takes a look at the composi-

Chart 1

Bank Liabilities by Short-Term Availability and the Transmission Mechanism

Key interest rate

Money market, central bank

Customer deposits, short-term bonds

Long-term bonds

Share capital, reserves

Lending rates

Consumer loans, housing loans, business loans, etc.

Source: OeNB.

tion of the liability side of the balance sheet of Austrian banks and the cost developments in its individual components. Section 3 examines whether the interest rate pass-through to retail interest rates has changed since the outbreak of the crisis in 2007.

2 Refinancing Costs of Austrian Banks
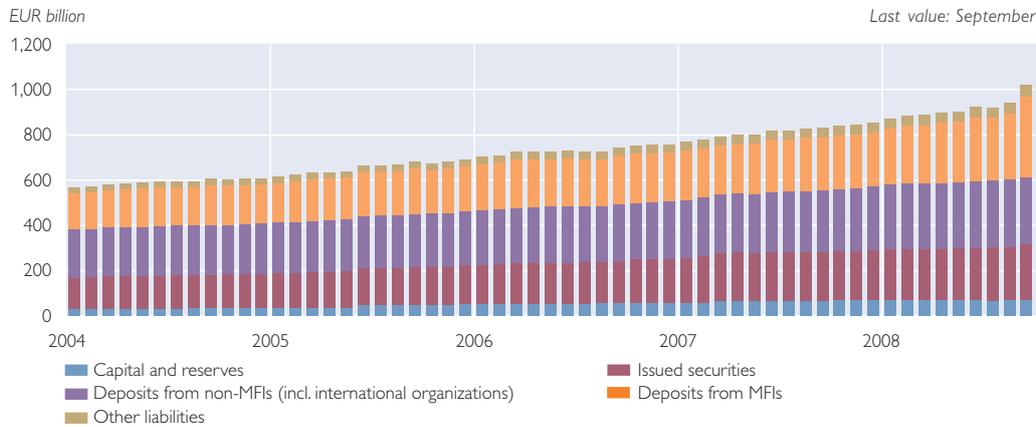
2.1 Origin of Funds

One look at the aggregate, unconsolidated balance sheet of the Austrian banking sector in chart 2 shows that at 33%, customer deposits represented the relatively largest share of liabilities on average in the last three years. Issued securities were in second place with 25.6%, and capital and reserves amounted to 7.7%. Interbank liabilities constituted 29% of the liabilities side on average in the last three years. The relative size of interbank liabilities, however, depends not only on the decision of banks regarding their desired financing structure, but also on structural factors, in particular whether parts of banks and bank groups draw up separate or consolidated balance sheets.[3]

The relative significance of individual components appears to be very stable over time. Even the outbreak of the financial crisis in summer 2007 did not result in significant shifts. Nevertheless, a breakdown by monthly inflows and outflows reveals interesting short-term trends. Chart 3 presents the changes in the individual components year-on-year. As MFI deposits do not represent additional funds for financing the real economy at the level of the entire banking sector, they are not included. Overall it can be seen that liabilities increased somewhat more slowly recently than in 2007, but growth remained at a high level comparable to 2005 and 2006. The considerable jumps recorded in mid-2005 and the beginning of 2007 can be attributed to large capital increases. The relative level of importance of deposits and bond issuance reversed after the outbreak of the crisis in summer 2007. While the issuance of securities declined and reached a low in spring 2008, deposits increased markedly, in particular time deposits with maturities of less than one year, which were highly attractive as a result of the

[3] For instance, the strong increase in MFI deposits in September 2008 can be attributed to institutional changes at one large bank.
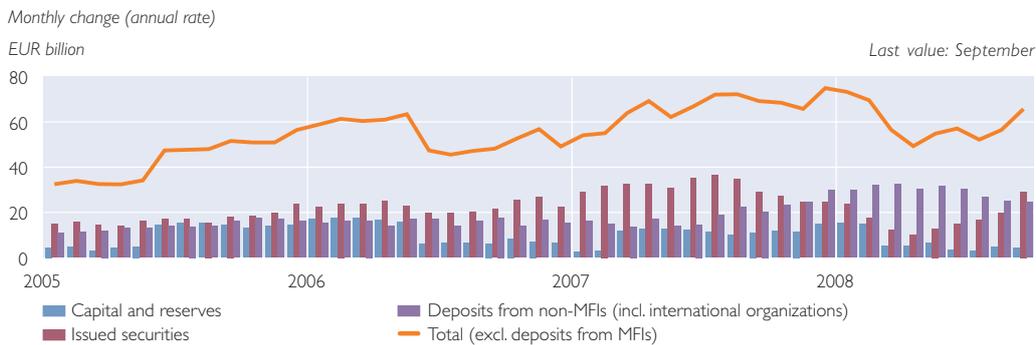
Chart 2

Liabilities by Instrument

EUR billion   *Last value: September*

- Capital and reserves
- Issued securities
- Deposits from non-MFIs (incl. international organizations)
- Deposits from MFIs
- Other liabilities

Source: OeNB.

Chart 3

Liabilities by Instrument

Monthly change (annual rate)

EUR billion   *Last value: September*

- Capital and reserves
- Deposits from non-MFIs (incl. international organizations)
- Issued securities
- Total (excl. deposits from MFIs)

Source: OeNB.

interest rate structure with high interest rates in this term range. Beginning in April 2008, however, securities issuance picked up notably, so that the annual increase in the fall of 2008 was once again at the level of 2005 and 2006. Despite the financial turbulence, financing via the capital market continued to be possible, at least until September 2008, up until data are available. In October 2008, financial market conditions worsened significantly once again; it remains to be seen how the most recent developments will feed through to the refinancing of banks.

2.2 Refinancing Costs of Austrian Banks

Drawing on the information on the liabilities side of bank balance sheets, we can now attempt to calculate a synthetic interest rate for the refinancing costs of Austrian banks. The idea is as follows: How much would Austrian banks have to pay if they increased their liabilities while maintaining the relative proportionality between deposits, debt securities and equity of their previous balance sheets? The synthetic interest rate should therefore not reflect the costs that banks in fact pay on average

for their liabilities, but rather the marginal costs of expanding their business. This interest rate is referred to below as average refinancing costs.

In fact, alternative methods of calculation are conceivable. The average refinancing costs would not be representative if the banks wanted to significantly alter the structure of their balance sheets in order to profit from shifts in the relative costs of individual components of liabilities.[4] However, if one considers that the various components differ not only in their costs, but also in other dimensions and are not perfectly substitutable, larger shifts are possible only to a limited extent. The weighting of the costs of individual types of liabilities with their share in total liabilities should therefore better reflect the medium-term marginal costs of liabilities in the banking sector.

In order to calculate the average refinancing costs, interest rates have to be assigned to the individual liabilities items. Table 1 lists the interest rates that are associated with the individual balance sheet items; special attention is paid to finding appropriate interest rates for the respective instruments and maturities. The most difficult part of this exercise is assessing the costs for additional equity, since this requires an estimate of future profits. The small number of listed banks in Austria also makes calculating an interest rate applicable to all banks difficult. The costs of raising capital certainly increased considerably in 2007 on the back of the large drop in the prices of bank shares. But since capital and reserves only constitute a small portion of liabilities (7.7% of the total unconsolidated assets), changes in the costs of equity should only have a small influence on the synthetic interest rate. Equity is therefore excluded from the following analysis. Finally, deposits from MFIs

Table 1

Main Balance Sheet Items and Assigned Interest Rates

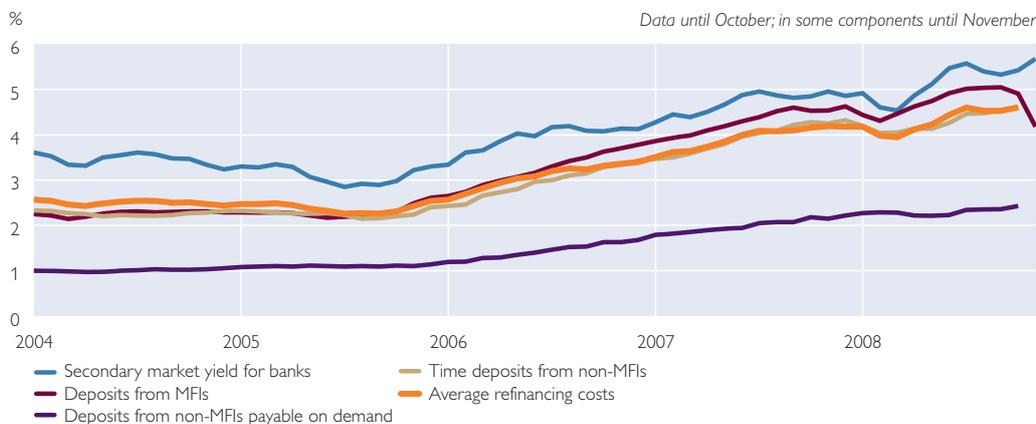| Balance sheet item	Applied interest rate
Deposits from MFIs	Money market interest rates with corresponding maturities
payable on demand	EONIA
up to 1 year	6-month-EURIBOR
1 to 2 years	12-month-EURIBOR
over 2 years	50% 12-month-EURIBOR, 50% secondary market yield for banks
Repos	3-month-EUREPO
Deposits from non-MFIs[1]	Retail interest rates
payable on demand	retail interest rates for households/non-financial corporations with
up to 1 year	corresponding agreed maturities weighted by amounts outstanding for Austria
1 to 2 years	
over 2 years	
Repos	Repos
Issued securities	Secondary market yield for banks
Capital, reserves and other liabilities	×

Source: OeNB.

[1] The amount of deposits redeemable at notice is insignificant.

[4] In this case, new loans/issuances could be applied as weights. Nevertheless, the question of how the large volumes should be handled in the renewal of short-term transactions is raised here. In addition, the new issuance business is highly volatile.

Chart 4

Refinancing Costs of Banks

%
Data until October; in some components until November

- Secondary market yield for banks
- Deposits from MFIs
- Deposits from non-MFIs payable on demand
- Time deposits from non-MFIs
- Average refinancing costs

Source: OeNB.

are also assigned an interest rate, which is presented in chart 4, but not included in the calculation of average refinancing costs, since net deposits from MFIs do not represent a liability for the sector as a whole.[5]

As can be seen in chart 4, the average refinancing costs of banks (without the interbank market) increased from around 2.5% (2005) to around 4% (2007). Following a short stabilization at the beginning of 2008, the costs increased further in the second quarter and are currently around 4.6%. A closer look shows that costs for all subcomponents have risen since the end of 2005. The components move together overall, but there are some differences in the pace of change. The increase since April 2008 can above all be attributed to the strong rise in the secondary market yield for bank bonds.

If the average refinancing costs are compared with the costs of financing via MFI deposits, it can be seen that the latter have become more expensive relative to the average refinancing costs since mid-2006. This relationship is probably set to reverse. Initial data for

November 2008 indicate strong decreases in the money market – in November 2008, the estimated costs of deposits from MFIs were around 80 basis points below the values recorded in the summer months. For the components based not on financial market data, but rather on surveys regarding retail interest rates, the time series end in October 2008.

3 Pass-Through of Interest Rates in the Austrian Credit Market

In this section we address the question of how changes in financing costs are transmitted to the interest rates that are relevant for aggregate demand, assuming – as described in section 1 – that in periods of calm, financing via the money market represents the marginal costs of granting an additional loan. Based on the correlation between money market and lending rates, we subsequently analyze whether it also applies after the outbreak of the crisis in July 2007. But first, the interest rates that are relevant for aggregate demand, i.e. lending rates, shall be examined in detail.

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[5] Although they are obviously relevant at the level of individual institutions.

3.1 Development of Lending Rates of Austrian Banks

The interest rate statistics of the Oesterreichische Nationalbank (OeNB) differentiate between loans to households and non-financial corporations; household loan data are collected broken down by loan purpose and rate fixation period, loans to enterprises are broken down by rate fixation period for small loans (under EUR 1 million) and large loans (over EUR 1 million). A representative selection from this multitude of different interest rates will be presented here. Therefore, this article concentrates on those types of lending rates that are applied in the majority of loan contracts. Over the average of the past six years, these interest rate categories represent around 90% of the loan amount extended in the respective loan category.

Charts 5 and 6 present the movement of six selected interest rate categories between 1996 and 2008; the interest rate on other loans (chart 5) is first available beginning in 2003. The interest rates presented show that – with the exception of housing loans – the Austrian lending landscape is dominated by loan contracts with a rate fixation period of less than one year. Within housing loans, loans with a rate fixation period of less than one year account for 55% and loans with rate fixation periods between one and five years constitute around 40%. For this reason, both types of housing loans are included in this study in order to represent more than 90% of the volume in this category, too.

The values listed and analyzed here represent interest rates on new loans, i.e. interest rates that are fixed for a specified period at the conclusion of the loan contract. As already described, lending rates are influenced by a variety of factors, above all the marginal cost of granting loans, which we will particularly concentrate on below.

3.2 Pass-Through from Market Interest Rates to Lending Rates

As is common in the literature, see e.g. De Bondt (2005), money and capital market interest rates with comparable terms are used to explain bank lending rates in order to avoid distortions caused by different terms. The marginal cost of providing loans with a rate fixation period of less than one year is approximated by the three-month EURIBOR. For loans with longer rate fixation periods, interest rates with correspondingly longer terms must be applied. De Bondt et al. (2005) argue that not only money market rates, but also capital market rates play a role in lending rate decisions. For this reason, the costs for loans with a maturity between one and five years are approximated by a simple average of the three-month EURIBOR and the 10-year benchmark yield for Austrian government bonds. In addition to the lending rates with a rate fixation of less than one year, chart 5 shows the three-month EURIBOR to illustrate the path of lending rates. Furthermore, chart 6 includes the previously mentioned bond interest rates, since they explain some of the movement of housing loans with a rate fixation period of one to five years.

The correlation between market interest rates and lending rates is going to be analyzed in detail below.[6] We follow an approach found frequently in empirical literature (see e.g. Moazzami, 1999; Mojon, 2000, Toolsema et al.,

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[6] For simplification, money market interest rates and/or capital market interest rates are hereinafter referred to as market rates.
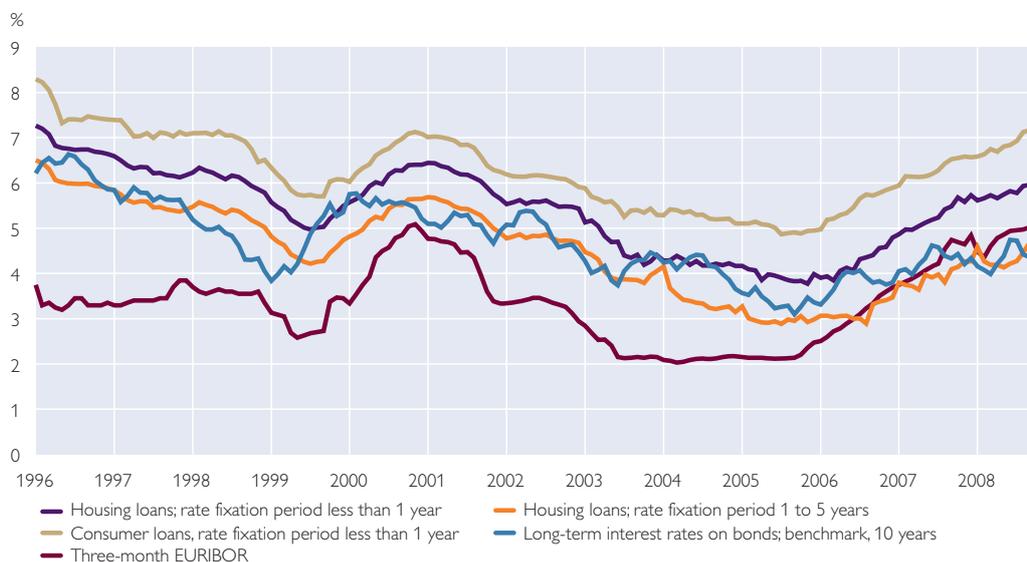
Chart 5

Interest Rates on Loans to Non-financial Corporations and Three-Month EURIBOR

%
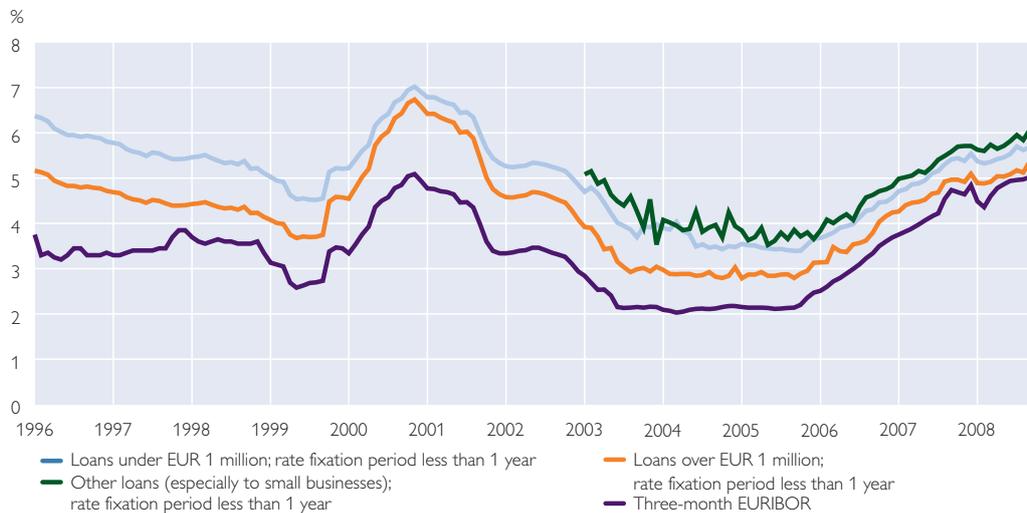
Source: OeNB, Thomson Financial

Chart 6

Interest Rates on Consumer and Housing Loans, Long-Term Interest Rates and Three-Month EURIBOR

%

Source: OeNB, Thomson Financial.

2001; De Bondt, 2005); we estimate the correlation between market rates (mr_t) and lending rates (kr_t) using an error correction model, assuming the following relationship:

$$\Delta kr_t = \alpha_1 + \alpha_2 \Delta mr_t + \\ + \beta_1 (kr_{t-1} - \beta_2 mr_{t-1}) + \varepsilon_t \quad (1)$$

Equation 1 expresses that the change in lending rates can be attributed to two factors. First, they react to changes in market rates, and second, to deviations from the long-term relationship between market and lending rates.

The coefficient α_2 in equation 1 represents the pass-through of changes in

the market rate to the lending rate within the same month (immediate pass-through). Furthermore, β_2 is the estimator for the long-term pass-through; it specifies how much of a change in the market rate will be transmitted to lending rates in the long run. Using data for banks from the euro area, De Bondt (2005) estimates that the pass-through e.g. for consumer loans amounts to between 70% and 90% after two years. The long-term pass-through is largely completed after three years. Finally, β_1 is the adjustment coefficient that indicates how much a deviation from the long-term relationship is reduced each month. In order to achieve a return to the long-term relationship, β_1 must be negative.

Table 2 shows the estimated pass-through of market rates to the six selected Austrian lending rates, with column 3 indicating the long-term pass-through (β_2). Column 4 includes the results of a formal statistical test that examines whether the long-term pass-through is complete (null hypothesis: $\beta_2 = 1$). Our findings suggest that in four out of six cases, the pass-through of market rates to lending rates is complete. In the remaining two loan categories, the pass-through is either incomplete (other loans) or higher than 100% (housing loans with a rate fixation period between one and five years).

There can be many reasons why a pass-through is incomplete, as it is the case in the other loans category. For instance, it can result from an implicit agreement between the bank and the customer as a consequence of long-term customer relationships (Berger and Udell, 1992; Allen and Gale, 2004), i.e. banks want to offer their long-standing customers relatively stable interest rates in order to insulate them from volatile market rates. In

addition, adjustment costs (Hannan and Berger, 1991; Hofmann and Mizen, 2004) such as labor costs or calculation costs have to be taken into account. Furthermore, an incomplete pass-through may be due to asymmetric information and moral hazard considerations. For instance, banks may have no motivation to raise their interest rates much since customers that accept higher lending rates are likely to have a higher default risk. It is possible that this is particularly true for small businesses, which dominate the category other loans.

In the second case of an incomplete pass-through, i.e. the transmission of more than 100% of interest rate changes in the category housing loans with long rate fixation periods, a range of factors in addition to the changes in market rates may play a role. For instance, a change in the risk assessment and therefore also the risk premium over the course of the interest rate cycle could explain this excess transmission.

As often found in the literature (e.g. Cottarelli and Kourelis, 1994; Borio and Fritz, 1995; Moazzami, 1999), the results of this study also suggest that, despite a complete long-term pass-through in the majority of cases, lending rates are highly rigid in the short-term. Column 2 in table 2 shows the immediate pass-through, α_2, which varies considerably depending on the loan category, but is significantly lower than one in each case. Whereas the immediate pass-through for other loans and housing loans with long rate fixation periods does not significantly deviate from zero, it amounts to 30% and 40%, respectively for consumer loans and housing loans with short rate fixation periods, and is considerably higher for business loans (60% to 80%). Burgstaller (2008), who also examines the transmission of interest rates at

Table 2

Interest Rate Pass-Through in the Austrian Banking Sector for Selected Loan Categories (1996 to 2008)

Interest rates on	Immediate pass-through α_2	Long-term pass-through β_2	Complete pass-through? $\beta_2 = 1$	Adjustment coefficient β_1	Cointegration relationship? $\beta_1 = 0$
Loans to non-financial corporations under EUR 1 million, rate fixation period less than 1 year	0.63*** (0.05)	1.31*** (0.25)	yes	−0.04*** (0.01)	yes
Loans to non-financial corporations over EUR 1 million, rate fixation period less than 1 year	0.79*** (0.05)	1.28*** (0.23)	yes	−0.04** (0.02)	no
Other loans, rate fixation period less than 1 year	−0.03 (0.27)	0.74*** (0.06)	no	−0.43*** (0.09)	yes
Consumer loans, rate fixation period less than 1 year	0.37*** (0.05)	0.95*** (0.14)	yes	−0.06*** (0.01)	yes
Housing loans, rate fixation period less than 1 year	0.27*** (0.05)	1.18*** (0.19)	yes	−0.05*** (0.01)	yes
Housing loans, rate fixation period 1 to 5 years	0.10 (0.07)	1.36*** (0.12)	no	−0.11*** (0.12)	yes

Source: OeNB.

Note: Other loans include above all loans to small businesses. ***, (**) and [*] represent the significance levels of 1%, (5%) and [10%], with which the null hypothesis that the respective coefficient equals zero is rejected. The estimates' standard error is indicated in parentheses. The critical values of Kremers et al. (1992) and Boswijk (1994) are applied in the test for the existence of a cointegration relationship (last column).

Austrian banks, also comes to the conclusion that the short-term pass-through is significantly below one.[7]

Finally, column 5 of table 2 contains the adjustment coefficient, β_1, that exhibits the right sign in all cases and is significantly smaller than zero in each case. As in De Bondt (2005), the null hypothesis $\beta_1 = 0$ is also applied as a criterion for a cointegration relationship between lending rates and the respective market rates. For this test, the critical values of Kremers et al. (1992) and Boswijk (1994) are applied. As column 6 of table 2 shows, the null hypothesis can be rejected in nearly every case, which means that the series are cointegrated and the previously described estimated results are not distorted. Nevertheless, there is an exception in the relationship between lend-ing rates on larger business loans and market rates, whose cointegration relationship is in question. For this reason, these specific estimated results should be interpreted with caution.

3.3 Effect of the Financial Crisis on Lending Rates

These results can now be used to analyze the question introduced at the beginning of this article: whether the behavior of banks in determining their lending rates has changed since the financial crisis began in July 2007. The first step is to identify a structural break in the relationship between market rates and lending rates in July 2007 that can be used as indication of a change in behavior. Table 3 shows the results of Chow tests for a structural break, with the last column indicating whether

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[7] However, in contrast to the results described here, Burgstaller (2008) finds the long-term pass-through to be in-complete. The differing results can be explained on the one hand by different methods of estimation and on the other hand by divergent time periods.

there is a structural break. In three out of six cases, a structural break can be localized in July 2007 (in both types of business loans and in housing loans with long rate fixation periods). The results from table 3 suggest a change at least in certain loan categories and therefore call for further analysis.

Below, the relationship described in equation 1 is re-estimated for all six loan categories; this time, however, not over the entire period of 1996 to 2008, but only until June 2007 in order to disregard the data since the financial crisis began. This method results in a relationship between market rates and lending rates such as existed for 11½ years.[8] This historical basis is then used to forecast the developments in the second half of 2007 up to and including October 2008. This forecast can be compared with the actual movement of lending rates to find out whether the path of lending rates since mid-2007 has followed the historical pattern or whether the behavior of banks in establishing their lending rates has changed.

The results of this comparison are presented in chart 7; they suggest that

– as announced in table 3 – the most recent developments of lending rates can be divided into two groups. The first group consists of those loan categories whose developments reflect the historical pattern: other loans, consumer loans and housing loans with short rate fixation periods. This is not the case with the second group consisting of small and large loans to non-financial corporations as well as housing loans with long rate fixation periods. In these loan categories, interest rates were not raised as much as the historical relationship would suggest. This resulted e.g. in spring 2008 in fictional savings of around 75 basis points for borrowers. This gap has begun to close in recent months, however; lending rates appear to be returning to their long-term relationships.

The lower increase over the course of 2008 appears surprising at first glance; after all, when embarking on this analysis we would have expected that lending rates would rise more sharply on the back of the global financial turbulence. A possible reason for the lower increase is that the refinancing

Table 3

Results of Chow Tests for Structural Breaks; Break: July 2007

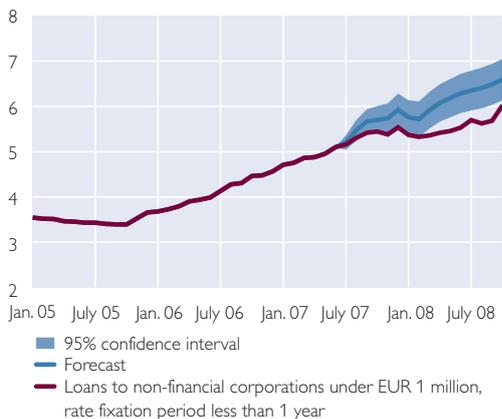| Interest rates on	Log-likelihood ratio	Wald statistic	Structural break?
Loans to non-financial corporations under EUR 1 million, rate fixation period less than 1 year	11.80**	11.62**	yes
Loans to non-financial corporations loans over EUR 1 million, rate fixation period less than 1 year	11.83**	11.65**	yes
Other loans, rate fixation period less than 1 year	3.98	3.62	no
Consumer loans, rate fixation period less than 1 year	5.07	4.88	no
Housing loans, rate fixation period less than 1 year	5.02	4.83	no
Housing loans, rate fixation period 1 to 5 years	17.45***	17.52***	yes

Source: OeNB.

*Note: Other loans include above all loans to small businesses. ***, (**) and [*] represent the significance levels of 1%, (5%) and [10%], with which the null hypothesis of no structural break in July 2007 is rejected.*

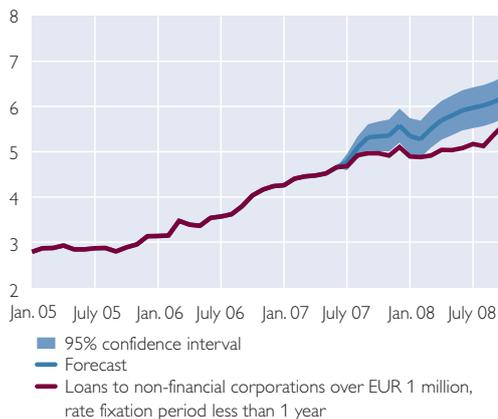[8] The sample begins in January 1996 and ends in June 2007.

Chart 7

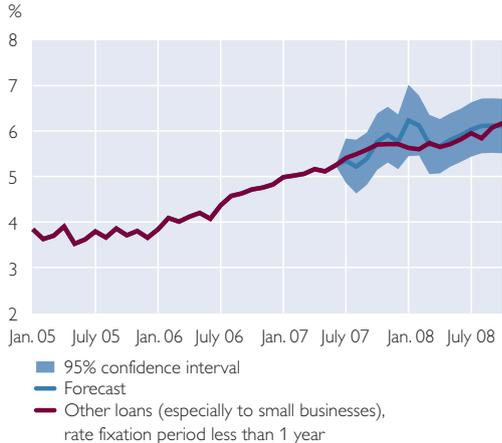## Comparison of the Estimated Pass-Through with Actual Interest Rate Developments

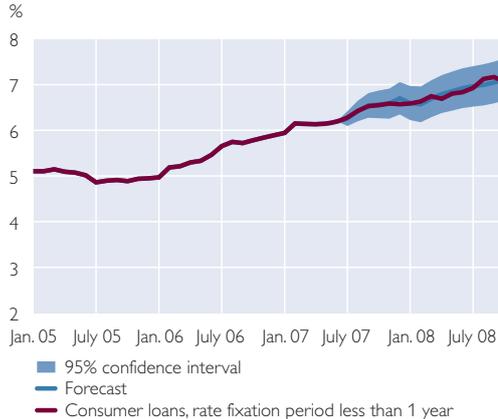*Loans to non-financial corporations under EUR 1 million*
%

- 95% confidence interval
- Forecast
- Loans to non-financial corporations under EUR 1 million, rate fixation period less than 1 year

Loans to non-financial corporations over EUR 1 million
%

- 95% confidence interval
- Forecast
- Loans to non-financial corporations over EUR 1 million, rate fixation period less than 1 year

Other loans
%

- 95% confidence interval
- Forecast
- Other loans (especially to small businesses), rate fixation period less than 1 year

Consumer loans
%

- 95% confidence interval
- Forecast
- Consumer loans, rate fixation period less than 1 year

Housing loans (up to 1 year)
%

- 95% confidence interval
- Forecast
- Housing loans, rate fixation period less than 1 year

Housing loans (1 to 5 years)
%

- 95% confidence interval
- Forecast
- Housing loans, rate fixation period between 1 and 5 years
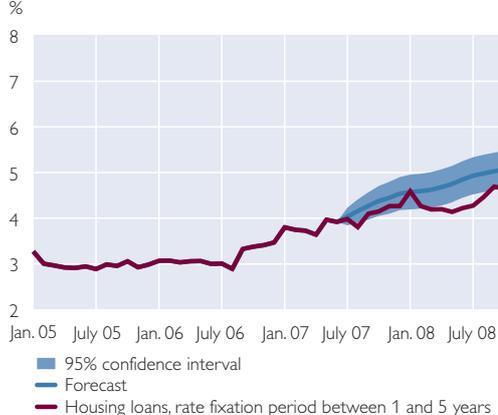
Source: OeNB.

costs of banks via deposits – as presented in section 2 – were lower than the costs of other sources of financing.

As chart 3 shows, the expansion of bank financing in early 2008 was indeed dominated above all by customer deposits – bond issues and capital increases played a relatively small role. It is possible that banks were therefore able to permit some borrowers to benefit temporarily from the relatively favorable conditions in the deposit business since spring 2008. Accordingly, the normalization towards the pre-crisis long-term relationship in recent months could be attributable to the declining significance of deposits – a comparably cheap source of funds – in the refinancing mix.

De Bondt et al. (2005) also presume that deposit rates play a role in banks' lending rate decisions. However, while they reject the hypothesis of Granger causality between interest rates on deposits and loans for all interest rates in the euro area, Austria appears to be an exception in this relationship. De Bondt et al. (2005) infer that in Austria deposit rates in fact play a role in establishing the price of loans. In past months, however, this interest rate advantage does not appear to have been passed on to all borrowers, but rather only in some loan categories. It is possible that there are implicit contracts (Berger and Udell, 1992; Allen and Gale, 2004) between banks and borrowers of business loans and long-term housing loans that prevent banks from transmitting fluctuations in the money market in their entirety. Whereas the error correction model reflects this behavior in principle, it is conceivable that in the case of an extraordinary shock, such as the current financial crisis, banks attempt to serve even more as shock absorbers.

4 Conclusions

According to recent results of the bank lending survey for Austria, banks say that it has become more difficult to raise funds in the money and capital markets. The initial hypothesis of this study was that the turbulence affecting global financial markets since July 2007 may have made financing more expensive for Austrian banks and, as a consequence, pushed up retail interest rates.

We find no evidence that lending rates in Austria have been higher since the turbulence began than would be justified by the pass-through of market rates. There appears to have been no transmission of increased costs, such as e.g. the costs of issuing bank bonds. Quite the contrary, there are some loan categories in which lending rates temporarily remained below the expected path. One possible explanation for this is the prevalence of relationship banking in Austria, which leads to a smoothing of interest rates for borrowers on the basis of implicit contracts. In addition, the results of this study suggest that banks differentiate between customer groups. Whereas the pass-through has remained the same as in the past for some borrowers, market rate changes are transmitted only partially in the categories business loans and housing loans with long rate fixation periods; in other words, the borrowers of the latter were insulated to a certain degree from the increase in interest rates in the money market.

Overall, we fi nd that the pass-through of market rates to lending rates has become temporarily weaker (in particular in loans to non-financial corporations) since the outbreak of the financial crisis in the summer of 2007. A major deviation from the historical pattern was not evident, however.

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Wealth Effects on Consumption in Austria

Gerhard Fenz,
Pirmin Fessler[1]

Between the start of the financial crisis in the third quarter of 2007 and the third quarter of 2008, Austrian household sector losses arising from investment in tradable securities amounted to approximately EUR 24 billion. This study uses micro and macro data to examine the possible consequences of this loss of wealth on the consumption behavior of households. Micro data for Austria indicate that owing to unequal distribution, it is primarily the wealthier households that have been directly affected by the crisis. However, all households may be impacted by the consequences of the financial crisis via confidence effects, irrespective of whether they hold securities or not. Estimates based on macro data show that the marginal propensity to consume out of wealth of Austrian households is 0.05 and thus within the international average. Results of Oesterreichische Nationalbank (OeNB) simulations using a macroeconometric model indicate that a decrease in wealth has a relatively minor effect on private consumption and economic growth in Austria. Moreover, this effect only occurs with a substantial lag. Due to the historic singularity of the current financial crisis, however, above all the indirect confidence effects could be more intense than estimated.

1 Introduction

Changes in asset prices can affect the real economy via two main channels. First, via investment decisions made by companies[2] and second, via consumption decisions made by households. The study at hand is primarily concerned with the latter channel.

The extensive literature on the transmission of asset price changes to private consumption is based on empirical observations of a positive correlation between these two variables. However, assessments of the causal relationship between consumption growth and changes in wealth diverge substantially. Some argue that equity prices are a leading indicator of future economic performance and that households do not change their consumption behavior because asset prices have changed – after all, even households with no assets would adjust their consumption behavior as their expectations of the future change (Poterba and Samwick, 1995). This effect thus represents an indirect phenomenon – the confidence channel. Others interpret asset price changes to be a direct cause of the positive correlation between consumption and wealth (direct wealth channel). According to economic theory, households will generally expand consumption spending when their wealth increases unexpectedly and permanently. Only under extreme assumptions, such as a bequest of the entire gain in wealth, would consumption remain unchanged. For all intents and purposes, it is thereby of no consequence whether the wealth effect works directly through a shift in budget constraints (direct wealth effect) or through a change in collateral in the case of credit-financed consumption (liquidity channel or balance sheet channel). Neatly separating indirect wealth effects (including the confidence channel) from direct wealth effects re-
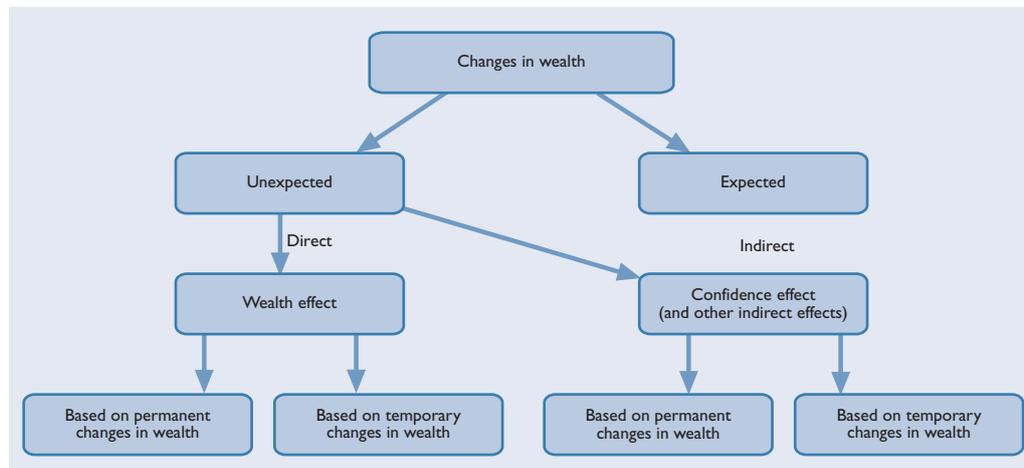

Chart 1

Wealth Effect Channels

Source: OeNB.

quires empirical studies based on micro data. For instance, Dynan and Maki (2001) found significant direct wealth effects but only weak empirical evidence for the existence of indirect wealth effects. Chart 1 illustrates the wealth effect channels for responding to asset price changes discussed here. In addition to differentiating between direct and indirect wealth effects, it is also of significance whether the asset price changes are permanent or temporary or are perceived as being permanent or temporary.[3]

The intensity of the direct wealth effect depends on a number of factors, including the liquidity of the assets in question. Liquid assets, in the case of which price changes may be readily realized by households, generally lead to more intense, direct reactions in private consumption. By contrast, changes in wealth that cannot be realized that readily – such as changes in the capital invested in pension funds – lead to slower and less intense reactions in private consumption. Moreover, con-

sumers keep "mental accounts" (Thaler, 1990). Rather than treating all assets equally, consumers tend to hold some instruments for long-term provision (life insurance, pension products). Holdings of such instruments are linked to a lower propensity to consume, while other instruments having a shorter time horizon are linked to a higher propensity to consume. In addition, changes in wealth that appear, or are known, to be uncertain or temporary lead to weaker consumption reactions (Lettau and Ludvigson, 2004). Finally, wealth distribution plays an important role as well. On the assumption of a concave utility function, wealthier households have a lower marginal propensity to consume (Caroll and Kimball, 1996). If wealth is distributed unequally, the aggregate wealth effect is lower.

The theoretical basis of the relevant studies is usually what is known as *wealth accumulation identity* and the *life cycle model* (Modigliani and Brumberg, 1954) or the *permanent income hypothesis*

[3] The simulations described in section 4 are based on the assumption of a permanent change in asset prices and do not allow for a differentiation between indirect and direct effects.

(Friedman, 1957). The theory implies that *anticipated* changes in income or wealth have no effect whatsoever on consumption. An analysis of the wealth effect becomes relevant as soon as *unforeseen* changes in wealth occur, which is usually the case in two areas of the household portfolio:[4] First of all with respect to real estate wealth when property values change unexpectedly, and second with respect to portfolio investments made by households, which can likewise be affected by unforeseen price fluctuations.[5]

Against this backdrop, this article will attempt to examine the wealth effect on private consumption in Austria on the basis of relevant micro and macro data. In so doing, recent developments on the financial markets will be given particular consideration. Section 2 offers an overview of the relevant literature. Section 3 quantifies the losses arising from investments in tradable securities since the start of the current financial crisis. Section 4 outlines the wealth structure of households as evident from available micro data, which provides an indication of the effect changes in wealth may have on individuals. In this respect our analysis focuses on the extent and distribution of Austrian households' real estate and securities holdings. Given that micro panel data are not available for sufficiently long periods for Austria, we use macro data to estimate the wealth effect on Austria (section 5). Finally, in section 6 we summarize our results and draw conclusions.

2 Overview of the Literature

Empirical analyses of the wealth effect focus on the question of whether – and if so, to what extent – changes in wealth affect consumption behavior. The purpose of these analyses is typically to estimate the marginal propensity to consume out of wealth. This figure reflects the cent amount by which households increase or decrease consumption spending when an unexpected increase or decrease in wealth of 1 euro occurs.

Methodically, two approaches (with somewhat different objectives) are possible to estimate the wealth effect, namely a framework based on *macro data* or a framework based on *micro data*. The advantage of macro data lies in the long time series available for many countries. However, macro data do not allow any conclusions to be drawn regarding individual wealth effects. Individual wealth effects depend on age, income, net worth, and other demographic features. Separating wealth effects from confidence effects requires the use of the corresponding micro panel data sets, which contain both wealth and consumption variables.

Numerous empirical studies have attempted to estimate the marginal propensity to consume out of wealth using macro data. As early as the 1970s, Modigliani (1971) calculated a figure of 0.05 for the U.S.A., meaning that for each increase in wealth of 1 euro, consumption increases by 5 cent per year. A number of follow-up studies, however, suggested that the results were highly sensitive to the wealth variables selected, the time periods studied, and the countries (regions) studied. An

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[4] *In the event of extreme inflation, additional effects could of course occur in other areas that are normally foreseeable, such as bank deposits.*

[5] *An additional third area consists of unforeseen debt-related changes, such as sharp interest rate changes for variable interest loans or sharp securities price changes affecting loans with repayment vehicles (above all savings plans involving mutual fund shares).*

overview article by Poterba (2000) cites estimates for the U.S.A. indicating that an increase in equity wealth of 1 euro causes consumption to increase by 3 to 4.2 cent, whereas an equal increase in real estate wealth leads to a consumption increase of 6.1 to 7.5 cent. Ludvigson and Steindel (1999) emphasized the fact that the marginal propensity to consume can vary greatly over time. For the U.S.A., for instance, they calculated a marginal propensity to consume of 0.021 for the period from 1986 to 1997, which is only approximately half of the average for the period from 1953 to 1997 (0.04). Ludwig and Slok (2002) found significant differences between countries with bank-based and countries with market-based financial systems. The long-term marginal propensity to consume out of equity wealth was much higher for market-based economies (0.043) than for bank-based economies (0.026). A comprehensive overview article from the ESCB (2004) found the marginal propensity to consume out of wealth to lie within a range of 0.015 and 0.07 across Europe, with the majority of studies determining higher values for the U.S.A. and the U.K. than for continental Europe. One panel estimate for European countries, however, estimated a marginal propensity to consume of 0.068, which is certainly comparable with the available estimates for the United States. Moreover, the ESCB study found evidence, albeit weak, suggesting that the real estate wealth effect is somewhat stronger than the equity wealth effect in European countries. Catte et al. (2004) confirmed these findings for the OECD countries.

The literature based on micro data is less extensive given that panel data are available only for a few countries. For the U.S.A. a direct wealth effect on consumption has been estimated in a few studies, the most relevant being Skinner (1989) and Parker (1999). Skinner concentrated primarily on real estate wealth effects, while Parker covered a broader wealth spectrum. Both studies found significant – if only minor – wealth effects on consumption. Parker, for instance, estimated a marginal propensity to consume out of wealth of 0.04. By contrast, Dynan and Maki (2001) focused on the effect of changes in equity wealth on consumption. They estimated a marginal propensity to consume out of equity wealth of 0.05 to 0.15. A more current study involving U.S. data was conducted by Juster et al. (2006) and estimated a marginal propensity to consume out of equity wealth of 0.17 over five years, a figure that is considerably higher than that for real estate or other assets. Bover (2005) estimated the wealth effect using micro data from the Spanish *Survey of Household Finances* (EFF). This study differs from others in that it reflects the different wealth distribution across different regions. The findings indicate significant effects of real estate wealth with a marginal propensity to consume of 0.015, but no significant effects of financial wealth. Similar findings were supplied by a more recent study by Grant and Peltonen (2008), which showed relatively strong significant effects of real estate wealth (0.05 to 0.08) and weaker effects of equity wealth (0.005) based on Italian micro data from the *Survey of Italian Household Income and Wealth* (SHIW). Paiella (2007), likewise using SHIW data, found similarly high marginal values for the propensity to consume out of financial wealth in Italy as in the U.S.A. (0.09), although the impact on the overall economy is considerably lower due to the lower levels of financial wealth. For net worth, the estimator is 0.04.

3 Household Wealth Losses Triggered by the Financial Crisis in the Period from Q3 2007 to Q3 2008

Since the onset of the financial crisis in the third quarter of 2007 and up to the third quarter of 2008, household sector losses arising from investment in tradable securities amounted to approximately EUR 24 billion. This corresponds to approximately 14% of disposable household income, or 5% of total gross financial wealth (based on the figure for the second quarter of 2007). The loss amounts to approximately 20% of the household sector's securities portfolio and is thus by all means considerable, even though securities amount only to some 30% of the financial assets of the household sector, compared with more than 50% held in cash and deposits.

The aggregate data on the household sector, however, contain not only the securities holdings of households per se but also those of self-employed persons, private nonprofit institutions and — from 2006 onward — private foundations. The share attributable to private foundations in particular cannot be disregarded. From the third quarter of 2007 to the third quarter of 2008, private foundations registered valuation losses of EUR 7 billion. However, this is hardly likely to affect the consumption spending of households. Households and self-employed persons (sector 14) are left with valuation losses of approximately EUR 17 billion.[6] The simulations described in section 5 are based on this figure.

It should furthermore be taken into consideration that statistics on securities do not separately identify pension funds and life insurance for households and self-employed persons. Some of these instruments also include equity investments, with the volume of losses attributable to households and self-employed persons arising from unit-

Chart 2

Price and Exchange Rate Effects on Household Sector Assets
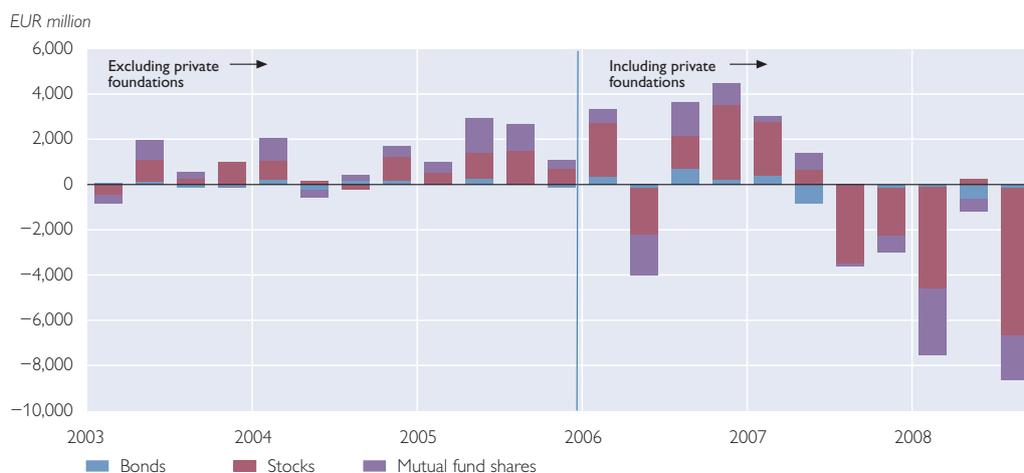
Source: OeNB.

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[6] _For a detailed portrayal of the data on income from financial assets and the special problems with regard to the underlying data, see Waschiczek (2009)._

linked life insurance contracts[7] being estimated at approximately EUR 1.5 billion (since the third quarter of 2007). Households have also suffered losses arising from defined contribution pension funds, with EUR 300 million these losses being attributed to reductions of current payments and EUR 600 million to losses in benefit entitlements, whereby the extent to which these are permanent losses or are perceived as such is debatable.

4 Structure of Household Wealth

Only with the help of micro data is it possible to determine which households hold which assets and in what quantities. This information is essential for an informed assessment of wealth effects, since the marginal propensity to consume can be assumed to differ for different wealth or income classes, and since other socioeconomic characteristics may also play a role. Moreover, the marginal propensity to consume is different for different types of wealth, as

confirmed by both macro and micro studies. With regard to real estate wealth, thus far no micro data set exists for Austria that can be mined for structural analyses,[8] but rough estimates based on international micro data from the Luxembourg Wealth Study (LWS) suffice to fill the void. For the purpose of analyzing security holdings, primarily stocks and mutual fund shares, we use data from a financial survey conducted by the OeNB in 2004.

4.1 Real Estate Wealth

According to Statistics Austria, the home ownership rate in Austria is approximately 57% (with respect to principle residences) and has fluctuated only slightly in recent years. In the rest of Europe, the home ownership rate ranges from approximately 40% in Germany to nearly 90% in Spain. Any real estate wealth – usually residential property – owned by a household normally accounts for the bulk of that household's total wealth. In aggregate terms,

Table 1

Luxembourg Wealth Study Micro Data

		Wealth variable		
	Source	Nonfinancial assets[1]	Financial assets	Total
		%		
Canada	SFS 1999	78	22	100
Cyprus	SCF 2002	84	16	100
Finland	HWS 1998	84	16	100
Germany	SOEP 2002	87	13	100
Italy	SHIW 2002	85	15	100
Sweden	HINK 2002	72	28	100
United Kingdom	BHPS 2000	85	15	100
U.S.A.	PSID 2001	67	33	100
U.S.A.	SCF 2001	62	38	100

Source: Luxembourg Wealth Study (LWS), Sierminska et al. (2006, table 5).

[1] In the LWS, the nonfinancial assets comprise: Principal residence, investment real estate, business equity, vehicles, durables and collectibles, as well as other nonfinancial assets. However, the majority of nonfinancial assets are made up of real estate assets.

[7] Approximately 21% of life insurance policies are (partially) unit-linked.

[8] The initial results of the OeNB's Household Survey on Housing Wealth are expected to be published in the spring of 2009.

Chart 3

Austrian Real Estate Price Indices Q1 00 to Q3 08

2,000 = 100

Real estate price index (Austria excl. Vienna) — Real estate price index (Vienna)
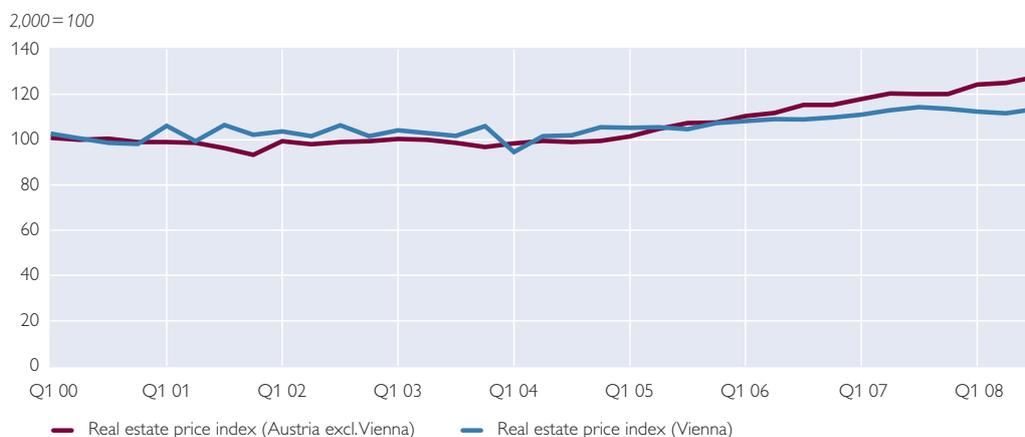
Source: OeNB, Austria Immobilienbörse, Vienna University of Technology, Institute for Urban and Regional Research.

the real estate wealth of households is, in most countries, also significantly greater than financial wealth, which can lead to substantial aggregate effects, even if the marginal propensity to consume out of real estate wealth is lower than the marginal propensity to consume out of financial wealth (table 1).[9]

The financial crisis has thus far not resulted in any notable revaluation of real estate assets in Austria. This is due to the fact that in contrast with the U.S.A, Ireland or Spain, real estate prices have performed unremarkably (chart 3).[10] At present, therefore, only the wealth effect of the financial crisis on securities is relevant. We have addressed this issue in the following.

4.2 Securities Wealth

The current crisis is leading to strong valuation effects in the capital mar-kets and thus to major changes in the securities wealth component. Securities wealth, particularly assets invested in stocks and mutual fund shares, can as a rule be regarded as being highly liquid, which would imply a stronger wealth effect. However, the exposure of Austrian investors to the capital markets and the determinants of such exposure would tend to favor a weaker effect. The distribution of wealth is highly unequal in general, and the marginal propensity to consume decreases along with decreasing income or wealth. When measuring the impact of crisis on households it is important to distinguish between the decision to participate in the capital market in the first place and the decision of how much to invest in capital market instruments.[11]

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[9] Micro data generally underestimate aggregate financial wealth (Sierminska et al., 2006).

[10] The impact foreign currency-denominated bullet loans with repayment vehicles taken out to purchase real estate may have on households' financial wealth cannot yet be estimated. These loans make up approximately 20% of all household sector debt. Since the majority of these foreign currency loans will not fall due prior to 2018, no notable effect on the real estate market is expected in the short term. In the medium term, the continued performance of the securities markets will be crucial. Yet the affected households may change their consumption and saving behavior even in the short term, as they will need to compensate any losses in the value of repayment vehicles by increasing future savings.
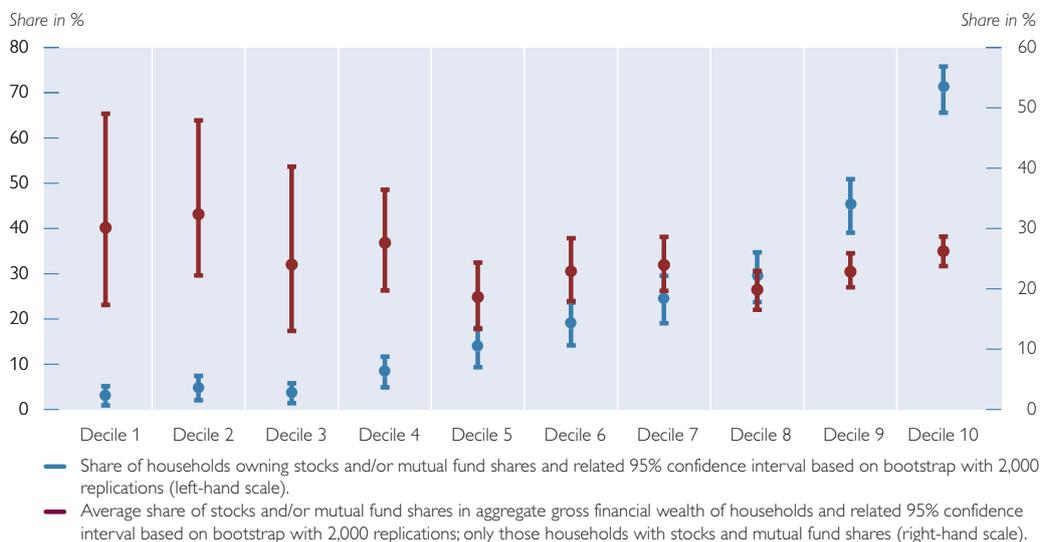
[11] See Fessler and Schürz (2008) for details on securities holdings in Austria.

Charts 4 and 5 depict the capital market participation rates and the share of wealth held in capital market instruments as a percentage of total gross financial wealth[12] (based on the OeNB's 2004 financial wealth survey). The rate of participation with respect to stocks and/or mutual fund shares increases sharply over the financial wealth decile and over the income classes. The overall participation rate is approximately 22% (weighted). Although participation rates show significant variations over the financial wealth deciles and income classes for the most part, no significant differences were determined with respect to the share of financial wealth held in these investments. The average share of assets invested in such instruments is approximately 23% (weighted). The sharp increase in capital market participation is reflected in the narrowing confidence intervals[13] for the share of assets of wealthy or high-income households held in stocks and/or mutual fund shares. This also means that the wealthier population strata have a higher exposure to securities price fluctuations due to their higher participation levels and larger securities portfolios. Thus it is the wealthier or higher-income households that tend to be especially affected by valuation losses on the capital markets, yet these households are at the same time less likely to have liquidity problems forcing them to realize these losses. In Austria, both the capital

Chart 4

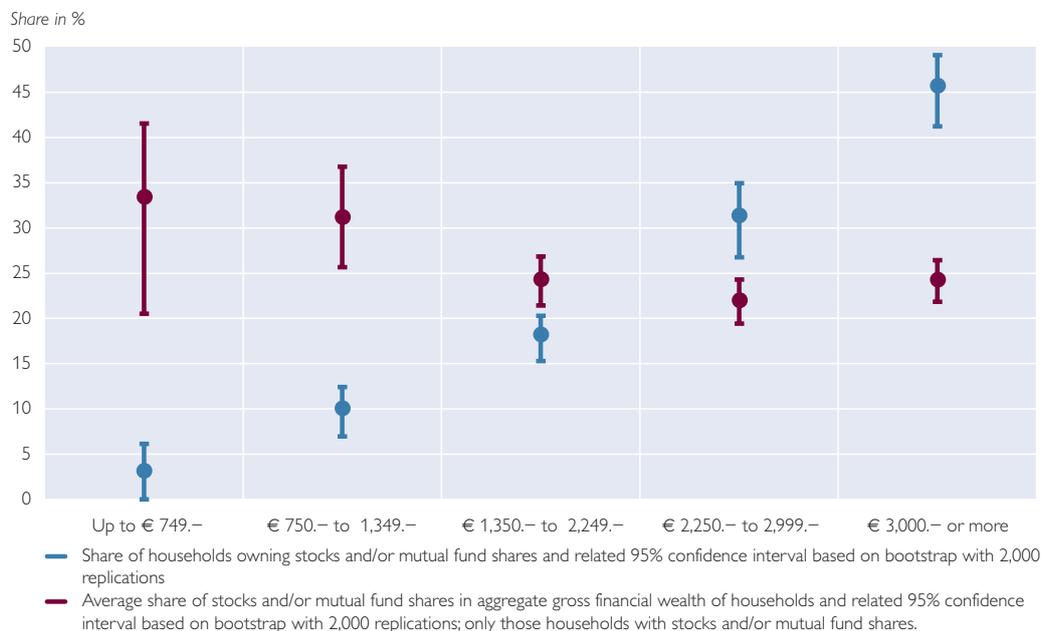**Stock and/or Mutual Fund Share Holdings by Gross Financial Wealth Decile**

Share of households owning stocks and/or mutual fund shares and related 95% confidence interval based on bootstrap with 2,000 replications (left-hand scale).

Average share of stocks and/or mutual fund shares in aggregate gross financial wealth of households and related 95% confidence interval based on bootstrap with 2,000 replications; only those households with stocks and mutual fund shares (right-hand scale).

Source: OeNB financial wealth survey of 2004.

[12] Gross financial wealth is defined as the sum of bank account holdings, savings deposits (including savings plans with building and loan associations), the value of bonds, stocks, mutual fund shares, holdings in enterprises, and aggregate premium payments for life insurance.

[13] The corresponding values – generated with the help of a bootstrap (2,000 replications) – are approximately 24% each. The bootstrap method (bias corrected) was used for charts 4 and 5 because when methods based on the assumption of the normal distribution are used to estimate very small shares this may result in confidence intervals, which contain partly negative values.

Chart 5

Stock and/or Mutual Fund Share Holdings by Net Household Income

Share in %

- ── Share of households owning stocks and/or mutual fund shares and related 95% confidence interval based on bootstrap with 2,000 replications
- ── Average share of stocks and/or mutual fund shares in aggregate gross financial wealth of households and related 95% confidence interval based on bootstrap with 2,000 replications; only those households with stocks and/or mutual fund shares.

Source: OeNB financial wealth survey of 2004.

market participation rate and the share of total assets held in capital market instruments are relatively low on an international comparison. This structure is not likely to have changed substantially since the survey was conducted in 2004.

The available international data indicate that the positive correlation between the rate of capital market participation and total asset holdings is an international phenomenon that is valid at different points in time[14] (table 2).

Table 2

Stock and/or Mutual Fund Share Holdings by Gross Financial Assets

	Quartile 1	Quartile 2	Quartile 3	Quartile 4	Top 5%	Total share
	%					
U.S.A.	4.4	38.3	66.0	86.7	93.7	48.9
United Kingdom	4.9	11.9	37.8	71.1	83.9	31.5
Netherlands	4.4	16.9	36.8	75.9	92.3	33.5
Germany	6.6	17.6	22.1	29.3	41.6	18.9
Italy	3.4	10.8	19.6	38.9	54.6	18.9
Austria	3.9	9.7	20.7	52.3	74.0	21.7

Source: U.S.A., United Kingdom, Netherlands, Germany, Italy: Guiso et al. (2002, table 1.5); Austria: OeNB financial wealth survey of 2004.

[14] *The data originated in the 1990s: U.S.A.: 1998; United Kingdom: 1997 and 1998; Netherlands: 1997; Germany: 1993; Italy: 1998. The Luxembourg Wealth Study (LWS), in which Austria also participated, supplied more current comparable data, at least for the U.S.A. and Italy. According to LWS data, the U.S.A. had a capital market participation rate of 30% in 2001 (following the burst of the dot-com bubble), and Italy reached a rate of approximately 18% in 2002.*

5 Estimate of the Wealth Effect for Austria

The theoretical foundation of the wealth channel is deeply rooted and is based on the concept that private consumption can be depicted as a function of income and wealth. This functional correlation can be derived from the permanent income hypothesis of Friedman (1957) and Muth (1960), the life cycle theory of Modigliani (Modigliani and Brumberg, 1954), and from Ando and Modigliani (1963). The saving and consumption behavior of households is thereby derived from intertemporal utility maximization.

Assuming that the subjective discount rate corresponds with the interest rate, the fundamental concept can be derived from a simple intertemporal budget constraint as described in standard textbooks (Romer, 1996):

$$\sum_{t=0}^{T} \frac{1}{(1+r)^t} C_t = W_0 \qquad (4.1)$$

with C_t referring to consumption, W_0 to total household wealth, and r to the interest rate. Household wealth is composed of A_0, the actual assets (financial and real estate assets), and H_0, human capital. For the latter variable, the literature typically assumes a cointegration relationship with labor income (Y_t).

$$W_0 = A_0 + H_0 = A_0 +$$
$$+\sum_{t=0}^{T} \frac{1}{(1+r)^t} Y_t \qquad (4.2)$$

The link between changes in wealth and changes in consumption can be derived from equations 4.1 and 4.2:

$$\Delta C_t = \left(\sum_{t=0}^{T} \frac{1}{(1+r)^t} \right)^{-1} \Delta A_0 \quad (4.3)$$

The expression on the right side of the equation represents the marginal propensity to consume out of wealth. Equation 4.3 exemplifies two important determinants of the marginal pro-pensity to consume: First of all, the duration of planning horizon T and second, the interest rate level r. In accordance with the findings of Poterba (2000), it is possible to determine theoretical values for the marginal propensity to consume out of wealth for various combinations of these factors, which can provide a rough theoretical framework for empirical studies. The findings presented in table 3 illustrate the fact that the marginal propensity to consume decreases as the planning horizon lengthens, and increases as the interest rate rises. The longer the planning horizon, the closer the marginal propensity to consume comes to the real interest rate.

The duration of the planning horizon is closely linked to life expectancy. Accordingly, retirees are expected to have a higher marginal propensity to consume out of wealth than persons who are at the start of their working lives. When bequest motives play an important role, however, the marginal propensity to consume is low. As portrayed in table 3, households experiencing an unexpected and permanent rise in wealth of 1 euro increase their consumption by between 1 cent (indefinite planning horizon and real interest rate of 1%) and 13 cent (10-year planning horizon and real interest rate of 7%).

Table 3

Theoretical Marginal Propensity to Consume

Interest rate	Planning horizon			
	10	20	40	∞
0.01	0.105	0.055	0.030	0.010
0.03	0.114	0.065	0.042	0.029
0.05	0.123	0.076	0.056	0.048
0.07	0.133	0.088	0.070	0.065

Source: Authors' calculations in accordance with Poterba (2000).

Empirical studies that work with macro data over time typically assume a common trend between consumption, wealth, and income. Gali (1990) offers a theoretical foundation for a cointegration relationship between these three variables. Following this approach, we first tested whether such a common trend between consumption, wealth, and income exists for Austrian data. The second step consisted of entering the long-run relationship thus calculated into a dynamic consumption function. As part of the OeNB's macroeconomic model (AQM, Austrian Quarterly Model), this error correction model of private consumption can be used to determine short-term and long-term wealth effects.[15] The estimation is based on the two-step procedure developed by Engle and Granger (1987).

Data on real private consumption are derived from current national accounts, and data on real disposable household income are derived from sector accounts. As there are no time series based on direct surveys that reflect the wealth of Austrian households, we use a simplifying assumption that first, allows us to construct the relevant wealth time series indirectly and second, corresponds to the AQM model logic. Assuming that households ultimately hold all of the wealth of an economy, an approximation of such wealth can be computed from the sum of the Austrian economy's total capital stock, the general government consolidated debt, and Austria's net interna-

tional investment position. Statistics Austria prepares a time series for capital stock, and data on general government consolidated debt and the net international investment position originate from Eurostat and the OeNB, respectively. This wealth assumption also corresponds to the structure of the AQM model and facilitates model closure, thus ensuring the stability of long-run simulations (Fenz and Spitzer, 2005).

Two points are worth mentioning when comparing the time series of Austrian household wealth thus computed with the data from other countries. First of all, the magnitude of the aggregate household wealth corresponds with that of comparable countries. During the observation period from Q1 1988 to Q2 2008, average wealth in Austria amounted to approximately 410% of GDP or 680% of disposable household income. Similar magnitudes were calculated for other countries (ESCB, 2004; Deutsche Bundesbank, 2007).[16] Second, on an international comparison the wealth variable for Austria is far less volatile than that of other countries. Short-term fluctuations on the equity markets play a minor role only, primarily due to the fact that data on wealth are collected indirectly via the capital stock. For this reason, fluctuations reflect permanent changes in wealth to a greater extent than is the case for comparable international studies. All variables are real indicators and adjusted for seasonal effects.

[15] The AQM model strategy follows the "neoclassical synthesis," a combination of short-term Keynesian and long-term neoclassical behavior. While the short-term model dynamics are determined empirically, the long-term dynamics follow from a neoclassical optimization framework. The process of adjusting to the theoretical equilibrium is slow. Imperfections in labor markets and goods markets prevent the economy from reverting immediately to its long-term equilibrium (see Fenz and Spitzer, 2005, for a more detailed explanation).

[16] The total assets held by households in Austria can be calculated using data from Synthesis Forschung on real estate assets and financial accounts data on financial wealth for the years from 1997 to 2002. Total assets amounted to approximately 400% of GDP in 1997 and 380% of GDP in 2002, which is very close to the average value for the asset time series computed by us.

Unit root tests[17] show that all three variables (consumption, wealth, and income) are stationary in first differences and that a cointegration relationship exists between them. When determining the functional form of the long-run relationship we follow the idea put forth by Muellbauer and Lattimore (1999). (Log) real consumer spending (lnc_t) is explained by a constant, the (log) real disposable household income (lny_t), and the ratio of real wealth (a_t) to real disposable household income. The time trend (*trend961*) depicts the rise in the saving rate since the second half of the 1990s, which cannot be explained by means of traditional consumption models. ecm_t denotes the residuals that are consequently included as an error correction term in the dynamic equation for private consumption. Pursuant to the unit root tests, the error correction term is stationary in level, confirming our assumption of a cointegration relationship between consumption, income, and wealth. Equation 4.4 illustrates the estimated results for the long-run consumption equation:

$$ln\, c_t = \underset{(-6.6)}{-0.431} + ln\, y_t + \underset{(5.4)}{0.054} \cdot \frac{a_t}{y_t} - \underset{(-17.4)}{0.001 \cdot trend\,961} + ecm_t \quad (4.4)$$

The values for the t-statistics are specified in parentheses under the variables. To the extent that changes in wealth are of a permanent nature, the effects thereof on private consumption can be calculated with the help of the above long-run equation. Accordingly, the long-term marginal propensity to consume out of wealth equals 0.05. This means that an increase in wealth of 1 euro will lead to a rise in private consumer spending of approximately 5 cent per year over the long term.[18] The results are quite sensitive to the estimation-period selected, fluctuating within a range of 3 to 8 cent. They are still statistically highly significant, however. Comparison with international analyses (section 1) shows that the results for Austria fall within the spectrum of the estimated results for other countries, though they are somewhat above the average for the continental European countries.

Over the short term, deviations from the long-run relationship estimated in equation 4.4 can occur. In the literature, adjustment costs, habit persistence, and liquidity constraints are among the primary reasons given for these deviations (Ludwig and Slok, 2002). These dynamic effects are excluded by definition from the statical analysis of the wealth effect in the long-run consumption equation. The AQM model can be used first, to estimate these dynamic effects and second, to account for feedback between the variables of the consumption equation and other model variables. The residuals of the long-run relationship are included in the following short-run consumption equation:

$$d(ln\, c_t) = \underset{-3.4}{-0.11 \cdot ecm_{t-1}} +$$

$$+ \underset{(13)}{0.76 \cdot d(ln\, c_{t-1})} + \underset{(4.4)}{0.19 \cdot d(ln\, y_{t-1})} - \quad (4.5)$$

$$- \underset{(-1.8)}{0.29 d(lti_t)} + \varepsilon_t$$

with d symbolizing first differences, lti_t the long-term interest rate as indicated by 10-year government bonds and ε_t the

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[17] *Augmented Dickey-Fuller and Phillips-Perron tests, 5% significance level.*

[18] *This figure is calculated by multiplying the coefficient for the ratio of wealth to income (0.054) by the ratio of consumption to income (0.926, which equals the long-term average over the observation period from Q1 1988 to Q2 2008).*

residuals. $d(\ln c_t)$ refers to changes in private consumption, which are explained by ecm_t (the error correction term), $d(\ln c_{t-1})$ (an autoregressive term), $d(\ln y_{t-1})$ (changes in disposable household income), and $d(lti_t)$ (changes in the long-term interest rate). Equations 4.4 and 4.5 form the consumption block of the AQM model for the following simulation.

The decrease in wealth of EUR 17 billion corresponds to approximately 1.7% of the aggregate wealth of households. While this is a substantial amount, AQM simulation results suggest only minor effects on economic growth and private consumption. After five years, the private consumption level is 0.3% below the baseline solution (table 4). The decline in real GDP of 0.1% is considerably less than the share of private consumption in total economic output would be, since a portion of the reduced consumer spending is compensated by lower imports and improved – albeit only slightly – price competitiveness.

Furthermore, these slight wealth effects only occur with a substantial lag. In the first year of the simulation (i.e. after the first four of a total of five quarters evidencing decreases in wealth), the negative effect on GDP and private consumption was still negligible.

The simulation is based on some critical assumptions, which are briefly discussed in the following. First, it was assumed that the changes in wealth were permanent. However, whether and if so, to what extent, the current changes in wealth are of a permanent nature or are assessed as permanent by consumers is very questionable. The extreme volatility of the stock markets would imply that consumers regarded neither the sharp increase in equities prices between 2003 and mid-2007 nor the following crash as being permanent. The ATX, for example, was still at the same level as at the beginning of 2004 at the time of writing. In such circumstances, any model estimate must be interpreted as representing the upper limit of the possible effects of changes in wealth on private consumption. In a survey covering the U.S.A., Lettau and Ludvigson (2004) found that 88% of all variance in net household wealth is attributable to transitory shocks. These fluctuations have an only very minor influence on the consumption behavior of households. Conventional estimates of the wealth effect are therefore in danger of overestimating this influence. However, since the wealth variable used for Austria is, by design, characterized more strongly by permanent wealth fluctuations, this does not play a great role in our estimate. The lower variance in wealth variables can also explain the somewhat stronger wealth effect in Austria compared to other countries.

Table 4

Effect on Austrian Consumption and GDP of EUR 17 billion Wealth Loss Accumulated from Q3 07 to Q3 08

	Year 1	Year 2	Year 5
	Deviation from base solution in %		
Private consumption	−0.03	−0.18	−0.30
GDP	−0.02	−0.06	−0.10

Source: Authors' calculations.

Second, we do not differentiate between real estate and financial wealth. The majority of international macro studies find a higher marginal propensity to consume out of real estate wealth than out of financial wealth. There are no data-based estimates on this for Austria. Accordingly, the wealth effect arising from stock price setbacks calculated by us would represent the upper limit. At the same time, the low depth of the real estate market, the low home ownership rate, and the high significance of bequest motives point toward a low marginal propensity to consume out of real estate wealth in Austria.

Third, the securities statistics upon which the computed decrease in equity wealth of EUR 17 million are based contain only highly liquid assets, whose price fluctuations are, in addition, very transparent for the holders. Both of these facts speak in favor of a relatively high marginal propensity to consume (Poterba, 2000, and section 1). At the same time it matters that some of the household sector's assets that are tied up in life insurance and pension funds have been invested in the stock market and are not included in the wealth statistics used in this study (section 3). Both insurance and pension fund assets, however, have long time horizons and are strongly characterized by precautionary saving motives. The propensity to consume should thus be accordingly low.

Fourth, in our linear model consumers react equally strongly to growth in wealth as to decreases in wealth. Zandi (1999) questions this symmetry assumption and emphasizes the possibility that consumers react more sensitively to decreases in prices than to price gains.

Finally, estimates of the wealth effect, such as that on Austria, do not dif-ferentiate between reasons for changes in wealth. Rather, the assumption of a constant marginal propensity to consume implicitly presumes that all changes in wealth have the same cause or that different causes trigger equally strong effects. However, it can be surmised that – for example – changes in wealth resulting from stock market bubbles trigger significantly different consumer reactions than productivity-driven changes in wealth.

6 Summary and Conclusions

Changes in asset prices, i.e. changes in real estate prices and in financial asset prices, can influence household consumption. On the whole, aggregate real estate wealth is considerably greater than financial wealth; financial wealth is usually more liquid, though. While real estate prices in Austria have hardly changed since the onset of the current financial crisis, tradable securities have experienced significant devaluation. Households and the self-employed (sector 14) lost approximately EUR 17 billion since the crisis began in the third quarter of 2007 until the third quarter of 2008. However, given that securities holdings are concentrated among the wealthier households as evidenced by micro data, potential wealth effects on consumption should be limited. Estimates based on macro data show that the marginal propensity to consume out of wealth of Austrian households is 0.05 and thus within the international average. Simulation results using a macroeconometric model indicate that the decrease in wealth of EUR 17 billion will have a relatively minor effect on private consumption and economic growth in Austria. Over a five year period, the effect is –0.3% and –0.1%, respectively. Moreover, the effect occurs only with a substantial lag.

Marked changes in wealth also present challenges for economic policy. First of all, wealth-based taxes are an important source of government revenue in many countries. In light of the positive correlation between economic activity and changes in wealth, tax revenues from capital (gains) taxes, inheritance taxes, and other wealth-based taxes are procyclical. While revenue from wealth-based taxes as a percentage of GDP has risen over the past 20 years in the U.S.A. (2006: 3.1% of GDP), in the EU-15 (2006: 2.2% of GDP), and in the OECD (2006: 2% of GDP), in Austria this figure has fallen significantly (2006: 0.6% of GDP). This means that in Austria, any changes in wealth would only have a slight fiscal impact given that revenues from wealth-based taxes are at a historical low anyway as well as being very low on an international comparison.

Second, it is important to analyze the wealth effect from a distributional policy perspective. Both national and international micro data indicate that it is the wealthier households that are most affected by the changes in prices and asset values on the capital markets due to their more frequent and greater market involvement. Accordingly, wealthier households are most likely to experience a direct wealth effect. Therefore, the direct wealth effect poses less of a challenge for economic policy since wealthier households are better able to absorb fluctuations in wealth. However, the number of households in Austria affected by fluctuations in securities prices is likely to have increased in recent years as a result of rising participation in the stock market, foreign currency bullet loans with repayment vehicles, pension funds, and private retirement plans (such as the "prämiengeförderte Zukunftsvorsorge" state-supported pension plans).

Households with no securities holdings may also be indirectly affected by changes in wealth via confidence effects. With our estimates, we were unable to distinguish between the direct wealth effect and indirect confidence effects. Empirical evidence for other countries suggests that the direct wealth effect tends to dominate indirect confidence effects. However, confidence effects could be of greater significance in the current financial crisis. Moreover, the data on which the estimates of wealth effects are based only extend back to 1988. Overall, the current unique situation can only be inadequately captured by estimate models. With respect to the direct wealth effect, this should not present a substantial problem. The lack of sufficient data could, however, lead to a considerable underestimation of indirect confidence effects. This is of significance from a distributional policy perspective, since it is precisely the less affluent households which are affected by little else than the confidence effect. Given the limited exposure of these households to the capital markets, they are hardly affected by direct valuation losses. However, they could feel any indirect effects on the real economy more than the wealthier households.

Finally, the question arises of how to react to changes in asset prices from the perspective of monetary policy.[19] Cecchetti et al. (2002) are in favor of an active monetary policy in the event of capital market aberrations. However, in practice it is difficult to say when a trend can be referred to as an aberration. Bernanke and Gertler (2001) make the case that central banks have no comparative advantage in recogniz-

[19] For a comprehensive discussion see Crespo Cuaresma and Gnan (2006).

ing aberrations and advocate ignoring fluctuations in stock prices as long as aggregate demand or inflation is not affected. However, even if one accepts the ideas of Bernanke and Gertler and additionally assumes a low marginal propensity to consume out of wealth, in view of the sheer magnitude of the recent stock market collapses in combination with the sharp increases experienced in the preceding years, it must be assumed that these developments are of the greatest relevance in terms of monetary policy.

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The Financial Crisis in 2007 and 2008 Viewed from the Perspective of Economic Research

Many economists monitored the developments that led to the financial crisis in 2007 and 2008 with concern. The course and depth of the crisis, however, came as a surprise to many. This paper discusses whether there are structural deficits in economic research which prevent a deeper analytical understanding of the current crisis. While research on specific aspects of the current crisis mechanisms and their structural causes has been pursued very actively in recent years, this research has not yet been incorporated into the mainstream of macroeconomics and finance – a fact that hinders analytical understanding of the crisis.

Martin Summer[1]

Economic research on financial markets and financial institutions has experienced a boom in the past 20 years. Many new methodological developments have inspired both theoretical and empirical research. It was also during this time that finance eventually became established as an independent field of research within economics and – not least due to the booming financial industry and its tempting job offers – gained immense popularity among talented and ambitious students and researchers. In the 1990s, methods of quantitative risk management were recognized in bank regulation. The issue of financial stability was one of the top research priorities in central banks and international organizations such as the IMF, the World Bank and the BIS.

Despite all this research activity, the crisis, which originated in the United States in July 2007 and subsequently spread unexpectedly quickly to the rest of the world, caught the profession rather off guard. The magnitude and depth of the crisis took many by surprise. It was true that economists and policymakers had worried for quite some time about global imbalances, the real estate boom and the high level of public and private debt in the United States, the lack of transparency of structured financial products as well as historically extremely low risk premiums. Concerns were frequently raised that correcting these imbalances would trigger a crisis. However, nobody foresaw the dramatic sequence of events that started in July 2007. This fact, on its own, would not be worth mentioning, since nobody – including economists – can predict the future. At the analytical level, though, our understanding of the structure of the current financial crisis has been and remains poor, which is rather alarming. Is the financial crisis 2007 and 2008 thus also a crisis of economic research? This contribution aims to explore this issue.

It is hardly possible to discuss these matters thoroughly and systematically; in any case, this would go beyond the scope of this paper: The scientific literature on financial markets is too comprehensive, too diverse and too specialized. This paper therefore employs a deliberately selective approach based

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upon the research experience of the OeNB's Economic Studies Division in the field of financial markets, financial stability and systemic risk.[2]

Section 1 discusses where theory has structural blind spots that hinder an analytical understanding of financial markets and financial crises. Section 2 examines the macroeconomic research issues, section 3 the microeconomic research issues arising from the current crisis. Section 4 highlights three current economic policy issues, and in section 5 conclusions are presented.

1 Two Structural Blind Spots in Economic Research

It would be inaccurate to claim that the economic research of the past two decades did not address financial crises, financial market risks and their impacts. In fact, quite the opposite is true, the research interest in financial market issues was tremendous. Despite this fact, blind spots can be identified in the two areas that are supposed to constitute the analytical core for understanding financial markets and financial crises – macroeconomics and finance.

First, modeling financial markets and financial institutions is just a side issue in current macroeconomics as represented in textbooks, taught at universities and discussed in academic journals.[3] Macroeconomics is, however, the very field of research which is suited to putting the study of financial markets, their risks for the real econ-

omy as well as their economic possibilities and limitations into the proper perspective. Nevertheless, the discipline that by definition adopts a systemic perspective on economics has focused only poorly on the connections between the real economy and financial markets.

Second, many areas of finance, in particular quantitative risk management,[4] are characterized by a somewhat problematic concept of financial risks that disregards the fact that financial risks arise endogenously from the collective action and the interaction of many players. The conceptual approach of many models in the field of finance treats financial risks just like the risk of the weather being good or bad tomorrow.[5] Financial risks, however, are not exogenous, as this approach suggests, but mostly endogenous. Thus the discipline that focuses on financial risks fails to contribute sufficiently to understanding the current crisis.

How did these blind spots arise? First of all, research processes are inherently slow. This is related to the fact that scientific arguments have to adhere to particularly high standards: They must have a solid theoretic foundation and also be compatible with the facts. Given that science is based on these principles, but at the same time consistently fails to meet them, many discussions continue for quite some time. Thus it happens that some issues remain unresolved for a long period of time. Macroeconomics, for instance, for a

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[2] The OeNB's Economic Studies Division has focused on these issues for some years, thus even before the current financial crisis. Other research areas of the Economic Studies Division comprise monetary policy, real macroeconomics and econometrics.

[3] It must be mentioned that from the beginning of the 1980s until the early 1990s, more comprehensive research was performed on the macroeconomic consequences of financial market imperfections in macroeconomics, as reflected above all by the work of Bernanke (1983), Bernanke and Gertler (1989, 1990), Bernanke et al. (1999) as well as Stiglitz and Weiss (1981). This research program, however, was not actively pursued afterwards.

[4] For a comprehensive treatment of the subject, see McNeil et al. (2005).

[5] This is especially true for a large amount of research work in the area of asset pricing. For a detailed overview on the theory of asset pricing common in finance, see e.g. Duffie (2002).

long time focused on reformulating the theory of how aggregate demand and output are interrelated assuming rational expectations, after the consensus on these interrelations had collapsed in the early 1970s.[6] The modern models, which emanated from this process as a new consensus, basically consist of three equations: One describes aggregate demand as a determinant of aggregate output, with demand in turn depending on expected future output and future inflation. The second describes a Phillips curve, in which inflation is determined by output as well as by anticipated future inflation. The third is a monetary policy rule according to which monetary policy can influence short-term real interest rates.[7] Recent macroeconomic literature, in particular studies on monetary policy,[8] rests almost entirely on this basic model, which does not consider the financial system.

Ignoring certain aspects of reality is, in fact, reasonable and necessary in any scientific work. Radical simplification and focusing on the essentials are precisely the features that define scientific reasoning. It is also clear that not all economic issues need to be examined with a model that explicitly accounts for financial markets. However, the fact that the mainstream discussion has neglected relationships between monetary policy, financial markets and real economic developments to such an extent has certainly contributed to a lack of analytical understanding of the current crisis, and it still does.

In the framework of this theory, inflation targeting became established as the prevailing doctrine in monetary policy. Central banks apply this adaptive monetary policy strategy when short-term interest rates deviate from target; they respond by moving interest rates in the opposite direction. The Federal Reserve System (Fed) averted a recession when it significantly lowered interest rates in response to the collapse of the stock market boom in 2001. Then it kept interest rates low for a long time because inflation remained low. These factors contributed substantially to the U.S. housing price boom as well as the events leading up to the current crisis. While the monetary policy blindness toward asset prices has been questioned repeatedly, the academic literature showed little interest in this critique.[9] Thus the blind spot in macroeconomic mainstream theory definitely had practical consequences.[10]

Where did the blind spot in finance originate? Research in both finance and risk management focuses on financial market risks, albeit in a conceptually problematic way. In grossly simplified terms, the paradigm of quantitative risk management can be described as follows: Take a portfolio of financial instruments. The value of these instruments at a given time in the future is determined by risk factors. The future development of these factors can be described using probability distribution, which can be estimated on the basis of historical data. This probability law is exogenous and not affected by

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[6] For an example of the heated debate, see Lucas and Sargent (1978).

[7] See Blanchard (2008).

[8] See the reference monograph by Woodford (2003).

[9] See Borio et al. (2003) as well as Leijonhufvud (2008).

[10] This interpretation of the U.S. housing price bubble from a monetary point of view is generally not acknowledged as such; see Caballero (2006).

actions carried out by individuals who hold the portfolios. One of the reasons for this prevailing viewpoint is the fact that finance, as a practical field, often adopts the partial perspective of a single player, an investor, a risk manager or an institution, and tries to explain how they can or should act optimally in a given environment. In doing so, the core question – how this very environment is changed by the interaction of many players – is often overlooked. Risks occurring in financial systems are thus not likely to be captured, as they in fact arise from the mutual influence of individuals and institutions and their interaction with the environment – they are endogenous.[11] This is a key aspect of financial market risks, particularly in a time of crisis. Models ignoring this problem are thus not well suited for contributing to our understanding of a crisis such as that which began in July 2007.

This adverse overlapping of blind spots – no financial stability analysis in macroeconomics on the one hand, hardly any equilibrium relationships in financial market research on the other – is also reflected in the internal organization of responsibilities and the research structure within central banks. Monetary policy and financial stability can typically be found in separate departments, each of which use models where blind spots are found in precisely those areas which should be thoroughly analyzed in view of the current situation.

A second structural problem of academic research on financial markets can be identified in banking research literature, which has been influenced since the 1990s by methodological impulses from microeconomics and the theory of asymmetric information.[12] The models used in this literature rely almost exclusively on partial models of individual institutions. Hence, they are inherently unsuited to providing research answers to those issues of the current crisis which result from the interaction of many institutions.[13]

In principle, these structural problems could be resolved by a reorientation of the individual research programs. A tendency toward such a redirection is in fact expected to arise. There have always been individual researchers who have been critical of the previously discussed shortcomings and who may now have a higher weight in the discussion.

A third structural problem may be more difficult or even impossible to resolve. While science and research are inherently slow, the reality of business life, in particular the reality of a booming financial system, is inherently fast, volatile. It is certainly true that researchers were not very familiar with financial innovations in the field of credit derivatives and structured financial products. Conversely, risk managers and finance experts possessed highly detailed knowledge that was, however, not suitable for understanding the systemic issues involved in these products. From the viewpoint of the above-mentioned risk concept, these products appeared to be no more than an additional, albeit more complex version of derivatives. Thus the blind spot regarding the concept of risk truly had repercussions. Most economists contented themselves with citing the benefits of

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[11] See Shin (2008).

[12] See Freixas and Rochet (1997), Greenbaum and Thakor (1995) as well as Dewatripont and Tirole (1994).

[13] See Summer (2003).

additional options for the distribution of aggregate risks derived from abstract allocation theory without studying the instruments in detail. Now we know that aggregate risks were by no means distributed but remained in the financial system. On the whole, academic expertise on financial innovation certainly lagged behind practical knowledge.

2 Macroeconomics and Financial Markets − A Research Program in Need of A Fresh Start

The current financial crisis clearly shows that a deeper analytical understanding of the role of financial institutions in macroeconomics, their business policy as well as their risk and accounting management is of major importance. While in the early 1990s numerous studies set out to address this classic issue with new methodological approaches, an integration of these insights into a macroeconomic mainstream model is not yet in the offing. The research program initiated 20 years ago by Bernanke, Gertler, Gilchrist, Stiglitz, Weiss and others requires new ideas.

The following passage from Charles Kindleberger's seminal work "A Financial History of Western Europe" clearly expresses several factors that impede integration of the role of financial institutions into current macro models:

"… *Modern economic theory tends to ignore price changes on the ground that while a change in price produces a gain or loss for one set of economic actors, it simultaneously results in offsetting loss or gain for another. On this score, to worry about prices and price levels is "money illusion", mistaking nominal money values for real values. This fails to take account of dyna-*

mic effects of two kinds. From a monetary viewpoint, price increases and decreases stimulate bank expansion and contraction, respectively, and produce macroeconomic change. When price declines lead to bankruptcy, moreover that bankruptcy spreads through the system in cumulating fashion with results that are not offset elsewhere. In the second place, while one group gains and another loses from price changes, awareness of gain and loss is not likely to be simultaneous or to fall on groups that are identical in behaviour. On both accounts, the results of price changes are unlikely to be offsetting. In financial crises merchants and producers whose prices are falling are painfully conscious of losses and cut their spending well before consumers have become conscious of gains in real income and increase their spending …"[14]

The transmission of monetary policy through the banking system – an issue approached in the research program by Bernanke and others but not pursued any further – is of major significance in the quoted passage. While this relationship was always in the focus of older macroeconomic research, the combination of financial intermediaries and developed, modern capital markets shed new light on these interrelations. This requires new research approaches.

Adrian and Shin (2008a), for instance, illustrate how the business model of (former) investment banks combined with modern quantitative risk management at the level of individual institutions not only acted as an extreme cyclical amplifier but also generated a structural demand pull for new asset classes, thus contributing to the U.S. subprime boom.

Adrian and Shin (2008a) observed that large investment banks managed

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[14] Kindleberger (1993, p. 271).

the capital structure of their balance sheets in such a way that there is a positive one-to-one relation between asset growth and leverage. This implies a capital structure theory that is in contrast to a world where the size of the balance sheet (the selection of projects) is separated from the financing decision. The data seem to suggest a situation where equity grows at an exogenous rate, while total assets and leverage move up simultaneously when perceived risk is low and move down when perceived risk is high. This collective behavior fuels boom and bust cycles because it implies that banks react to increases in asset prices by buying more assets and to decreases in prices by selling assets. Procyclical leverage therefore implies that banks have an increasing demand curve and a decreasing supply curve for risky assets. It is obvious that a model where the financial sector as a whole behaves in this way results in direct feedback between monetary policy, banks' balance sheets and the real economy.[15]

Kindleberger (1993), in the passage quoted above, addresses bankruptcy, its spread across the financial system and its impact on the real economy. Research on the macroeconomic consequences of bankruptcy is not plentiful and so far has been more deeply analyzed rather in peripheral fields of economic theory only. At a practical level, it is clear why the insolvency of important financial intermediaries leads to severe problems. When a bank goes bankrupt, claims by shareholders and debtholders have to be reassessed.

If, during this process, the bank's operations are interrupted for too long, intermediation does not take place and investment opportunities cannot be financed. This financial sector event thus has a knock-on effect on the real economy. At a theoretical level, though, it is very difficult to illustrate and analyze insolvency and bankruptcy in current models. To date, progress in this area has been made mainly in the framework of the general equilibrium theory.[16] The reason why these models have not been successfully integrated into the mainstream macroeconomic literature certainly also lies in the fact that they are formulated at such a level of abstraction as to allow for only limited results – apart from general statements about the existence of equilibrium – and thus for only very general statements about efficiency.[17]

Another aspect discussed by Kindleberger (1993) is the role of heterogeneity. The quoted passage addresses the asynchronous reaction of producers and consumers to price changes. Heterogeneity, however, is of significant importance in much broader economic contexts. Much of modern macroeconomic theory is based on ignoring this very fact, instead concentrating on models assuming a representative consumer. This reduces the chances of truly understanding financial markets and financial crises. The confines of the representative consumer model likely account for the fact that modern macroeconomics in the field of financial markets and financial systems have

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[15] *For a detailed discussion on the relevant interrelations, see Adrian and Shin (2008b).*

[16] *See Dubey et al. (2005).*

[17] *Another reason might be the fact that the core problem of the impacts of insolvency and bankruptcy on the real economy is analyzed from a different point of view than that of an operational standstill of companies during bankruptcy proceedings. The literature has mainly examined the impacts of bankruptcy on risk allocation, and is based on the assumption that bankruptcy proceedings occur without friction.*

hardly developed beyond a relatively specialized asset pricing theory.[18]

New impetus for a macroeconomic research program which targets financial markets could arise from a thriving modern literature, literature which has developed largely at the margin of current macroeconomic literature but still presents many interesting interfaces.[19]

The current research on liquidity and crisis dynamics is a case in point. One important study in this literature, Brunnermeier and Pedersen (2008), focuses on the interaction of funding liquidity (i.e. the ease with which traders can borrow funds) and market liquidity (i.e. the ease with which they can obtain funding by liquidating assets). This interaction may set off a self-reinforcing mechanism that leads up to a liquidity crisis – as clearly evidenced by the current crisis: It was triggered by a decline in U.S. housing prices in a situation when many large and highly leveraged financial institutions had a large exposure to this market. As a consequence, the banking sector faced massive writedowns and a sharp contraction of funding liquidity. Financial institutions focused on deleveraging by selling assets, hoarding money or introducing more stringent risk management provisions. When the interbank market came under pressure as many financial institutions attempted to deleverage at the same time, the funding liquidity problem spread beyond the banking sector and led to a market liquidity crisis that affected all asset classes around the world.

Brunnermeier and Pedersen (2008), in a similar vein as Morris and Shin (2008), show that it is misleading to think of liquidity as a given stock of available funding that is allocated within a financial system. When liquidity dries up, it literally disappears from the system rather than being reallocated. Tighter funding conditions cause balance sheets to shrink simultaneously, and credit institutions are generally less willing to extend loans. Kyotaki and Moore (2008) combine modern liquidity theory with a macroeconomic analysis of monetary policy and the business cycle.

Current research on systemic risk also focuses on crisis amplification effects that are caused by structural characteristics of the financial system. Korinek (2008) examines these interrelations in a remarkable paper and finds that the structural problem lies in an externality that arises from market participants failing to consider that their individual financing decisions may set off liquidity spirals as described in the model of Brunnermeier and Pedersen. Thus, market participants undervalue the benefits of liquidity and take on excessive systemic risks in their financing and investment decisions.

Numerous recent contributions to the banking literature, especially those by Diamond and Rajan (2000, 2001, 2005 and 2006), and studies from the literature on public and private information in asset pricing[20] offer various insights that are directly relevant for research that combines a focus on financial markets and macroeconomics. There are, in fact, many approaches and ideas worth developing further, and such research activities may be expected to receive a new impetus from the current crisis.

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[18] *See Magill and Quinzii (1996, section 3, p. 16).*

[19] *The OeNB hosted a research workshop where some recent interesting studies in this field were presented and discussed. For a summary of this workshop entitled "The Economics of Financial Stability", see Summer (2008).*

[20] *Morris and Shin (2002), Angeletos and Werning (2006).*

3 Microeconomics and Financial Markets: Why Banking Research Needs to Focus More on the Interaction between Banks

Over the past ten years, the banking literature has probably made the most active contribution to the scientific debate on the banking system, its risk-bearing capacity, its optimal institutional design and its functions. This literature was strongly inspired by methodological advances in microeconomics, information economics and game theory.

What the numerous contributions have in common is that they focus on individual institutions with their internal incentive problems between the different investor groups of a bank, between the bank and its debtors, and between the bank's management and its owners.[21] The same approach was adopted by financial regulators. Modern financial regulation, as laid down in the Basel standards,[22] concentrates on the regulatory capital buffer of individual institutions. The size of this buffer has to be sufficient to absorb most of the risk taken on the asset side of the individual institutions. The hope is that safeguarding the solvency of each institution will also ensure systemic stability.

A simple example[23] shows, however, that safeguarding the soundness of an individual institution may very well conflict with the interests of systemic stability: Let us assume that bank 1 borrows from bank 2, and that bank 2 incurs credit losses from other assets it holds. This does not affect the credit-worthiness of bank 1 but cuts into the capital of bank 2. As a result, bank 2 (in line with banking regulation focusing

on individual institutions) has to reduce its exposure and the size of its balance sheet. It will do so by lowering the volume of loans it extends, thus limiting the funding options of bank 1. If bank 1 has no alternative sources of funding, it has to reduce its assets, too, by either extending fewer loans or by selling assets. Given a combination of three conditions, the risk-adequate behavior by bank 2 in line with prudential supervision standards is equivalent to a bank run from the perspective of bank 1: if bank 1 has no alternative sources of funding, bank 2 reduces its exposure by a sufficiently large amount and the assets of bank 1 are illiquid. During the crisis in 2007 and 2008, the cases of Bear Stearns and Northern Rock were, in fact, characterized by certain elements of this simple logic. It is therefore entirely conceivable that measures safeguarding the soundness of individual institutions may jeopardize the stability of other institutions and undermine systemic stability.

In addition, a bank's assets may meet all regulatory capital requirements but still carry a large potential for instability from a systemic perspective. The following example was again taken from Morris and Shin (2008). This time, the system includes three banks. Bank 1 holds mortgage-backed securities and funds these assets by pledging them in overnight repos with bank 2: Bank 1 sells the securities to bank 2 and agrees to repurchase them at a specified price on the next day. This transaction is repeated at the end of each day. The repo is on the liability side of the balance sheet of bank 1, and a reverse repo is on the asset side of the balance sheet of bank 2. Bank 2 funds the loan it

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[21] *See Freixas and Rochet (1997).*

[22] *Basel Committee on Banking Supervision (2005).*

[23] *This example was taken from Morris and Shin (2008).*

extends to bank 1 by pledging the same securities in a repo with bank 3.

From the perspective of bank 2, its assets are extremely safe. On the one hand, risk is limited by the short-term nature of the transaction, while on the other hand, the loan is fully collateralized (provided that the haircut is sufficiently large). Bank 2 incurs no credit risk vis-à-vis bank 1. In addition, it does not incur any maturity risk, because the asset and liability items have matching maturities. Bank 2 is free to reduce the size of its balance sheet flexibly, if circumstances require. It can diminish its asset exposure by reducing the value of the reverse repo with bank 1. It can also react to a withdrawal of funding: If bank 3 does not renew the repos, bank 2 can suspend the reverse repo with bank 1. Viewed from this perspective, bank 2 is in a very secure position and its required minimum capital in line with Basel standards would be low. Bank 2 can attain a high leverage ratio. From a systemic perspective, the assets of bank 2 are extremely relevant, however, as they correspond to the liabilities of bank 1. If the assets of bank 1 are illiquid, a reduction in the exposure of bank 2 would have severe consequences. If the repo transaction is no longer renewed, bank 1 is forced to sell the mortgage-backed securities (provided that it cannot use alternative sources of funding). The assets of bank 2 are thus highly important in terms of systemic stability, even though they are fully secured from the perspective of the individual bank.

During the financial crisis in 2007 and 2008, such effects materialized especially clearly in the interaction of banks and capital markets. The systemic impact of collateralized credit opera-

tions is particularly strong when the haircuts on repo transactions fluctuate in response to market conditions, because the haircut determines the maximum permissible leverage ratio of a credit institution.

The following example from Morris and Shin (2008) illustrates this connection. Bank 1 has to pay a haircut of 2% on a repo transaction, which means it must pledge securities worth EUR 100 to borrow EUR 98. In other words, to hold securities worth EUR 100, the bank has to come up with EUR 2 of equity. The maximum leverage is 50. If the haircut rises to 4%, the maximum leverage halves to 25. As a consequence, bank 1 has to either raise new equity so that its equity doubles from the previous level, or it must sell half its assets, or some combination of both. Both transactions are difficult in times of crisis and increase systemic stress. According to Adrian and Shin (2008a), a strong empirical link exists between leverage and the willingness to extend loans. They show that large investment banks adjust their leverage by expanding their balance sheets during economic upturns and shrinking them during downturns, thus contributing substantially to the amplification mechanism of boom-bust cycles. An ironic paradox of the current crisis lies in the fact that modern risk management methods, which are even reflected in banking regulation as a result of the Basel process, play an important role in the amplification mechanism, thus further underscoring the need to adopt a systemic perspective in banking research.[24]

The crisis in 2007 and 2008 revealed a weakness in recent research work on systemic risk that received

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[24] See Danielson and Shin (2003), Danielson et al. (2004), Shin (2008).

particular attention from central banks.[25] This strand of the literature highlights the need to adopt a systemic perspective for assessing the risk-bearing capacity of a banking system. It focuses on quantifying balance sheet domino effects that arise from a shock on the assets of a banking system. The modeling strategy of this literature relied on generalizing quantitative risk management approaches from one institution to a system of institutions. A consistent finding of these studies was that only implausibly severe shocks to bank assets would trigger significant domino effects. The experience of the current crisis has shown that an assessment of a banking system's risk-bearing capacity based on balance sheet mechanics alone fails to consider highly relevant shock amplification mechanisms. A crisis like the current one is inconceivable in a model that does not capture the behavior of banks and their balance sheet and exposure management. The financial crisis in 2007 and 2008 clearly shows that we should focus on explaining structures that amplify shocks. A total direct loss on subprime mortgages of between USD 500 billion and USD 1,500 billion would still roughly equal the loss caused by a normal swing in stock prices: A mere 2% movement in the U.S. stock index triggered a loss of more than USD 500 billion.[26] To understand the dimensions of the current crisis, we need to comprehend the amplification mechanisms that drive up losses.

The connection to the questions discussed in section 1 is obvious if we acknowledge the interaction between banks and between banks and capital markets. To date, many insights and promising approaches exist also from a microeconomic perspective. It will probably require additional substantial effort to draw meaningful conclusions from these findings for economic policy.

4 Some Policy Issues

In a contribution like this, it seems logical to organize the discussion along the "blind spots" of banking research. Still, some insights from financial market research are helpful as points of reference for the current economic policy discussion. In the following, we will briefly highlight three issues — again selectively and not systematically — that have played a role in the public debate of the past weeks and months: Should short selling be prohibited? Would a tax on financial transactions help mitigate this or future crises? How should a bank bailout package be designed?

4.1 Should Short Selling Be Prohibited?

In the course of 2007, the supervisory authorities of numerous countries restricted or even prohibited the short selling of stocks in reaction to plunging stock markets and especially to plummeting bank stocks. Short selling means that investors borrow securities in the hope that their market price will drop and then sell them. Later, they buy the securities back at the current (lower) market price and return them to the lender. By restricting short selling, the authorities attempted to stabilize the markets and prevent investors from speculating on falling stock prices. This measure, which was implemented in many countries around the world, is

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[25] *See Elsinger et al. (2006) and Upper (2007).*

[26] *See Diamond (2008).*

basically meant to support bank stock prices. Unsurprisingly, it was ineffective in stabilizing prices in the short run. After all, investors can simply imitate the strategy employed in short selling stocks on derivatives markets.[27] To prevent investors from speculating on falling prices, the authorities would have to prohibit short selling of stocks, while at the same time shutting down derivatives markets. The economic costs of doing that would be substantial, however.

From the perspective of economic research, imposing restrictions on short selling is questionable for two reasons: It impedes the efficient allocation of aggregated risks, and it reduces market liquidity. These are not merely academic statements – if short selling were generally prohibited, all markets for derivatives (futures, forwards, options, swaps, etc.) would cease to exist. But these markets make it possible to efficiently distribute aggregate risks (e.g. the risk of commodity price fluctuations, exchange rate variations and interest rate changes) among many individuals at a low cost. Investors have to be able to engage also in speculative transactions (both on rising and falling prices) for such risk transfers to be made on organized markets (i.e. at a low cost). Otherwise, what is now a competitive market would become a matching mechanism, which would be significantly more difficult and complex to handle. The liquidity that is created by permitting speculative transactions also simplifies pricing. During a

boom, a ban on short selling stocks would have a destabilizing effect, as those market participants who believe that certain stocks are overvalued would not be able to take this into account in their investment decisions. This is why prohibiting short selling is probably a bad idea; in addition, it would not solve the current problem with funding liquidity.

Still, permitting short selling in a market that is characterized by substantial market power can lead to serious problems that need to be remedied with regulatory measures.[28] In that case, however, it makes more sense to address the market power problem directly.[29] Permitting short selling in a functioning competitive financial market has considerable economic benefits: It makes it possible to transfer aggregated risk at a low cost and makes it easier to price securities.[30]

4.2 Would a Tax on Financial Transactions Help Mitigate This or a Future Crisis?

The introduction of a tax on financial transactions has featured time and again in the public debate and in economic research. It was seen as a possible measure to deescalate crisis dynamics or even prevent crises from occurring. The debate centers on whether financial markets are characterized by excessive (as opposed to economically optimal) transaction volumes that lead to excessive price volatility, thus destabilizing markets and contributing to financial crisis.[31] So far, no definitive

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[27] For instance, by buying a put option on the stock.

[28] See Brunnermeier and Pedersen (2005).

[29] Interestingly, while there is extensive industrial economics literature that empirically examines the issue of market power in product markets, similar research hardly exists for financial markets. It would be important to know whether or not the requirements for effective competition are fulfilled in these markets so as to assess whether the theoretical advantages of a competitive market can actually be utilized.

[30] See Shiller (1993).

position has been reached in the literature, but the majority of contributions by researchers in the field of market microstructure, asset pricing and international finance[32] indicate that a tax on financial transactions would increase price volatility und restrict market liquidity, which would have further indirect effects (up to and including effects on the financing costs of enterprises).

The analyses by Adrian and Shin (2008a), Morris and Shin (2008), Brunnermeier and Pedersen (2008), and others mentioned above identify four main factors that caused the financial system *as a whole* to accumulate an extremely high exposure to long-term illiquid assets (the U.S. mortgage market) that were mainly funded with extremely short-term capital market instruments and thus led to the crisis: structural incentive problems in the business model of investment banks, new credit risk transfer instruments, modern risk management focusing on individual institutions, and the Fed's easy monetary policy. The self-reinforcing processes observed in the unfolding of the crisis (money market freeze and extreme volatility across all asset classes) are therefore rather consequences than causes of the crisis. A tax on financial transactions, even if it had the beneficial effects assumed by its advocates, would at best mitigate a crisis symptom (enormous asset price volatility); it would certainly not resolve the crisis itself. If, however, the opponents of the tax are correct, it would further aggravate the tight liquidity situation.

4.3 How Should a Banking System Be Recapitalized?

What started out as a liquidity crisis in 2007 and 2008 quickly developed into a capital crisis affecting banking sectors on a global scale. To prevent the possible collapse of bank intermediation and thus a stop to lending and financing for households and enterprises, the EU Member States – following a similar initiative by the U.S.A. – launched bank rescue packages that included state guarantees on bank debt on the one hand, and recapitalization options funded by tax money on the other. A collapse of intermediation would imply enormous economic costs and would have unforeseeable short- and long-term economic, social and political consequences. Therefore, it is only sensible to take measures to prevent such a collapse. Most economists agree that a recapitalization program for the banking sector, in tandem with other measures that help revive intermediation, is in order in the current situation. Opinions are quite strongly divided about the details, however: What should this program include to make it fair and transparent and to factor in long-term consequences? The original version of the U.S. bank bailout plan, the Paulson Plan, named after U.S. Treasury Secretary Henry Paulson, for instance, was

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[31] *The public debate is also driven by other arguments: Critics maintain that financial markets only redistribute existing wealth, but that these transfers do not generate economic benefits. While individuals can get rich this way, they argue, society as a whole loses out, as enormous resources are tied up unproductively. This argument is largely neglected in the academic discussion about taxes on financial transactions, because it is based on a misconception about the function of financial markets and especially about the public benefits generated by enabling risk transfer.*

[32] *See Habermeier and Kirilenko (2003).*

widely rejected by economists from academia.[33]

One of the reasons banks and other financial institutions find it difficult or even impossible to obtain funding on the market lies in the fact that the private sector does not know how to estimate the current value of assets in which it acquires a stake. The public sector faces a similar valuation problem: Civil servants and politicians do not know either on what conditions they can reasonably provide banks with capital. The fact that the negotiations are conducted with bankers who stand to lose a lot also personally makes it exceedingly difficult to achieve tax-payer-friendly negotiation results.

At the same time, the process of determining how to distribute the assets of an insolvent bank in bank-ruptcy proceedings is time-consuming and may take years, a time during which this bank cannot fulfill its inter-mediation function. Letting intermedi-ation collapse on a large scale, even for a short period of time, is not an option for the reasons mentioned above. If it were possible, however, to clarify all claims immediately in the wake of a bank insolvency, insolvency would not pose a danger to the economy.[34]

Some insights from economic research on bankruptcy law suggest that facilitating an efficient and quick renegotiation of claims might be an alternative approach to recapitalizing the banking sector.[35]

The core idea is to create a type of standardized bankruptcy procedure that would allow banks to quickly reor-ganize their capital structure and resume lending. A standardized procedure would thus replace time-consuming structured negotiations between inves-tors. Under this approach, the equity held by a bank's current stockholders would become worthless and the bank's existing debt would be transformed into equity. This would immediately recapitalize the bank and allow it to resume lending. To avoid the de facto expropriation of current shareholders in this type of debt-to-equity swaps, Bebchuk (1988) suggests giving them a purchase option on their stock. Those who believe that the bank is actually solvent can pay their share of debt and thus regain their share of the bank's equity.

This approach, which is outlined only briefly in this contribution, has three advantages. First, banks are recapitalized at no cost to taxpayers. Second, the public sector does not have to solve the (difficult to impossible) valuation problem. The transformation of debt into equity does not affect its total value; it only changes the legal nature of the claim. And third, with this solution, the public sector would not have to decide which banks should survive and which ones should fail.

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[33] See e.g. the letter drafted on the initiative of Luigi Zingales, Paola Sapienza, Anil Kashyap and Robert Shimer that was sent to Congress and the Senate on September 24, 2008. It can be downloaded from http://faculty. chicagogsb.edu/john.cochrane/research/Papers/mortgage_protest.htm. See also the special issue of The Econo-mists' Voice, Vol. 5, of September 2008. Both address the original version of the Paulson Plan, which has been modified substantially in the meantime. See Veronesi and Zingales (2008) for a critique of the current plan.

[34] For an economic discussion of bankruptcy law, see Hart (1999).

[35] See Zingales (2008).

5 Conclusions

The current crisis highlights some structural weaknesses in economic models, especially in the fields of macroeconomics and finance. At the same time, we also find that the literature on financial crises – which has become quite extensive and varied in recent years – offers some useful insights into the nature of this crisis and its structural characteristics. Integrating these insights into the mainstream of macroeconomics and finance seems to be the logical next step; attempts to do so will certainly be considered more relevant and important than before the unfolding of the crisis. In this sense, academic research will probably even benefit from the financial crisis 2007 and 2008, as it has raised numerous complex and topical issues.

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Analyses

Crude Oil Prices and the USD/EUR Exchange Rate

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Jesús Crespo
Cuaresma[1]

This paper investigates the impact of changes in the U.S. dollar/euro exchange rate on crude oil prices. The negative correlation of these two variables is ascribed to five possible channels: on the supply side, the purchasing power of oil export revenues and on the demand side, local prices in non-U.S. dollar regions, investments in crude oil-related asset markets, the monetary policy regime in oil-exporting countries and the efficiency of the currency market. We give evidence that using information on the U.S. dollar/euro exchange rate (and its determinants) significantly improves oil price forecasts. We discuss the possible implications these results might suggest with regard to the stabilization of oil prices or the adjustment of global imbalances.

Due to the recent oil price shock, economists have increasingly devoted their efforts to the analysis of energy markets. Similarly, the continuous build-up of global imbalances keeps raising economists' interest in exchange rate issues. Despite these co-occurring events, little attention has been paid to the relation between oil prices and exchange rates. Only few economists have shown an active interest in the following question: Is it just a coincidence that crude oil prices have been soaring while, simultaneously, the U.S. dollar has depreciated to reach a record low (and vice versa)?

In this study we analyze the information content of the USD/EUR exchange rate for forecasting oil prices, using monthly data from 1983 to 2006. In particular, we analyze whether including information on the exchange rate and its determinants in simple time series models of the oil price improves the models' predictive power. The effects found here may also be reflecting indirect effects of other economic variables which are captured through the evolution of the exchange rate.

Five possible channels of the negative relation between the U.S. dollar and crude oil prices can be put forward: a purchasing power channel, a local price channel, an investment channel, a monetary policy channel and a currency market channel. These five channels can be derived from the following five hypotheses: First, oil-exporting countries aim to stabilize the purchasing power of their (U.S. dollar) export revenues in terms of their (predominately euro-denominated and not U.S. dollar-denominated) imports. Second, the U.S. dollar's depreciation makes oil less expensive for consumers in non-U.S. dollar regions (in local currency), thereby increasing their crude oil demand, which eventually causes adjustments in the oil price denominated in U.S. dollars. Third, a falling U.S. dollar reduces the returns on U.S. dollar-denominated financial assets in foreign currencies, increasing the attractiveness of oil and other commodities as a

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class of alternative assets to foreign investors. Commodity assets also serve as a hedge against inflation, since the U.S. dollar's depreciation raises the risk of inflationary pressures in the United States. Fourth, the U.S. dollar's depreciation entails monetary easing elsewhere, including in oil-producing countries with currencies pegged to the U.S. dollar. In turn, lower interest rates increase liquidity, thereby stimulating demand, including demand for oil. Fifth, foreign exchange markets are possibly more efficient than oil markets and hence anticipate developments in the real economy that affect the demand for and supply of oil.

Apart from the obvious motivation of enlarging our understanding of oil markets and improving oil price forecasts, there are also a number of pertinent economic debates related to this research path. One hotly debated issue, for instance, is the contribution of oil-exporting countries to persistent global imbalances. The surge in oil prices since the end of the 1990s has led to rising current account surpluses of oil-exporting countries that outpace those of Asian emerging economies and whose levels correspond to a large extent to U.S. current account deficits. As a consequence, the U.S. Treasury suggested that *"oil exporters should consider the role that the choice of foreign exchange regime can play in the adjustment process"* (McCown et al., 2006). The IMF concludes from this debate that *"[h]igher spending [of oil-producing countries] … would help … contribute to reducing global imbalances"* (IMF, 2006, p. 81). Given that oil exporters import (industrial) goods and services predominantly and increasingly from Europe and Asia rather than the U.S.A. (e.g. Ruiz-Perez and Vilarrubia, 2006) and diversify their investment away from U.S. dollar-denominated assets (BIS,

2006), it is not obvious that this recommendation will have an impact. Indeed, it is usually argued that petro-dollar recycling may have exacerbated global imbalances as it may have alleviated the dampening effect of the current oil price shock on European growth (European Commission, 2006). Furthermore, the impact of oil prices on Europe has already been moderated by the appreciation of its currencies – in particular of the euro – vis-à-vis the U.S. dollar. All in all, this did not sufficiently curb European oil demand; oil prices continued to rise and contributed further to unbalanced current account deficits in the U.S.A.

This contribution is also related to the research agenda on the connection between commodity prices, currencies and their fundamentals. Chen et al. (2008) successfully forecast commodity prices with the use of exchange rates of important "commodity currencies," i.e. of economies with floating exchange rates and a substantial share of commodities in their exports. The explanation to this nexus provided by Chen et al. (2008) relates to the fact that commodity currencies embody important information about future commodity price movements, while commodity markets are less forward-looking. In this sense our paper can be seen as an extension to the approach on non-commodity currencies adopted by Chen et al. (2008), while at the same time presenting complementary explanations to that approach.

This paper is organized as follows. Section 1 shows some stylized facts about the historical development of the main bilateral exchange rates to the U.S. dollar and of crude oil prices. Section 2 introduces a review of the theoretical and empirical literature on the link between these variables and discusses the five hypotheses on the pre-

sumed negative (causal) relationship between exchange rates and oil markets. In section 3 we present our forecasting exercise; section 4 concludes.

1 A Short Contemporary History of Oil Prices and the U.S. Dollar Exchange Rate

In post-war economic history (1950 to 2007) we can roughly distinguish four periods in the relationship between oil prices and the (synthetic) USD/EUR exchange rate. Chart 1 shows annual time series of U.S. crude oil import prices and nominal USD/EUR exchange rates (a synthetic euro is used for the period prior to 1999 while for the period prior to 1978, the Deutsche mark is converted into synthetic euro).

The four different periods are easily discernable by the two variables' varying volatility and their degree of co-movement. Interestingly, these periods coincide with important regime shifts in both oil and money markets. The distinction of the periods is also reflected by changing correlations between crude oil prices and nominal USD/EUR exchange rates (table 1). While the

whole sample of data yields a correlation coefficient of -0.64, both sign and size of this correlation vary quite substantially across the four different periods – a result which is also confirmed by rolling correlation exercises.

The first period under observation (1950 to 1970) coincides with the Bretton Woods system of fixed exchange rates, which was introduced in 1946. The commitment to maintain a fixed conversion rate of the U.S. dollar to gold created a *world dollar standard* (McKinnon, 2005), i.e. all other exchange rates were anchored to the (gold) dollar. During this *golden age* (Marglin and Schor, 1990) of low inflation, low interest rates and high growth, crude oil prices remained remarkably stable and low. The price formation process took place under the control of the so-called *Seven Sisters*, i.e. the seven international oil companies that dominated mid-20th century oil production, refinement and distribution.

This period of extraordinary stability was followed by an episode of rupture between 1971 and 1984, which is usually associated with the first and second oil price shocks of 1973 and

Chart 1

USD Exchange Rate and Crude Oil Prices 1950 to 2007 (annual change)
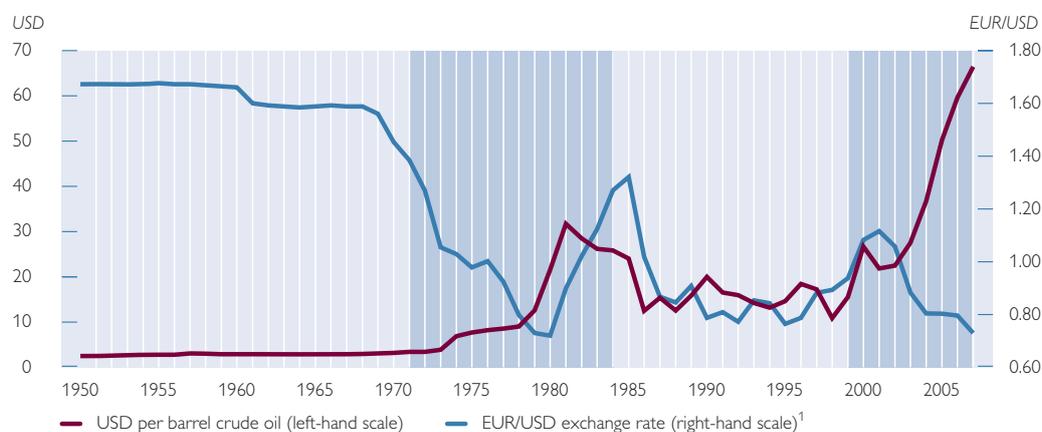
Source: EIA, BIS, Bloomberg, www.history.ucsb.edu.

[1] Before 1978: synthetic EUR values (converted DEM).

Four Periods of Correlation between U.S. Dollar Exchange Rates and Oil Prices

Period	Time spread	Key element	Volatility	Correlation
1	1950 to 1970	Bretton Woods System	low	−0.62
2	1971 to 1984	Oil supply shocks I and II	high	−0.18
3	1985 to 1998	OPEC collapse	medium	+0.44
4	1999 to 2007	Emerging market demand and tight supply	high	−0.80

Source: OeNB.

1979, respectively. The so-called *Nixon shock* (e.g. Kuroda, 2004) had occurred on August 15, 1971, i.e. even before the first oil price shock, when U.S. president Richard Nixon announced the discontinuation of gold convertibility of the U.S. dollar given the deteriorating U.S. balance of payments. This move resulted in a steep depreciation of the value of the U.S. dollar against gold and many other currencies, notably the Deutsche mark and the Japanese yen. Since oil was invoiced in U.S. dollars, this implied that oil producers were receiving fewer revenues at the same price of oil. The Organization of the Oil Exporting Countries (OPEC) was initially slow in adjusting oil prices to reflect the U.S. dollar's depreciation. Only two years later, during the Yom Kippur War, OPEC cut its oil production and placed an embargo on shipments of crude oil to the West. As a result the oil price had quadrupled by 1974, reaching USD 12 per barrel. The second oil crisis occurred in the wake of the Iranian Revolution, which temporarily shattered oil production in the country. The subsequent market panic and a phased decontrol of oil prices by the Carter administration triggered another boost of crude oil prices over the next 12 months, with prices going up to almost USD 40 per barrel. Subsequently, oil prices moderated slightly despite the ongoing *war between Iran and Iraq*, but remained at a high level. In parallel, the U.S. dollar started to regain strength due to the so-called *Volcker shock*. By limiting money supply and abandoning interest rate targets, the chairman of the Federal Reserve System, Paul Volcker, successfully trimmed down inflation by more than 10 percentage points in two years – a measure which entailed a significant recession, however. The negative correlation between the U.S. dollar exchange rate and the crude oil price can be observed until 1985.

Between 1985 and 1998 the correlation between U.S. dollar exchange rates and oil prices diminished in absolute terms, while both remained remarkably stable (Krichene, 2006). This period was characterized by the collapse of the oil price and a weak U.S. dollar following the *Plaza Accord* concluded by five G-7 countries. Important changes took place in the OPEC which affected its power to exert influence on the oil market. In August 1985, Saudi Arabia gave up its swing producer strategy (which had involved occasional production cuts in order to stem price decreases), linking its oil prices to the spot market for crude oil and more than doubling its extraction quantity instead. By mid-1986, crude oil prices had dropped to around USD 10 per barrel. From then until 1998, oil prices remained weak and OPEC's attempts to set price targets failed, not least because rapidly growing spot, forward and futures markets brought about greater price transparency and inde-

pendence of oil importing countries from the alleged cartel.

In September 1985, the *Plaza Accord* was signed with the aim of devaluing the U.S. dollar in relation to the Japanese yen and Deutsche mark in order to help the U.S.A. reduce its current account deficit and emerge from a serious recession. Over the following two years, coordinated central bank intervention in currency markets caused a depreciation of the U.S. dollar against the Japanese yen by more than 50%. The decline of the U.S. dollar exchange rate was slowed by the *Louvre Accord*, signed by six G-7 countries in 1987, but the U.S. currency did not recuperate until the middle of the next decade.

The price of crude oil surged temporarily in 1990 during the Iraqi occupation of Kuwait, but after the subsequent *Gulf War* crude oil prices declined almost uninterruptedly, partly squeezed by transition-induced recession in the former Soviet Union and in Central and Eastern Europe (Borensztein and Reinhart, 1994), reaching their deepest level throughout the Asian Crisis of 1997 and 1998.

The last period under review, i.e. the period from 1999 to 2007,[2] is marked by an oil price pickup which has been triggered by increasing demand from emerging markets (in particular from China). Both the failure of oil producers to anticipate the fast rebound of the Asian economies and the low levels of exploration investment due to low crude oil prices in the 1990s led to insufficient supplies. Future supply, however, increasingly became a major matter of concern, as global crude oil production did not amplified for two years in a row and excess demand could only be met by natural gas liquids (NGL). Given the fact that non-OPEC production is already beyond its peak, the only hope for meeting increasing demand rests on the oil production by OPEC countries. The fact that these countries are politically instable added to the apprehension about future oil supply. Being in the comfortable position of a producer of last resort, the OPEC is experiencing a revival of some of its market power, as announced production cuts have now again been at least partly effective. Actual and expected oil market fundamentals,[3] geopolitical tensions as well as financial turmoil — not least due to excess liquidity — have given rise to financial speculation, which in turn has contributed to an *overshooting* oil market.

At the beginning of the last period, the U.S. dollar was supported by the booming U.S. economy. However, from around 2002 onward — after a short interruption of the oil price hike[4] — the relation between the U.S. dollar exchange rate and oil prices has once again become clearly negative. Accumulating U.S. external imbalances have built up pressure on the U.S. dollar, and the situation has been aggravated by mounting interest rate differentials in comparison to the euro area. Very recently, however, both the U.S. dollar decline and the oil prices hike have

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[2] *From the present point of view, this period lasted until mid-2008.*

[3] *Additionally, crude oil prices may have been driven by many other factors. As for refining capacity, it should be noticed that unlike common believe the relationship to oil prices is negative such that higher refinery utilization rates reduce crude oil prices. This effect arises from shifts in the production of heavy and light grades of crude oil, leading to changes in price spreads between them and depending on the composition of demand as well as the technical requirements of refining (Kaufmann et al., 2008).*

[4] *This interruption would justify dividing the last period into two shock phases.*

been partially reversed, as it became evident, that Europe and the rest of the world would not be able to decouple from the economic slump in the United States.

As this short overview suggests, any meaningful interpretation of data behavior has to take into account geopolitical and historical economic events. Notwithstanding the difficulties of abstracting from these facts, some theories of a more general nature have already been put forward.

2 Theoretical Models of the Oil Price − Exchange Rate Link and Empirical Evidence

The exchange rate/oil price link has been defined as a kind of natural relationship by Mundell, 2002, p. 1: *"[t]here is a definite link between monetary policies, exchange rates and commodity prices (…)".* This view acknowledges the simple truth that changes in prices might also reflect changes in their numeraire. With the gold-dollar standard in place, it was logical to price and quote homogenous goods like commodities in U.S. dollars. Later, under a flexible exchange rate regime, markets continued to stick to the U.S. dollar, partly because having only one reference and vehicle currency is efficient. Yet, the extreme instability of the external value of the U.S. dollar has translated into U.S. dollar prices of commodities such as crude oil. The underlying causes of this apparent link between the commodity price cycle and the U.S. dollar cycle, however, are controversial. These cycles may mutually affect each other or be both caused by common factors. Depending on the

channel highlighted by the respective theory, the link may either be positive or negative or may change from one period to the other. Five possible channels of a negative causal relation between the external value of the U.S. dollar and crude oil prices can be put forward (e.g. Cheng, 2008).

2.1 Purchasing Power Channel

To the extent that oil-exporting countries aim to stabilize the purchasing power of their (U.S. dollar) export revenues in terms of their (predominantly euro-denominated) imports, changes in the U.S. dollar/euro (USD/EUR) exchange rate may be mirrored in oil exporters' pricing behavior[5] (Amuzegar, 1978). Following up on the role of the U.S. dollar as a numeraire of standard commodities *(U.S. dollar commodities)*, a change in U.S. dollar exchange rates alters the terms of trade between any pair of countries. The extent of this change depends on the proportion of "dollar goods" relative to "non-U.S. dollar goods" in these countries' trade structure (Schulmeister, 2000). Since the difference between the export and import share of dollar goods is greatest for oil-exporting countries, their income position is most strongly affected by U.S. dollar exchange rate fluctuations. Hence, they have an incentive to react to U.S. dollar depreciation by increasing export prices.[6]

The plausibility of this *purchasing power channel* hinges on at least three conditions: First, oil exporters have a certain degree of price-setting capacity. Second, oil exporters receive a substantial share of their imports from Europe

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[5] *Although it is often the case that the literature refers to the price-setting behavior of oil exporters, it should be noted that the OPEC, as of 1986, has not tried to set prices directly, but followed a quantity strategy which indirectly influenced the market clearing price.*

[6] *Note that their reaction might be asymmetric, as they tend to tolerate the U.S. dollar's appreciation rather than depreciation.*

(in particular from euro area countries). Third, for good reasons, oil invoicing is conducted in U.S. dollars. We will briefly examine evidence on each of these three conditions.

As to the first condition, the market for crude oil is often described as a cartel, which is at best an oversimplification (Krugman, 2000).[7] Indeed, the concurrence of declining production with plummeting prices during the early 1980s and the subsequent reversal of this behavior in both time series are not characteristic of a cartelized market (Yousefi and Wirjanto, 2005). Certainly, members of the OPEC do exert some market power, but the extent of it varies dramatically over time depending on general market conditions. With soaring demand from China and other emerging economies as well as gradually depleting sources in non-OPEC oil-producing countries, OPEC has arguably regained some price-setting capacity. In 2006 OPEC's 13 member countries accounted for 55% of world crude oil exports, 45% of world oil production and about 78% of the world's oil reserves.

Perhaps the most accurate way to describe the market has been undertaken by Yousefi and Wirjanto (2005). They consider a model of oligopolistic rivalry among oil-exporting countries with a partial sharing of a world oil market segmented by quality differences (sweet vs. sour, heavy vs. light, etc.). In each segment each member country enjoys a certain degree of market power due to non-homogenous commodities (imperfect substitutes). This results in *Bertrand competition* with incomplete price equalization and Saudi Arabia – by far the biggest OPEC oil producer with about one-third of OPEC production – displaying price leadership.

As to the second condition, the asymmetry of the trade structure of oil-exporting economies is presented in table 2. While the fact that oil is invoiced in U.S. dollars first implies that virtually all exports are going to the *U.S. dollar area*, the U.S. dollar plays only a marginal role with respect to oil exporters' imports. In particular the EU (and the euro area) is the most important source region for consumption and investment goods in exchange for *petrodollars*.[8]

Table 2

Geographical Trading Patterns of Ten Major Oil Exporters (2005)[1]

	U.S.A.	Euro area	EU	Asia
Share in %				
Export destinations	13.9	27.4	38.7	25.6
Import sources	6.8	29.2	41.9	25.4

Source: ECB (2007).

[1] *Algeria, Iran, Kuwait, Libya, Nigeria, Norway, Russia, Saudi Arabia, UAE and Venezuela.*

[7] *Krugman (2000) refers to an idea of multiple equilibria developed by Cremer and Isfahani (1991). According to this, the fact that oil is an exhaustible resource means that not extracting it is a form of investment. For a different explanation, see Rauscher (1992).*

[8] *Note that in this sample Russia and Norway are included, which compared to OPEC have even closer ties to the EU than to Asia. According to Mazraati (2005), average import shares of OPEC between 1970 and 2004 have been 28.82% from the euro area and 13.45% from the U.S.A.*

Eventually, such asymmetry should translate into the terms of trade.[9] Already in 1972 certain OPEC members and international oil companies concluded the *Geneva I Agreement*, which introduced quarterly adjustments to posted prices to take account of exchange rate changes. They set up an index which later has changed to an import-weighted index, the *present modified Geneva I + U.S. dollar* currency basket, which accounts for both infla-

tion and currency fluctuations (OPEC, 2006).[10] Half of this basket is made up by the euro (46.4%; Mazraati, 2005).

We take this high weight as justification for simplifying our empirical exercise by using the USD/EUR exchange rate as a proxy to nominal effective exchange rates. Over time, however, the share of the euro area within all OPEC imports has decreased, as shown in chart 3, in favor of developing and emerging economies.

As to the third condition, oil exporters face three interrelated currency choices: invoicing, recycling of oil revenues and pegging. Mileva and Siegfried (2007) explain the almost universal use of the U.S. dollar in invoicing[11] petroleum by the fact that oil is a homogeneous good traded in commodity exchanges. The initial decision to invoice in U.S. dollars has possibly to do with the U.S.A.'s reputation of a stable economy and the depth of its financial markets, but is also built on political grounds. In the mid-1970s, Saudi Arabia was highly influential in ensuring that oil-prices were set in U.S. dollars.[12] Since then, the latter member states of the Gulf Cooperation Council (GCC) have supported the value of the U.S. dollar by invoicing oil in U.S. dollars and by investing in U.S. dollar reserves and securities. Despite their nervousness about U.S. imbalances and the declining value of U.S. dollar

Chart 2

Geneva I + USD Currency Basket 1998 to 2002

Shares of currencies (reflecting import weights)

%
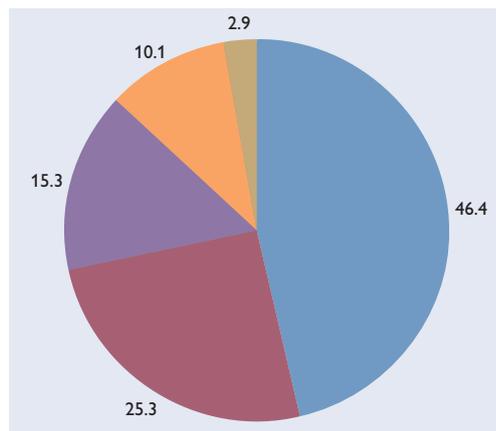
- Swiss franc
- Euro
- U.S. dollar
- Japanese yen
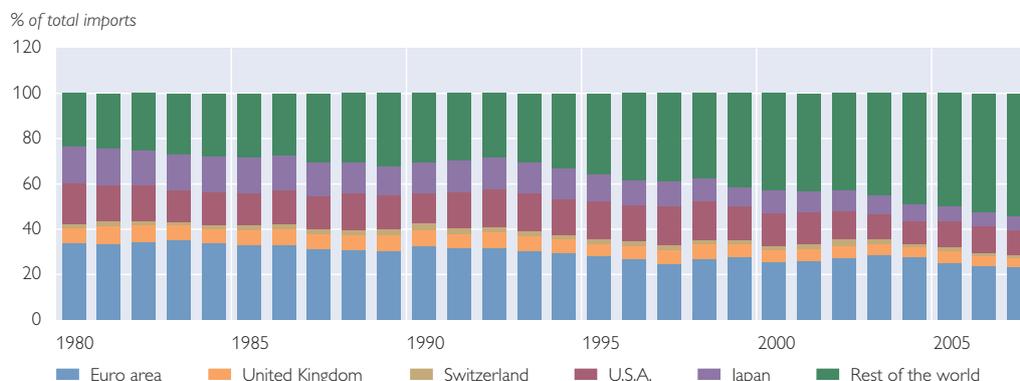- Pound Sterling

Source: Mazraati (2005).

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[9] *Mazraati (2005) calculated that between 1970 and 2004 the loss in purchasing power of OPEC oil revenues through the U.S. dollar's depreciation had been significant (−15.6%), but smaller than the loss through inflation (−57.4%). Yet these two effects are difficult to disentangle as virtually all oil-producing economies with undiversified economies and U.S. dollar-pegged currencies display an inverse relationship between the value of the U.S. dollar and inflation (Alhajji, 2004).*

[10] *Indeed, for some time OPEC used currency variations in the Geneva basket to justify oil price increases; although it is unclear to what extend this actually played a role.*

[11] *Attempts to shift to euro invoicing have been made by Iran, Iraq and Venezuela.*

[12] *In 1975 a U.S.-Saudi deal to recycle Saudi wealth into U.S. bonds was complemented by a subsequent arrangement to invoice oil in U.S. dollars. Saudi Arabia used its OPEC influence to persuade the other members to sell OPEC oil in U.S. dollars, in exchange for enhanced power in the IMF and military protection (Momani, 2006).*

Chart 3

Shares in OPEC Imports (without intra-OPEC Trade)

% of total imports

Euro area ■ United Kingdom ■ Switzerland ■ U.S.A. ■ Japan ■ Rest of the world ■

Source: IMF.

reserves, GCC oil exporters have a big stake in the U.S. economy (Momani, 2006). Almost all oil-exporting countries, and in particular, the GCC countries have their exchange rates either formally pegged or tightly oriented to the U.S. dollar (ECB, 2007). They regard dollarization as beneficial given their reliance on the export of a single U.S. dollar-priced commodity, but also because it may lower financing costs, help attract foreign investment and support macroeconomic stability.[13] However, a decline in the value of U.S. dollars and expansionary monetary policy in the United States adds to the inflationary pressure in oil-exporting countries already mounting due to soaring oil prices. Additionally, enhanced trade ties with Europe and the envisaged reduction of oil dependence speak in

favor of a reorientation of their economies away from the U.S. dollar toward the euro.[14] Nevertheless, the dominant role of the U.S. dollar as invoice, investment and anchor currency seems to be unchallenged so far despite the fact that it has pushed oil exporters into a monetary dilemma and in conflict with their own development strategies. As long as feasible alternatives are not in sight,[15] the current OPEC strategy of dollarization and oil price stabilization proves reasonable.

2.2 Local Price Channel

Apart from the described supply-side *purchasing power channel*,[16] there is arguably also a demand-side *local price channel* at work. According to Austvik (1987), fluctuations in the exchange rate of the U.S. dollar create disequi-

[13] *Furthermore, dollarization facilitates the transition of the GCC countries into a currency union by 2010, which is to be an instrument to integrate and to diversify the economies of the region. The decision to establish a common currency was taken at the foundation of the GCC in 1981. The official adoption of the U.S. dollar as a common basis was agreed in 2001. Only after its actual introduction, the new currency may be either anchored to the euro, a currency basket, or floating freely (BIS, 2003).*

[14] *OPEC Secretary-General Abdalla El-Badri announced recently, "Maybe we can price the oil in the euro. It can be done, but it will take time." (www.gulfnews.com/business/Oil_and_Gas/10188508.html; published on February 9, 2008).*

[15] *Frankel (2006) proposed a peg to oil export prices, which would possibly exacerbate volatility. Mundell (2002) proposed invoicing in special drawing rights.*

[16] *Note that Alhajji (2004) also observes that the U.S. dollar's depreciation reduces activities in drilling activities in Europe and the Middle East.*

libria in the market for crude oil. The U.S. dollar's depreciation makes petrol less expensive for consumers in non-U.S. dollar regions (in local currency), thereby increasing their commodity demand, which eventually causes adjustments in the oil price denominated in U.S. dollars. Using annual BP data from between 1965 and 2007, we discover as a first indication of this channel a highly negative correlation (–0.81) between European demand for oil products and the USD/EUR exchange rate.

2.3 Investment Channel

In addition, an *asset channel* is put in motion, as a falling U.S. dollar reduces the returns on U.S. dollar-denominated financial assets in foreign currencies, hence increasing the attractiveness of oil and other commodities as a class of alternative assets to foreign investors. Furthermore their attractiveness as a hedge against inflation rises too, since the U.S. dollar's depreciation raises risks of inflationary pressures in the United States. This is reminiscent of the topical debate over the extent to which contemporary oil price developments are driven by market speculation rather than fundamentals. Krugman (2008) speaks about an "oil nonbubble." He argues that "the only way speculation can have a persistent effect on oil prices is if it leads to physical hoarding," which he cannot discern. Yet, Stevans and Sessions (2008) counter, "(…) there is empirical evidence of hoarding in the crude oil market: both oil stocks and futures prices are positively correlated with each other." The debate is not concluded yet, not least because it is difficult to distinguish between speculation, which exploits rather short-term volatility, and hedging activity with the aim of diversifying portfolios, insuring oil-dependent industries against price-related risks and making

use of the presumed anti-cyclical performance of commodity futures. In the context of this study it is only important to note that activity in West Texas Intermediate (WTI) future contracts has grown strikingly since 2000. Between January 2004 and June 2008 the number of open interest contracts across all relevant contract types traded on the New York Mercantile Exchange (NYMEX) alone more than tripled from around 900,000 to more than 2.9 million. Yet empirical evidence suggests that the causality goes rather from oil future price changes to changes in contract positions than the reverse (ITF, 2008).

2.4 Monetary Policy Channel

Co-movements could also evolve by a *monetary channel*, as the U.S. dollar's depreciation entails monetary easing elsewhere, including oil-producing countries with currencies pegged to the U.S. dollar. In turn, lower interest rates increase liquidity, thereby stimulating demand, together with that for oil (Cheng, 2008). This channel is evidenced by the fact that currently most of the growth in global crude oil demand comes from China and the Middle East, both known for having their currencies anchored to the U.S. dollar. Similarly, one could argue that both relative price developments (oil price and exchange rate) may have common causes. Most prominently, the hypotheses that oil and other commodity price developments are influenced by interest rates (Frankel, 2006) in combination with the theory of (uncovered) interest rate parity of exchange rates would allow such a rationalization.

2.5 Currency Market Channel

Finally, a *currency market channel* may be at work as well, since foreign exchange

Chart 4

USD Federal Funds Rate and Crude Oil Price 1971 to 2007 (annual change)

USD per barrel crude oil (left-hand scale) — Federal funds target rate (right-hand scale)
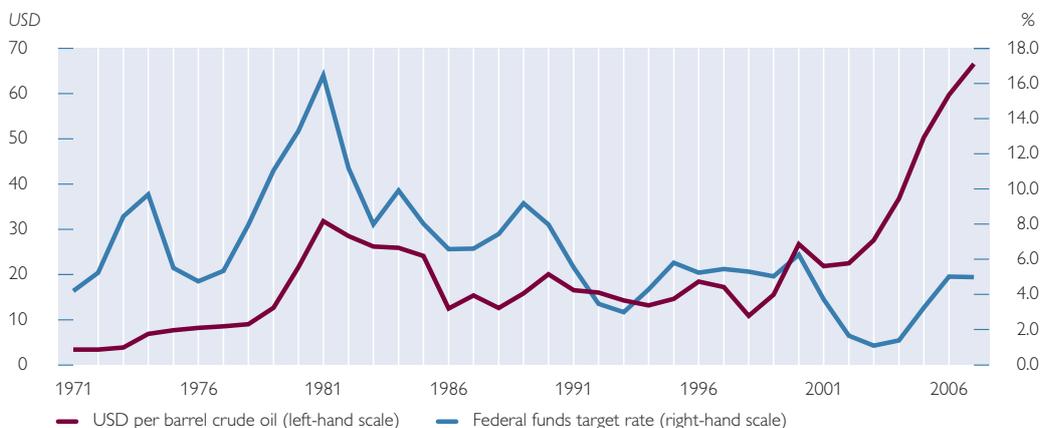
Source: EIA, Thomson Reuters.

markets are possibly more efficient than oil markets and hence anticipate developments in the real economy that affect the demand for and supply of oil (Chen et al., 2008). The causality of this last channel appears to go from the U.S. dollar to oil prices, while it is actually underlying a relation which runs in the opposite direction. In this sense, hypotheses on a negative relation in which oil impacts the U.S. dollar might complement rather than substitute the hypotheses on a reverse direction of causality from the U.S. dollar to oil, which we prefer here.

One of the above-mentioned channels may dominate the relationship, which does not exclude the influence of even (temporarily) contradictory forces. Krugman (1980), for instance, proposed a three-country model where the direction of the effect depends on a comparison of balance of payment effects of higher oil prices with those of petrodollar recycling. Initially the relation would be positive as oil profits are invested in U.S. dollar assets, but it might turn negative in the long run since over time OPEC's spending on manufactured products rises, and preferably these imports come from other countries than the United States. Extensions of this model by Krugman (1984) deliver similar outcomes, namely that an oil shock affects all countries, and its exchange rate effects arise from asymmetries between countries. The same asymmetries determine the outcome of the above-mentioned purchasing power channel of the reversed causality.

Ultimately the question concerning which one of these channels dominates should be approached empirically. Table 3 collects the most relevant pieces of the empirical literature on the exchange rate-oil price link; they display a great variety of estimation results due to differences in theoretical concepts, data definition and temporal delimitation.[17] Over time, the negative relation between the U.S. dollar and the oil price, driven by the exchange

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[17] One noticeable detail is that most studies use real instead of nominal data. However, we regard nominal data as more appropriate since oil prices contribute directly and indirectly via other input costs, such as energy or other commodities, to inflation. Thus, inflation adjustment removes some important information of this relative price. Real exchange rates, which are sometimes used as well, mask the fact that exchange rate and inflation are interdependent.

Table 3

Selection of Studies on the Relationship between Crude Oil Prices and U.S. Dollar Exchange Rates

Study	Direction	Causality	Theory	Model	Period	Exchange rate data	Oil data	Method
Cheng, 2008	Short- and long-term negative (except 1980s)	USD → oil	Purchasing power, local price, asset, and monetary channel	Demand-supply framework (Borensztein/ Reinhart, 1994)	1980–2007	NEER and REER USD	Average petroleum spot price	Dynamic ordinary least squares
Bénassy-Quéré et al., 2005	Cointegration; long-term positive, but negative from 2002 on	Real oil → real USD Causality reversal as of 2002	China impacts via USD peg and energy-intensive growth	Four-country model (Krugman, 1980): U.S.A., China, OPEC (U.S. dollar bloc); EU	1974–2004 (1980–2004)	REER USD (robustness EUR-USD)	Real market price crude petroleum	Cointegration VECM Granger test
Krichene, 2005	Cointegration, long-and short-term negative impact	USD → oil	Purchasing power, local price channel	Simultaneous equation model (SEM), structural model and interest rates and NEER	1970–2004	NEER USD	IMF crude oil price index	VAR
Yousefi and Wirjanto, 2005	Negative export price elasticity	Real USD → oil	Purchasing power of oil revenues channel	Incomplete FX pass-through, oligopolistic rivalry of OPEC	1989–1999	REER USD index	Monthly spot prices of 4 OPEC members	OLS estimation with standard error correction
Yousefi and Wirjanto, 2004	Negative correlation	USD → oil	Purchasing power of oil revenues channel; Incomplete exchange rate pass-through	Partial market-sharing model, price leadership Saudi Arabia	1989–1999	REER USD (price adjusted Pmcdi + Pbdi)	WTI, Brent, OPEC and monthly spot prices	Hansen's GMM, perfect correlation
Amano and van Norden, 1998	Positively cointegrated	Oil → exchange rate	Real oil price reflects terms of trade shocks	Single equation error correction model	1972–1992	REER USD	Real WTI	Dynamic simulations

Source: OeNB.

Note: NEER: Nominal effective exchange rate; REER: Real effective exchange rate; WTI: West Texas Intermediate; VAR: Vector autoregression; VECM: Vector error correction-model; OLS: Ordinary least squares.

rate, gets increasing support (Cheng, 2008; Krichene, 2005; Yousefi and Wirjanto, 2005). Still, a considerable group of authors disagrees (Amano and van Norden, 1998; Bénassy-Quéré et al., 2005; Schimmel, 2008).

The impact of oil prices on exchange rates of currencies other than the U.S. dollar has at least partly been confirmed by various researchers (Akram, 2004; Chen and Chen, 2007; Habib and Kalamova, 2007; Korhonen

and Juurikkala, 2007). Typically, such studies focus on currencies of oil-exporting countries, where the nexus arises more directly than in the case of the U.S. dollar. The apparent difference in terms of direction of causality between these results and most studies (including ours) on the U.S. dollar oil relation indicate that the U.S. dollar could be an exception due to its role as the oil invoicing currency.

Recently, related studies on a more general link between exchange rates and commodity prices have delivered important results. In the case of freely floating *commodity currencies*, there seems to be more evidence that commodities are affected by currencies rather than vice versa (Chen et al., 2008; Clements and Fry, 2006). A broader, less selective sample of commodity currencies, however, suggests the opposite conclusion (Cashin et al., 2004).

3 The U.S. Dollar Exchange Rate and Oil Prices: A Forecasting Exercise

In this section we perform a simple forecasting exercise aimed at evaluating whether changes in the USD/EUR exchange rate contain information about future changes in oil prices.[18] For that purpose we compare the predictions of a simple autoregressive (AR) model on oil price changes with those of a vector autoregressive (VAR) model,

including changes in the exchange rate, its determinants and oil prices, as well as a vector error correction (VEC) model for these variables. In the case of the VAR and VEC models, the specification can be interpreted as a monetary model of exchange rate determination augmented with an oil price variable (e.g. Frenkel, 1976; Meese and Rogoff, 1983; MacDonald and Taylor, 1992 and 1994), where the exchange rate is assumed to be determined by changes in the relative money supply, output and interest rate changes in the U.S.A. and the euro area.

For both economies, the data for money supply refer to M1, production is proxied by the industrial production index and we use the 1-month money market rate as the relevant interest rate. The USD/EUR exchange rate prior to 1999 refers to the synthetic euro and the nominal oil price is U.S. dollar per barrel (West Texas Intermediate). All data are of monthly frequency, covering the period January 1983 to December 2007 and stem from Datastream with the exception of oil price data, whose source is the Energy Information Administration.[19]

The two competing models are given by the following specifications,

$$\Delta p_t = \phi_0 + \sum_{k=1}^{p} \phi_k \Delta p_{t-k} + \varepsilon_t \qquad (1)$$

and

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[18] There are two reasons for the use of an out-of-sample approach. On the one hand, nesting all possible links in a single theoretical (structural) model, which would be needed to test the different channels properly, is a hopeless aim. This would imply developing a fully-fledged model for the whole world, whose assumptions could be just as readily criticized as the concentration on small partially reduced models such as the one we use here. This problem is also magnified by the fact that, empirically, some of the channels may be observationally equivalent. On the other hand, the focus on out-of-sample predictability may be seen as an extra value added of this study, in the sense that most of the literature concentrates on in-sample correlations which may or may not contain important information for prediction.

[19] We chose monthly data in order to limit white noise associated with higher frequencies and to better focus on fundamental drivers of data movements. We use nominal data not least because real data would enter the consumer price index which is endogenous to oil prices and exchange rates. Our series of interest is the front-month contract price of barrel of West Texas Intermediate (WTI) which is one of the three marker crudes (together with Brent and Dubai) whose prices are strongly linked to each other.

$$\Delta v_t = \Theta_0 + \sum_{k=1}^{p} \Theta_k \Delta v_{t-k} + u_t \qquad (2)$$

where $v_t = (p_t\ e_t\ m_t\ y_t\ i_t)$, $p_t = ln(p_t)$, $e_t = ln(e_t)$, $m_t = ln(M_{t,US}/M_{t,EUR})$, $y_t = ln(Y_{t,US}/Y_{t,EUR})$, $i_t = (r_{t,US} - r_{t,EUR})$ and $e_t = ln(e_t)$, where p_t is the oil price, M_t is money supply, Y_t is output, r_t is the interest rate and e_t is the nominal USD/EUR exchange rate. Θ_0 is a 5-dimensional vector of intercept terms and Θ_k are 5×5 matrices of parameters. The error term ε_t is assumed to be a white noise process with constant variance σ^2, and $u_t = (u_{1t}\ u_{2t}\ u_{3t}\ u_{4t}\ u_{5t})$ is assumed to be an iid vector process with zero mean and a constant variance-covariance matrix Σ.

Since there is evidence of a unit root for all variables in the vector v, a potential specification relating these variables would be a vector error correction (VEC) model, where there is an adjustment in the long run to a cointegration relationship given by a linear function relating the covariates of the model,

$$\Delta v_t = \Gamma_0 + \sum_{k=1}^{p} \Gamma_k \Delta v_{t-k} + \alpha\beta'\, v_{t-1} + u_t \qquad (3)$$

where β is the (column) cointegrating vector, which defines the long-run equilibrium among the variables of the system, given by $\beta'v_t$, and α is a (column) vector capturing the adjustment speed of each one of the components of v_t.

The forecasting exercise is carried out as follows. The models given by (1), (2) and (3) are estimated using monthly data from January 1983 to December 1996 and choosing the optimal lag length (p in the specifications above) by minimizing the Bayesian information criterion (BIC) for lag lengths one to twelve. With the estimated models, out-of-sample forecasts for the oil price are produced for forecasting horizons ranging from one month ahead to three

years (36 months) ahead. Measures of forecasting error are computed for the predictions by using the actually realized oil prices at the different forecasting horizons. The observation corresponding to January 1997 is added to the estimation sample, the models are re-estimated (after choosing a potentially new optimal lag length) and the procedure described above is repeated for this new in-sample period. This procedure is iterated until no usable out-of-sample observations are left.

We compute two measures of forecasting accuracy:

a) The root mean squared error (RMSE), given by

$$RMSE(h) = \sqrt{\frac{1}{N} \sum_{n=T+h}^{T+h+N} \left(p_n^h - p_n \right)^2} \qquad (4)$$

where p_t^h is the forecast for p_t obtained by the model with data ranging up to $t-h$, and N is the number of out-of-sample forecasts carried out. Root mean squared errors are computed for forecasting horizons (h), ranging from one month ahead to 36 months ahead.

b) The direction-of-change (DOC) statistic, defined as the number of correctly forecast changes in the oil price for forecasting horizon h divided by the total size of the forecasting sample for that forecasting horizon. This measure describes the model's ability of correctly forecasting the direction of change of the oil price.

If two models deliver forecasts of different quality (as measured for instance by the RMSE), the question arises if the "better" model performs *significantly* better than the "worse" model in statistical terms. In order to evaluate the statistical significance of differences in RMSE, we compute the Diebold-Mariano test. The Diebold-Mariano test (Diebold and Mariano,

1995 henceforth, DM) is an asymptotic test for the null hypothesis of equal predictive accuracy of two models. For a given forecasting horizon h, the null hypothesis in the DM test is that

$$d_n = E\big[g(e_{1n}) - g(e_{2n})\big] = 0 \qquad (5)$$

where e_{1n} is the forecasting error produced by model 1 when forecasting p_t, e_{2n} is defined analogously for model 2 and $g(z)$ is a loss function associated to the forecast error. In our case, the loss function is a quadratic one, so that $g(z) = z^2$. The DM test is based on the observed average forecast error difference, $\bar{d}$ The DM test statistic is given by

$$S_1 = [\hat{V}(\bar{d})]^{-1/2}\,\bar{d} \qquad (6)$$

$\hat{V}(\bar{d})$ is an estimate of the asymptotic variance of $\bar{d}$, given by

$$\hat{V}(\bar{d}) = \frac{1}{N}\left(\hat{\gamma}_0 + 2\sum_{k=1}^{h-1}\hat{\gamma}_k\right) \qquad (7)$$

where $\hat{\gamma}_k$ is the k-th order sample autocovariance of the forecasting error difference series. The asymptotic distribution of S_1 is standard normal, so tests for equality of predictive accuracy between different models can be easily carried out. Although the DM test has become standard in forecasting evaluation research, this test methodology is not free of criticism. For a recent critical assessment to testing predictive accuracy using the DM test statistic see Kunst (2003).

Table 4 presents the results of the forecasting exercise described above. The results corresponding to the best models in terms of forecasting accuracy are presented in bold characters. For each forecasting horizon in which the VAR and/or VEC model performs better than the benchmark AR model we carried out a DM test for equal forecasting accuracy; the result in terms of

significance is presented in the table in the form of asterisks. Some interesting results can be read from table 4. In terms of RMSE, models including information on the exchange rate and its determinants perform better than the benchmark AR model for forecasting horizons up to one year ahead and over 18 months ahead. For short-term forecasts the VAR model, which abstracts away from the existence of a long-run relationship linking the variables in the VAR structure, is the specification that performs best, obtaining forecasts which are significantly better than the benchmark model (as measured by the DM test statistic) in forecasting horizons ranging up to six months ahead. The VEC model performs best for relatively long forecasting horizons and obtains significantly better forecasts than the AR benchmark at forecasting horizons of more than two and a half years ahead.

The results concerning the DOC statistic speak clearly for the inclusion of information on the exchange rate when forecasting oil prices. The best-performing model according to this criterion is the VAR model for relatively short forecasting horizons (up to nine months ahead) and the VEC model for longer forecasting horizons. The supremacy of the models including information on the exchange rate and its determinants when forecasting the direction of change of the oil price is systematic and robust for all forecasting horizons considered.

As a robustness check we also performed the forecasting exercise using exclusively bivariate time series models formed by the oil price and the exchange rate, that is, without controlling for the potential determinants of the exchange rate. The results of this exercise are presented in table 5, and they reinforce those found with the larger VAR models.

Table 4

Results of the Forecasting Exercise: Multivariate Time Series Models

Months ahead	AR model		VAR model		VEC model		Out-of-sample observations
	RMSE	DOC	RMSE	DOC	RMSE	DOC	
1	0.084	0.472	**0.082***	**0.509**	0.084	0.491	108
3	0.164	0.453	**0.152***	**0.528**	0.171	0.481	106
6	0.242	0.379	**0.223***	**0.515**	0.265	0.447	103
9	0.307	0.410	**0.295**	**0.490**	0.345	0.490	100
12	0.370	0.371	**0.365**	0.392	0.407	**0.474**	97
15	**0.428**	0.362	0.428	0.340	0.451	**0.511**	94
18	**0.466**	0.418	0.471	0.308	0.478	**0.516**	91
21	0.494	0.398	0.505	0.284	**0.491**	**0.523**	88
24	0.516	0.388	0.532	0.165	**0.492**	**0.565**	85
27	0.522	0.383	0.540	0.198	**0.483**	**0.617**	82
30	0.532	0.316	0.551	0.139	**0.483**	**0.544**	79
33	0.547	0.250	0.562	0.145	**0.482***	**0.539**	76
36	0.569	0.151	0.581	0.123	**0.486****	**0.493**	73

Source: OeNB.

*Note: (*) refer to the significance level of the Diebold-Mariano test statistic of the corresponding model against the AR model. * (**) refers to significance at the 10% (5%) significance level. The best models for each forecasting horizon are in bold font.*

Table 5

Results of the Forecasting Exercise: Bivariate Time Series Models

Months ahead	AR model		VAR model		VEC model		Out-of-sample observations
	RMSE	DOC	RMSE	DOC	RMSE	DOC	
1	0.084	0.472	**0.081***	**0.528**	0.084	0.472	108
3	0.164	0.453	**0.151***	**0.566**	0.176	0.519	106
6	0.242	0.379	**0.219**	**0.563**	0.280	0.437	103
9	0.307	0.410	**0.291**	**0.550**	0.365	0.480	100
12	0.370	0.371	**0.360**	0.433	0.423	**0.464**	97
15	0.428	0.362	**0.421**	0.362	0.461	**0.500**	94
18	0.466	0.418	**0.462**	0.352	0.483	**0.505**	91
21	0.494	0.398	0.495	0.318	**0.490**	**0.534**	88
24	0.516	0.388	0.521	0.224	**0.486**	**0.576**	85
27	0.522	0.383	0.527	0.235	**0.474**	**0.630**	82
30	0.532	0.316	0.537	0.215	**0.473**	**0.544**	79
33	0.547	0.250	0.547	0.197	**0.470***	**0.539**	76
36	0.569	0.151	0.565	0.164	**0.473****	**0.493**	73

Source: OeNB.

*Note: (*) refer to the significance level of the Diebold-Mariano test statistic of the corresponding model against the AR model. * (**) refers to significance at the 10% (5%) significance level. The best models for each forecasting horizon are in bold font.*

In the short run, the VAR model including the exchange rate forecasts significantly better than the simple autoregressive benchmark, while in the long run it is the VEC model with the exchange rate and the oil price which significantly beats the alternative specifications. These results thus offer extra evidence concerning the fact that the USD/EUR exchange rate contains in-

formation about the future development of oil prices.

In a preliminary analysis, we ran Granger causality tests between changes in the exchange rate and the oil price in the framework of a bivariate VAR in first differences in order to grasp the existing causality links between these two variables. The results are relatively inconclusive in this respect: there is marginal evidence of causality running from the exchange rate to the oil price if VAR models of lag length higher than six are used. However, the optimal lag length for the bivariate VAR model as chosen by the BIC for the complete sample is equal to one. At this lag length there is no statistical evidence of causality links between the two variables.[20]

4 Concluding Remarks

This paper provides evidence for the fact that exchange rates do matter in forecasting commodity prices. While, both from a theoretical perspective and from simple Granger-causality tests, the direction of causality is unclear, we show that exchange rate information significantly improves oil price forecasts. The negative correlation of these two variables is ascribed to five possible channels: a supply-side purchasing power channel, a demand-side local price channel, an asset market investment channel, a monetary policy regime channel and a currency market efficiency channel.

As to the political implications of our results, we prefer to state those in form of pertinent questions. Given the vulnerability of oil prices to monetary shocks, should Taylor-like rules explicitly include crude price volatility (Krichene, 2005)? To what extent is a stable U.S. dollar a prerequisite for stable oil prices? Would exchange rate flexibility of oil exporters be a remedy or an amplifier of global imbalances? What effect would a hard landing scenario of the U.S. dollar have on oil prices? Is there an alternative to the U.S. dollar as invoicing, reserve and anchor currency? How should an orderly replacement best be managed? And will with euro-, yuan- or basket-denominated oil prices the stagflationary effects of oil price shocks be reduced (Wohltmann and Winkler, 2005)?

Future research should concentrate on modeling and testing the five channels of the U.S. dollar-oil nexus. Non-linearity and asymmetries in the relation (Crespo Cuaresma et al., 2007), as well as the systematic exploitation of the cyclical component of oil price changes (see Rauscher, 1992, for a theoretical explanation and Crespo Cuaresma et al., 2007, for a recent empirical application) could be explored. The robustness of the forecasting models should be checked further in terms of alternative oil data sets, diverse frequency or trade weighted exchange rates. Making an explicit distinction between supply and demand shocks may also shed more light on the nature of the relationship between oil prices and exchange rates (Kilian and Park, 2007).

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[20] *Detailed results of the causality analysis are available from the authors upon request.*

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Highlights

Housing Market Challenges in Europe and the United States – Any Solutions Available?

Karin Wagner[1]

On September 29, 2008, the Oesterreichische Nationalbank (OeNB) hosted a workshop entitled "Housing Market Challenges in Europe and the United States - any solutions available?" The workshop's objective was to discuss the most recent developments in housing markets and housing finance. Housing prices have developed quite differently in Europe in the last decade. Austria, for example, has faced very moderate price increases compared with, for example, Spain, the U.K. or Central, Eastern and Southeastern Europe. Most economic studies claim that monetary policies exert a major influence on housing price developments, and thus transmission mechanisms are a focus of research. But additionally, different institutional features of housing finance as well as regulatory/fiscal arrangements play an important role in any explanation of house price developments.

The first session addressed the recent crisis in the U.S. housing market and considered possible solutions. Session 2 offered an overview of developments in European housing markets and their macroeconomic implications, while session 3 dealt with micro data on housing wealth. Session 4 highlighted regulation and fiscal aspects. The last session was about statistics on housing markets. A panel discussion concluded the workshop.

The main shock to the financial markets was triggered by problems in the subprime mortgage market. It spread to securitization instruments and more generally to credit and capital markets. That a crisis within the U.S. national housing market would end up as a worldwide financial crisis was and is surprising not only for "ordinary" private households but also for analysts around the world.

The starting point of the workshop was the question: what are the factors that drive housing markets? As housing prices in European countries have developed quite differently over the years, the workshop's objective was to discuss the factors behind these developments, to analyze how the country-specific house finance markets are linked together, whether spillover effects exist and how they work. Against the background of the current crisis it has become very clear just how important housing markets are. There-fore, the reasons why housing markets and housing finance structures play such an important role and why housing markets can give rise to fluctuations in macroeconomic and financial developments need to be analyzed in detail.

First, the housing sector and housing finance affect the macro-economy because the housing sector plays an important role in a country's development and accounts for a considerable part of a country's welfare and GDP. There exist country-specific differences in demographics and institutional regulations, however. Furthermore, international trends – globalization and liberalization – play a prominent role in housing finance. Liberalization and globalization in housing finance systems and easier access to credit for households have caused this situation because although housing is a sector whose GDP share is too small to cause a recession by itself, spillover effects have caused severe macroeconomic problems. Second,

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fiscal and regulatory aspects of housing markets vary considerably from country to country and have direct implications for households' housing affordability; in any case, housing should be one of the main targets for policymakers. Third, in house financing systems there has been a trend away from more traditional methods relying on specialized intermediaries or government programs towards more market-based systems of housing finance. There has also been the phenomenon of securitization, whereby individual mortgage loans are pooled and used as collateral and sold to investors. Instruments like mortgage-backed securities or special purpose entities have been created. Within this process of securitization, mortgages are financed by institutional investors as pension and mutual funds. Home financing, and especially mortgage financing, has become international and integrated in capital markets. Finally, the role of monetary policy, which influences housing markets by raising or lowering short-term interest rates, needs to be mentioned. During the current crisis, banks have become more restrictive in providing liquidity. This fact, together with banks' subprime market exposure, has had tremendous effects on some investment and commercial banks. The current turmoil has made clear that capital market requirements and regulations have to be completely rewritten. Regulatory policy changes are necessary, as it has become obvious how enormous the spillover effects from the housing markets on the macro-economy and on capital markets can be.

In his keynote speech in session 1 entitled "The US housing market – recent crisis and way out", *Elias Karakitsos* (University of Cambridge, U.K.) expanded the overview of the U.S. housing market and focused on the causes of the crisis and some of their implications for theory and policy. He recommended that all institutions confronted with this unforeseen crisis, including central banks, should critically reassess their instruments for detecting an emerging crisis. The origin of the current crisis could only occur through an increase in credit. The excessive liquidity which led to the bubble was mainly driven by financial innovation and loose monetary policy. The financial innovation followed the repeal of the U.S. Glass-Steagall Act in 1999. The new regime allowed financial institutions to separate loan origination from loan portfolio. Banks were no longer obliged to keep their own loan portfolio. This financial innovation encouraged banks to provide risky loans, also to subprime borrowers who were less able to service their mortgage principal and interest. Furthermore, Structured Investment Vehicles (SIVs) with a simple legal structure and a very small capital base were created. SIVs raise money from the short-end capital markets and then use that money to buy the loan portfolio of the parent company. While they do that, they repackage it in a collateralized debt obligation (CDO) and sell it back to the private sector – either to hedge funds or pension funds. So, minimal capital was necessary. This was profitable so long as the yield curve was positive. Karakitsos stated that this form of banking, outside the regulatory framework, was behind the current credit crisis. When the yield curve became inverted, the bubble burst. All these financial innovations, especially CDOs, have injected huge liquidity into the financial system – a kind of liquidity not reflected in monetary aggregates. The sale of CDOs to international investors made the U.S. housing bubble a global problem and influenced the world economy and all European coun-

tries. Loose monetary policy was a further driving force: the Federal Reserve System cut interest rates dramatically (from 6.5% to 1%) as a reaction to the Asian-Russian crises in Asia and Russia of 1997 and 1998 and to the dotcom crash, and it injected huge liquidity. Karakitsos argued that this liquidity financed in the first instance the Internet bubble but because there was no deleveraging following the dotcom crash and because of very low rates, the liquidity went on to finance other bubbles, including housing, private equity and commodities. Thus, the housing bubble is a transformation of the previous dotcom bubble. He explained the problems of central banks in first detecting and then in dealing with such phenomena: their major tool of analysis, namely New Consensus Macroeconomics, is not capable of monitoring the kind of liquidity which has been responsible for financing such bubbles. Even if central banks were to include monetary aggregates it would not solve the problem. Financial innovations do not allow a monitoring of a significant proportion of liquidity in the system by way of traditional monetary aggregates. Besides, the models used ignore the role of wealth in affecting households' decisions. Karakitsos then presented a model showing the current credit crisis. He revealed the shortcomings for central banks of only having an inflation target. He stressed the need to monitor and to work out what implications of asset prices for the spending patterns of consumers (by the variable of net wealth) and pointed to the need to target also the output gap in an asset-led business cycle as the volatility in the output gap is greater than the volatility of inflation.

Session 2 examined European housing market developments and their macroeconomic implications.

Elisabeth Springler (University of Economics and Business Administration, Vienna) and *Karin Wagner* (OeNB) presented a paper that seeks to explain differentials in housing finance and especially in home ownership rates across Europe and the U.S.A. Their paper does not solely focus on changes in housing finance. It also deepens the analyses of the implications of the structure of housing finance systems for the level of home ownership rates. To date, the impact of the level of (mortgage) interest rates on ownership rates has been most often analyzed. However, the role of government in national housing markets is widely acknowledged but only rarely integrated into empirical studies (topics such as whether governments foster ownership rates or how to get more demand- or supply-side subsidies into the system or whether governments try to encourage a shift from rental housing to ownership via tax structures, etc.). In their paper, Springler and Wagner tried to broaden this approach by including a measure for the role of the state in housing via its impact on the cost of financing. The included variable of the cost of financing provides for the deductibility of mortgage interest rates and for tax allowances for homeowners. So, the model tests for impacts of house financing systems and of the dynamics of changes in tax structures to home ownership rates by analyzing data from 1996 to 2006 for European countries and for the U.S.A. Results of their model indicate that institutional features are important. Taxation regulations in particular play an important role and have a significant influence on the level of home ownership.

Christophe André (OECD) took a closer look at housing markets, business cycles and economic policies in OECD countries. In the vast majority

of OECD countries, house prices and housing wealth have risen sharply from the mid-1990s to 2006 and 2007. At the same time, household debt has reached record levels in many countries, largely as a result of the decrease in real and nominal interest rates and a wide range of financial innovations in mortgage markets. He argued that the current house price cycle differed from past experiences in three respects: In most OECD countries, the increases in recent years have pushed house prices above previous peaks. Second, the duration of the run-up has been longer than in past episodes of large price increases. And third, this house price cycle has been disconnected from the business cycle. He then focused on interest rate developments – the envisaged reduction in nominal and real interest rates over time and the reduction of spreads on mortgages in some countries. He mentioned furthermore the increase in the proportion of adjustable rate loans in some countries. André said that innovations in mortgage markets and the considerable increase of household wealth in the economy implied a high impact on asset price changes in the monetary policy transmission mechanism, in particular through their influence on private consumption. Subsequently, he examined the impact of interest rates on households' consumption, particularly on the consumption of durable goods, on income, wealth and liquidity. He concluded that the mentioned developments in mortgage finance had also created new challenges for central banks and financial regulators and that financial system regulation and supervision had a crucial role to play in avoiding crises.

Dieter Gstach (University of Economics and Business Administration, Vienna) discussed both papers. In his opinion, analyses of wealth effects, such as the one presented by André, should be adjusted to take account of a variable for rental rates. If, in the long run, rental rates follow house prices, we should see a much greater impact of higher house prices than we observe today simply based on consumption function. He suggested expanding Springler and Wagner's model by including rental price measures. Furthermore, he stressed the need for indicators to measure the financing cost of housing as presented in the paper. As data availability on housing is poor in European countries he pointed out the need for housing data.

The main topic in session 3 was the measurement of households' wealth position and the question whether micro data could provide a better understanding of housing markets.

Karin Wagner (OeNB) considered why it was interesting to measure housing wealth. She pointed out that housing assets were the most important form of collateral. The value of housing property can affect households' expenditure by improving access to credit for liquidity-constrained households. Furthermore, micro data give more disaggregated information on the mortgage situation and vulnerability of the various subgroups of households as the socio-demographic information behind is available. Additionally, such data may be interesting when comparing financial wealth effects with housing wealth effects. She presented some results on the OeNB Household Survey on Housing Wealth 2008 and talked about its sample and implementation. The focus of the survey is the analysis of housing wealth and housing debt of households. The objective was to learn more about how households finance their homes. Furthermore, the survey contains information on intergenerational trans-

fers and gifts – when, how much, from whom households receive something. It included questions on whether they expect an inheritance. Wagner stressed that it is the first time that micro data on housing wealth had been available in Austria. She subsequently stated that the survey results would be published in early 2009 in the OeNB publication "Monetary Policy & the Economy".

Thereafter, *Michael Wagner-Pinter* (Synthesis Forschung) discussed Wagner's presentation. He raised two issues. First, he discussed how to optimize the informational value added of the OeNB Household Survey on Housing Wealth 2008. He regards the survey as a unique source of micro data in Austria but also as part of an information string, and it does not stand alone. He recommended using the survey data with other register statistics with a much larger sampling size to recalibrate the weights derived from sampling procedures. The survey, which in his opinion is rich in variables but rather limited on sample size, should not primarily be used to draw inferences about the distribution of variables among the total population of Austrian households. The survey should be used to concentrate the analysis on co-variances between variables to derive estimated statistical models, the results of which could be applied to micro data sets much larger than the survey.

Second, he asked how micro data could help us to understand housing markets better. In his opinion, such surveys would not help. Instead, other housing market data sources (on transaction values, household mobility, etc.) would be useful. The survey reports on the risk positions households take to acquire property. It is not a survey on markets where the transaction is at the center of interest but rather the risk issue that is of interest. He thinks that

equating the housing market with the financing of housing can be misleading. Different questions have to be answered on housing market dynamics and on the dynamics of financing housing.

Session 4 offered some specific insights into European housing policies. *Montserrat Pareja Eastaway* (University of Barcelona, Spain) focused on European rental markets and asked whether regulation or liberalization was on the increase. She subsequently focused on Spain.

She said that the recent change in the economic scenario directly affected the approach taken towards the mechanisms used by housing policies in order to achieve their goals. Housing markets are currently unstable and uncertainty characterizes expectations for the final market equilibrium. The characteristics of rental markets and their regulations vary across Europe. However, in terms of tenure, there are some general trends in Europe: a general increase in home ownership and a fall in the share and quality of rented dwellings. In some cases, the percentage of dwellings in this segment has been stable (e.g. Germany); in others, it has fallen dramatically (i.e. Spain). Concerning the trend in rents, real rents have increased in the long run (except in Portugal and Denmark) because of the cost of construction land, the cost of housing services and the need for quality improvements. Real rents are less cyclical than house prices and fluctuations are usually linked to regulatory reforms. There is a sort of relationship between the private rental regime in Europe and the trend towards private rented houses. There are two reasons why the share of rented dwellings has decreased since 1980 in Europe: The strictness of rent controls may have reduced the amount of rental accommodation, and ownership has become

more attractive given the lower cost of mortgage credit, favorable tax/subsidy policies for owner-occupation and expectations of capital gains from rising housing prices. Fundamental aspects in rent control systems are how the initial rent will be raised over time, how the control on the initial rent will be negotiated in a new contract and how to regulate contract termination. Concerning the situation of the rental market regulations in Europe, most EU countries allow annual rent indexation in a simple way. There are provisions on renewing contracts (which limit the landlord's negotiating power). Most countries have moved towards a process of decontrolling rents in new contracts and have a tendency to allow the duration and contract termination rules to be freely negotiated. In Spain with highly negative rates of building permissions and the highest house price increases in Europe a quite high proportion of immigrants worked in the real estate sector. These people are unemployed now. Social renting is very small (1% of housing stock) – tenants account for 10%, owner-occupiers for 89%. By contrast, the rented sector in 1950 was 54%. The share varies greatly across the country. Over the years there have been three stages of regulation (or deregulation) in Spain: Till the 1980s there was a rent freeze as well as indefinite contracts. During the 1950s owners preferred their flats to stay empty. Between 1985 and 1994 there was a complete liberalization of rents and length of contracts. After 1994, rents were freely negotiable and rental contracts lasted a minimum of five years. Until the late 1990s there were better returns from public debt bonds than from rented housing (which, among other things, explains the high share of owner-occupied housing in Spain). Pareja Eastaway concluded that Spanish

housing policy was currently completely focused on the rental sector. The public sector/government is the guarantor for all new contracts. There are favorable financial conditions for the landlord (in case of repairs and improvements) and fiscal advantages for landlords.

Guido Wolswijk (European Central Bank) presented some fiscal aspects of housing in Europe. He discussed the role of fiscal instruments in the housing and mortgage markets. He stressed that almost any fiscal measure mattered for the housing markets. Government intervention aims to extend home ownership as it results in positive external factors (home owners are more active in local communities, they are more healthy, etc.). Related to that is the argument that households underestimate the importance of housing for themselves and that they cannot make a proper assessment of how much to spend on housing. Furthermore, governments try to increase the affordability of housing for the entire population, and especially for low-income households, who are more credit-constrained. Housing is an investment and consumption good. So whether governments favor ownership or not can be seen by the benchmark of tax neutrality. Tax neutrality is defined as treating owner-occupied housing like other assets (e.g. bonds) or – as it is also consumption good – as the purchase of other durables (e.g. cars). Treating it as e.g. bonds means that any costs involved in such investments are usually tax-deductible and the annual returns are taxed. There is some degree of diversity in Europe concerning fiscal treatment. In Germany, where the share of the rented sector in the entire housing market is the largest in Europe, households often take out a mortgage with buy-to-rent in mind. So even if there is

quite a big rental market it is heavily affected by interest rates and fiscal regulations. But, in general, in most European countries the fiscal systems financially favor owner-occupied housing. Wolswijk then elaborated on the effects and risks of the fiscal subsidization of housing. It is said to have a positive effect on housing consumption. It can be questioned whether fiscal subsidization is needed for that. Furthermore, other taxes need to be raised if there are subsidies for housing. Capitalization of subsidies should be also mentioned (i.e., if there is low housing supply elasticity, then higher subsidization causes redistribution from new to current owners). There is also a regressive income distribution effect (higher income classes profit more than lower income classes, basically because of the deductibility of mortgage interest payments at the highest marginal interest rate). Wolswijk questioned what fiscal measures could do if there are housing market imbalances or if imbalances are just coming up. Although there is a single euro area monetary policy, housing markets remain national. The literature also discusses if and when there is a right time to intervene. Structural and fine-tuning measures are to be distinguished. "Structural" means that a measure is implemented to reduce the variability of house prices, while "fine-tuning" is more on an ad hoc basis. All the instruments to be used are country-specific. He concluded that there was an overall favorable fiscal treatment of housing, with country variation, and that the single monetary policy potentially played a relatively big role in housing markets.

Margarete Czerny (Austrian Institute of Economic Research) discussed both papers (Pareja Eastaway's and Wolswijk's). She observed that while there was a big increase in home ownership in Europe,

there was a substantial decrease in the subsidization of all housing allowances, both for rental homes and for tax allowances. Housing investment has had a big impact on growth in Spain and other countries. Persons with higher incomes benefit from fiscal instruments more. Low interest rates favor ownership. However, only half of the population lives in owner-occupied homes. The influence of fiscal instruments on home ownership is hard to evaluate. In her opinion, fiscal measures on home ownership cannot be said to have a strong influence in Europe. For example, in Germany and Austria fiscal instruments do not play an important role. In Spain, the U.K. and Ireland house prices have increased by 10% to 20% in some years. In neoclassical theory, housing transactions should decrease, but the opposite has happened: Dwellings became more and more expensive and housing purchases went up. As speculative aspects increased there should have been policy interventions, but there were none. Spain is a special case in Europe as there was additionally overinvestment in housing in the past few years, because of high revenues in tourism and many rental apartments for tourism (second homes) were constructed for tourism. A shift from home ownership-oriented fiscal policy towards rental housing is necessary. Then Czerny gave some reasons why house prices have become an object of speculation and recommended a new orientation in housing policy in Europe.

A further topic to be discussed in the workshop was housing finance in Central, Eastern and Southeastern Europe – trends and challenges.

Wolfgang Amann (Institute for Real Estate, Construction and Housing, IIBW) gave a presentation on new policies to facilitate affordable housing

in Central and Eastern Europe (CEE). He said that, first, it was necessary to describe the present housing provision, housing construction and housing markets in the CEE countries to understand the housing policy challenges in CEE properly. Most CEE countries have a small share of rental housing due to major privatizations in the early 1990s. Major challenges include: housing market prices being at western levels while household incomes being far below, deteriorating housing stocks, insufficient housing construction for lower- and middle-income groups as well as in regions with low economic dynamism, small and even diminishing rental markets and inadequate legal frameworks. Amann then presented projects which have been developed by IIBW. The focus of the institute is the development of sound legal regulations and, linked to this, the establishment of business structures for PPP (public-private partnerships) housing. He highlighted the recently passed housing law for Romania (it was drawn up by IIBW). The second main project is the design of structured financing for affordable rental housing to make it economically attractive for tenants to go into rental markets instead of living in owner-occupied apartments. Respective projects are currently being prepared for Montenegro and Albania.

József Hegedüs (Metropolitan Research Institute) commented on Amann's paper and discussed whether there was divergence or convergence of housing policies in CEE. After the political changeover, governments in the region worked under constant fiscal pressure caused by the social and economic costs of bankrupt socialist economies. Housing policies responded differently in CEE countries. In the process of transition, the negative consequences of economic restructuring (regional and social inequality, declining living standards, affordability problems, etc.) raised the need for a new housing policy that first had to build up a new market-based housing finance system (legal framework and subsidies) and then to develop a sustainable social housing policy. These processes have been carried out at different speeds and in different ways across CEE countries.

Session 5 dealt with statistics and the question of how to measure house prices properly.

Anthony Murphy (University of Oxford) considered the need for a strategic approach to the development of statistics to meet user requirements. Good-quality house price data are essential (especially data over a longer period, at least 20 years). He explored the advantages and disadvantages of various house price data in the U.K., the U.S.A. and Ireland at annual or quarterly frequency.

For the U.K. various mix-adjusted house price indices are available. According to Murphy, there is no single ideal index. However, all the indices are co-integrated with each other (since real house prices are I(1) and composition or mix bias is I(0) or trend stationary) and display the same medium- and long-run trends. So, for forecasting purposes, the choice of index is not that important. However, when modeling European housing markets, there appears to be a shortage of long-run, disaggregated average and mix-adjusted house price data, as well as other housing-related data, which hinders research. At the end of his presentation Murphy showed a wish list. At the macro level, he would like consistent, medium-run time series data on the housing stock (including vacancy rates) and the main components of household wealth. In addition, the distribution of LTV (loan-to-value ratio) and LTI

(loan-to-income ratio) data for first time buyers and other borrowers would be very useful for tracking changes in credit conditions. At the micro level, he would like survey measures of house price expectations and lending, as well as more information on housing finance and wealth in household and panel surveys.

The second speaker of this session, *Adrian Page* (European Central Bank) gave an overview of residential property price statistics for the euro area and selected EU countries. Since 2001, the ECB, in cooperation with the EU national central banks, has gradually expanded the collection of residential property price statistics. The data are used both for country analyses and the monitoring of euro area-wide developments.

He concluded that considerable data were available but significant work was needed to achieve the urgently required improvements in EU residential property price statistics in terms of representativity, comparability, timeliness and frequency. Such work is underway, notably being done by EU national statistical institutes in the context of the Eurostat pilot project on price indices for owner-occupied housing.

The workshop was concluded by a panel discussion entitled "What lessons have we learned from the Spanish/Italian/British/U.S. case? What can be done in Europe to make housing markets more stable?" *Elias Karakitsos* (University of Cambridge), *Montserrat Pareja Eastaway* (University of Barcelona) and *Leonardo Gambacorta* (Banca d'Italia) discussed ways out of and the perspectives for the U.S./Spain/Italian (respectively) house price crisis/bubble.

Montserrat Pareja Eastaway observed that housing markets were not competitive. She pointed out the vulnerability of households and said that intervention was needed. Regulation can be a source of distortion. Although regulation measures seem to enforce stability, sometimes the opposite is the result. Against a background of a 90% ownership rate in Spain, it can be seen that housing policy has not at all been neutral in the current situation. Under the Franco regime the main issue in housing policy was to give shelter to people. Direct construction was the main issue in housing policy until the end of the dictatorship. After it, housing policy strategy was transformed into subsidies directly given to people. In this period, officially protected housing (these are privately owned flats, a characteristic specific to Spain) were invented. After a period of 15 years, the flats/houses could be sold on the free market. So, housing policy was subsidizing protected housing, privately owned, which allowed the owners to profit from it. One of the consequences of the possibility to sell these flats was that the effect of "protected housing strategy," which was originally trying to stimulate ownership, in fact discouraged ownership. But also public housing is diminishing. Decentralization of housing policies made the autonomous communities responsible for housing. According to Pareja Eastaway, the private rented sector should be stimulated in the Spanish market. Furthermore, it was decided to deregulate completely the land market. But the land market and housing markets are interdependent. In reply to the question "What have we learned?" she said that the Spanish example showed that it was not healthy to keep the housing price bubble continuing for a period of six years and it should be discussed whether it was wise to keep such a small share of housing stock as public housing. Furthermore, it should be discussed whether the tenure imbalance

should be counteracted by the public sector. As a strategy for the future she recommended that changing economic conditions be taken into consideration in order to have adequate housing policy instruments. Furthermore, social housing is a determinant in dampening overheated markets. Land markets play a crucial role in guaranteeing a certain percentage of social housing. (Nowadays in Spain, it varies between 20% and 50% of new dwellings built – depending on the autonomous community).

Leonardo Gambacorta first explained some characteristics of the Italian household loan market, with its fast growth (even faster than in the euro area) but relatively small size compared with other countries (e.g. Spain). Then he pointed out some of the effects of the financial turmoil, especially securitization, on the quality of loans. He showed that half of the observed slow-down in lending to households in Italy was due to the statistical effect of securitization. Even in a phase of financial turmoil, securitization in Italy went up. After the introduction of the law on securitization in Italy, the annual flow of securitized lending as a percentage of the stock increased as from December 2007 due to self-retained securitization. It means that banks sold mortgages via SPVs but they bought them back in order to obtain asset-backed securities that could be used as collateral in a Eurosystem refinancing operation. So, securitization had a direct role in the market, spreading credit risk among financial intermediaries. He questioned whether this fact was good or bad. As this is difficult to answer it is very important to understand what the effects of securitization are on bank lending. They are not trivial at all. There are negative ones – e.g., as banks sell loans to the private and institutional markets they lose the incentive to

monitor them and thus there is deterioration in the quality of credit. But there are also positive aspects of securitization cited in the literature and generally securitization is seen as positive; problems of asymmetric information can be mitigated. It is an empirical issue. Some preliminary estimates for Italy show that securitized lending is, other things being equal, less risky. The quality of credit in Italy remains high, but the number of clients in difficulties has increased. Institutional factors that may have limited the financial tensions in Italy include the increase of the loan-to-value ratios by law (from 50% to 80%) and the usury law, which imposes a ceiling on interest rates. Both factors have contributed to a reduction in the subprime market. The strength of retail funding is a further interesting institutional characteristic. During the current crises many banks are facing a shortage of deposits. So banks should look more closely at their liabilities. Italy – unlike the rest of the euro area – has faced an increase in borrowing from banks since the beginning of the financial crisis. Gambocorta concluded that we had to rethink regulation for the financial economies, having in mind that they are subject to "booms and busts." There have to be new rules but regulation should not inhibit financial innovation. In his opinion, some rules are necessary in order to have a continuous chain that goes from "financial deepening" to economic growth. The Italian experience shows that some rules (limits on LTV, usury law) have reduced at least so far the effects of the financial turmoil. Overall, he claimed that we had to think up new rules that do not affect negatively loan supply and ended his comments with the sentence: "A bank has to be a bank!"

Elias Karakitsos started his contribution by stating that the housing market

is just a market where liquidity has been channeled effectively and therefore he did not consider regulation in housing markets as really important. For financial institutions and the question of what has to be changed, he said that things were changing fast. He stressed that we were lagging behind. The problem has been liquidity and liquidity is draining out very fast. The U.S. housing market was not the cause of the credit crisis and the current turbulence in the global economy. Rather, the crisis is a symptom of the huge liquidity that was put in place by "financial engineering" and some mistakes in the conduct of monetary policy, especially in the U.S.A. This liquidity has financed a number of major bubbles in the last ten years (Internet, housing, and commodities) and a few minor ones (shipping and private equity). Nowadays, the financial system is deleveraging. To stop this is the challenge before it becomes systemic. The question is how to do this and to prevent it deteriorating rapidly into a crisis. The system that we have seen, namely borrowing from the short end of the market and using it at the long end (which was done e.g. by the investment banks) is going to collapse. Karakitsos commented that private equity and hedge funds would not take over the role of those banks. So, this kind of model will not work any longer. As the U.S. administration is taking over more companies, much more regulation will be coming. The real risk is the proper asset in that deflation process that may take about ten years. He would have preferred to see some recapitalization of the U.S. banking sector rather than injecting money into the markets. But from a policy perspective it should be recognized that regulation is backward- rather than forward-looking. Smart people will always find loopholes in any given legislation and take advantage. Regulators will always react with a long lag to close the loopholes and on some occasions, like the current crisis, will react too late to prevent a calamity. A better approach than over-regulation is for the central bank to have an asset price target that does not impede the functioning of free markets and does not prevent financial innovation. Since securitization implies the transfer of assets and risks to the private sector he considers the ideal target variable for a central bank to be the net wealth of the personal sector as a percentage of disposable income.

The workshop program and the papers/presentation slides can be found at
http://www.oenb.at/en/geldp_volksw/ Volkswirtschaftliche_Veranstaltungen/ workshop___housing_market_challenges_ in_europe_and_the_united_states__ any_solutions_available_.jsp
on the OeNB website.

Furthermore, there is a publication planned with Palgrave Macmillan.

Saving in Austria –
Too Little and Too Late?

On October 24, 2008, the Oesterreichische Nationalbank (OeNB) held an international workshop entitled *"Saving in Austria – Too Little and Too Late?"*. The purpose of the event was to devote more attention to an important economic topic which even experts still do not understand sufficiently in all its various facets. In a small group of experts, the following questions were discussed at length: What determines people's saving behavior? What influencing factors stand in the way of rational saving behavior? And what problems arise in the analytical conceptualization of household saving?

In his opening speech, *Peter Mooslechner* (Director of the OeNB's Economic Analysis and Research Department) stressed the fact that household saving behavior is a key area of application for microdata. Microdata on saving behavior can be used for simulation studies as well as the empirical verification of predictions generated by theoretical models. Without microdata, economic analyses of saving behavior would hardly be sufficient. Referring to the OeNB's Survey on Financial Household Wealth (SFHW) from the year 2004, Mooslechner underscored the idea that different social groups have different motives for saving, which in turn implies heterogeneous saving behavior. Mooslechner also noted that as early as 1930, Irving Fisher emphasized the heterogeneity of saving behavior among various groups in a treatise entitled *"The Theory of Interest"*.

Introduction to the Workshop Topic

The relevant literature frequently uses the life cycle model (Modigliani and Brumberg, 1954) or the *permanent income model* (Friedman, 1957) as a point of departure for explaining household saving behavior.[2] In both models, household consumption and saving decisions are interpreted as problems of intertemporal optimization. The saving and consumption behavior of households depends on their preferences, on interest rates and the present value of their lifetime income, and on wealth. The life cycle model makes it possible to generate predictions about wealth accumulation over the course of a person's lifetime. The model relies on the assumption that young households first take out loans (i.e. borrow against future earnings) and subsequently accumulate wealth in order to secure retirement income, which they use for consumption purposes during retirement. According to this model, the development of wealth should follow a hump-shaped curve in the course of the life cycle. However, microdata on households have been used to show that observed consumption behavior diverges from the predictions generated by such models. For example, consumption actually depends more on a person's current income than it should according to the life cycle model.

In the academic literature, therefore, this savings model has been expanded to include liquidity and credit

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[2] An overview of these models is presented in Browning and Lusardi (1996).

constraints.[3] In addition, planned bequests and uncertainty about future income development have also been integrated into the model. Another reason why microdata might contradict the predictions of the simple life cycle model is precautionary saving. In the literature, this is considered an important saving motive, which must be taken into account in order to describe household saving and consumption behavior accurately. Saving also provides a safeguard against income, wealth and expenditure shocks in the future. Given incomplete insurance markets, households hold assets as a precautionary measure in order to maintain their planned consumption paths at least to a certain extent. However, findings based on microdata indicate that precautionary saving accounts for 2% (e.g. Lusardi, 2000) to 40% (Carroll and Samwick, 1998) of household assets. The vast differences between these estimates make it almost impossible to assess the significance of precautionary saving. In light of these problems, Kennickel and Lusardi (2004) suggest surveying households directly regarding the extent to which they save for precautionary reasons,[4] and the authors come to the conclusion that approximately 8% of overall assets are held for precautionary reasons. Precautionary saving plays an especially important role among older households and business owners. Low-income households, on the other hand, exhibit a low level of precautionary saving. Precautionary saving and liquidity constraints can also compound each other, and it is thus often impossible to isolate the individual impact of each factor completely.

Saving in Austria

For Austrian households, estimates of the share of precautionary saving in their wealth are only partly available. However, the results of the OeNB's 2004 SFHW have been used for research on many topics related to saving behavior (e.g. financial literacy, debt, and investment behavior).[5]

In their presentation, *Pirmin Fessler* and *Clemens Jobst* (OeNB) referred to one subsection of the 2004 SFHW. The results of this study corroborate the idea that a majority of Austrian households save only very little, while a small minority of households put aside a large amount. The vast majority of households indicated that they put money aside for health emergencies, for unemployment or simply "for a rainy day." Of those who do save, the majority do so without a specific reason ("for a rainy day"). Among the respondents under 29 years old who put money aside, only about one fourth stated that they were saving in order to secure retirement income. This saving motive reaches its highest level in cases where the head of household is between 40 and 49 years of age. Chart 1 illustrates the significance of precautionary saving.

The ability to save as well as saving behavior depend heavily on a household's income. High-income households tend to save on a regular basis or according to a savings plan. The lower a household's income, the more often they will simply put aside what is left
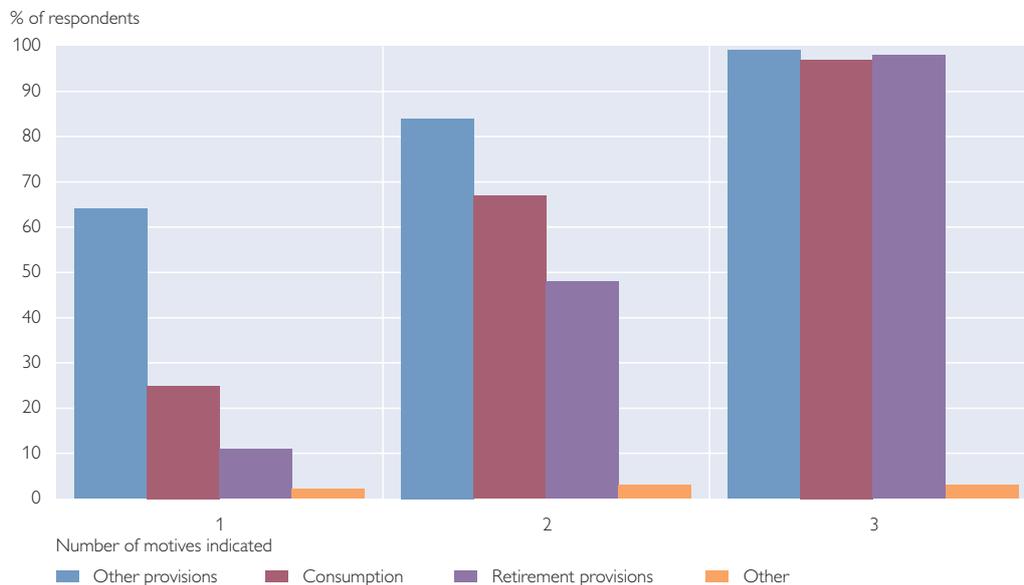
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[3] *Deaton (1999) provides an overview of the literature on this topic.*

[4] *In the Federal Reserve System's Survey of Consumer Finances, the following question is asked with regard to savings for emergencies and other unexpected events: "About how much do you think you and your family need to have in savings for unanticipated emergencies and other unexpected things that may come up?".*

[5] *See Beer and Schürz (2007), Fessler et al. (2007), and Fessler and Schürz (2008).*

Chart 1

Motives for Saving

% of respondents

Number of motives indicated

Other provisions   Consumption   Retirement provisions   Other

Source: OeNB, based on the Survey on Financial Household Wealth (2004).

over at the end of the month or see no possibility of saving at all.

The tendency to save is more widespread among older respondents and in higher-income groups. Of the households in the survey, 82% consider individual saving for retirement to be important. The main motive behind individual retirement saving is uncertainty with regard to the state pension system. It comes as no surprise that the importance of private pension savings declines with increasing age. What is more striking is the empirical finding that this form of retirement savings is considered more important among respondents with higher levels of income and education. First, high-income households are in a better position to save for retirement. Second, due to legal regulations (earnings cap for pensions, steeper lifetime income curve), those households cannot expect state pensions to be sufficient to maintain their usual standard of living in retirement. A clear difference between in-

come groups can also be identified in the reasons why people save for their own retirement: In higher-income groups, private retirement saving tends to focus more on return considerations.

Among young people, saving is generally geared toward future consumption objectives. For example, young people put money aside in order to purchase automobiles, to furnish apartments and to buy other consumer durables. As people age, however, saving for health reasons (e.g. dental work, surgery) becomes an important factor.

In her presentation, *Annamaria Lusardi* (Dartmouth College) explained that the retirement savings landscape in the U.S.A. had undergone major changes, in particular the shift from defined benefit (DB) to defined contribution (DC) pensions. Moreover, the complexity of financial products has grown enormously, and investors generally face a far broader selection than they did just one decade ago.

Lusardi's ensuing research question was whether individuals are equipped to deal with these new developments; the answer was negative. According to Lusardi, the U.S. population exhibits only a low level of financial literacy, and financial illiteracy is especially widespread in lower-income groups, among African Americans and among people with lower levels of education.

In the 1990s, a number of private and public-sector organizations in the U.S.A. launched initiatives with a view to improving financial literacy in certain population groups. The U.K. has also been active in promoting financial education for some time now, and the OECD embraced this topic and drew up related recommendations as early as 2004. These economic policy initiatives mainly aim to change people's financial behavior.

In recent years, the question of whether higher financial literacy serves to improve financial behavior has also been addressed in numerous studies in the field of behavioral economics. While neoclassical economists assumed that people make rational decisions to optimize welfare on the basis of all available information and that more information brings about better decisions, behavioral economists point out numerous anomalies in individuals which lead to improper financial behavior. These anomalies were a key topic in the presentation given by Brigitte Madrian.

Furthermore, Lusardi highlighted the fact that it is very difficult to evaluate the effectiveness of financial literacy programs, stating that it is not sufficient to rely on the satisfaction of the participants or their subsequent investment decisions. At the same time, in her forthcoming book *"Overcoming the Saving Slump: How to Increase the Effectiveness of Financial Education and Saving Programs"* (due out in January 2009), she argues that heightened financial literacy promotes better financial planning, which in turn leads to greater wealth accumulation.

In her presentation, *Brigitte Madrian* (Harvard University) pointed out a formidable number of problems in people's financial behavior. These problems include the following:

- While attending seminars on retirement savings, participants might be convinced that they will invest in an individual retirement savings plan in the future. However, six months later, hardly any of the participants will have made the decision to do so. Surveys have often shown that people believe that they do not save enough and thus resolve to save more. For many, however, this remains a mere resolution.
- People are also influenced by the number of alternatives presented to them. Studies show that when people are offered multiple equity funds and only one bond, the majority will decide for the equity investment. Offering multiple alternatives for one option tends to encourage fixation on that option in decision making.
- Other studies indicate that the participation rate is only about one third in the case of retirement savings plans where employees are required to make an active decision to participate (i.e. opt-in systems). However, if all employees are enrolled in the retirement savings plan automatically using an opt-out system, the participation rate rises drastically.
- As a rule, people prefer investments with which they are familiar. Therefore, we can also identify a tendency to invest in stocks in one's own company despite the risks discussed publicly in the wake of scandals such as those at Maxwell or Enron.

- When making decisions, people often fail to use all of the relevant information available; they have a tendency to be short-sighted and are influenced by external circumstances. In this context, financial education can only effect change to a limited extent.

Madrian suggested that these problems might be mitigated by simplifying offers using standardized solutions and by requiring an active decision on the employee's part.

Ayuso et al. (2007) examine the effects of the 1988 introduction of tax incentives for retirement savings in Spain. The authors use data from a panel of tax returns in order to identify the characteristics of households which invest in pension funds. On the basis of a survey on household consumption, they also investigate whether there is a connection between pension fund contributions and changes in expenditure and savings. Saving rises most dramatically in the 46 to 55 age group, while there appears to be more of a substitution relationship between saving and pension fund contributions among households in the 56 to 65 age group. In a further step, the authors attempt to estimate the extent of new savings generated by the tax incentives. Using a two-sample, two-stage least-squares model, they estimate the share of new savings at approximately 5% to 19% of pension fund contributions. In contrast, households in the 46 to 55 age group and in the highest income quartile augmented their saving by nearly 65%.

The authors come to the conclusion that tax incentives do not have a particularly strong effect on household saving; instead, such incentives have a more visible effect on the composition of wealth portfolios. Therefore, in light of the budgetary burden created by these incentives, their fiscal effect appears questionable.

In his talk, *Luc Arrondel* (CNRS-PSE) analyzed how heterogeneous risk and time preferences of households affect wealth portfolios. The objective of this analysis was to carry out a comprehensive measurement of the risk and time preferences of investors in France. What is innovative about Arrondel's approach is the fact that he develops an indicator which makes it possible to bundle various questions regarding risk aversion and time preference for the present. In this way, Arrondel is able to overcome the problem that preferences are generally examined on the basis of only three parameters: the degree of relative risk aversion, which impacts precautionary saving; the time preference for the present; and the degree of altruism, which influences intergenerational transfers of wealth (e.g. financial assistance, gifts and bequests to children). At the same time, Arrondel also shows that a sufficiently large number of heterogeneous questions covering various areas of life are required in order to address this issue.

The research presented by *Herbert Walther* and *Alfred Stiassny* (Vienna University of Economics and Business Administration) demonstrates quite impressively the far-reaching statistical limitations and problems associated with international comparisons of household saving rates. Walther and Stiassny underscore the need to devote greater attention to statistical definitions of the saving rate, and they conclude that the shadow economy systematically distorts international comparisons of household saving rates. Larger shares of income from shadow activities bring about lower employment rates and thus higher saving rates.

Conclusions

The OeNB's workshop on *"Saving in Austria – Too Little and Too Late?"* revealed that microdata are indispensable for research on saving behavior. Microdata help enhance our understanding of the economic decisions made by households. As a result, these data are becoming an increasingly important factor in monetary and economic policy. Unfortunately, Austria still has relatively few useful sources of microdata. The results of household-level surveys make it possible to question certain established convictions and enable an empirical verification of economic policy concepts and different theories on saving. Due to data problems and institutional differences, international comparisons of macroeconomic saving rates remain difficult. The results of Madrian's empirical work point to many severe behavior problems in financial decision making.

Empirical information at the micro level is gaining in importance due to changes in the pension system and in the labor market, the liberalization of the financial markets as well as the current financial crisis. The household sector is becoming increasingly heterogeneous, which generally makes it difficult to assess household behavior on the basis of aggregate data. From the year 2010 onward, the periodic surveys planned within the framework of the Eurosystem Household Finance and Consumption Survey (HFCS) should improve the international data situation substantially and provide a more realistic picture of households' financial behavior, including that of Austrian households.

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Notes

Abbreviations

A-SIT	Secure Information Technology Center – Austria	IHS	Institut für Höhere Studien und Wissenschaftliche Forschung – Institute for Advanced Studies, Vienna
ASVG	Allgemeines Sozialversicherungsgesetz – General Social Security Act	IIF	Institute of International Finance
A-Trust	A-Trust Gesellschaft für Sicherheitssysteme im elektronischen Datenverkehr GmbH (accredited certification service provider)	IIP	international investment position
		IMF	International Monetary Fund
		ISO	International Organization for Standardization
		IWI	Industriewissenschaftliches Institut – Austrian Institute for Industrial Research, Vienna
ATX	Austrian Traded Index	JVI	Joint Vienna Institute
BCBS	Basel Committee on Banking Supervision (BIS)	LIBOR	London Interbank Offered Rate
BIC	Bank Identifier Code	M3	broad monetary aggregate M3
BIS	Bank for International Settlements	MFI	monetary financial institution
BOP	balance of payments	MRO	main refinancing operation
BSC	Banking Supervision Committee (ESCB)	MoU	memorandum of understanding
CACs	collective action clauses	NACE	Statistical Classification of Economic Activities in the European Community
CEBS	Committee of European Banking Supervisors (EU)		
CEE	Central and Eastern Europe	NCB	national central bank
CEEC(s)	Central and Eastern European country (countries)	OeBS	Oesterreichische Banknoten- und Sicherheitsdruck GmbH (Austrian banknote and security printing works)
CESEE	Central, Eastern and Southeastern Europe		
CESR	Committee of European Securities Regulators		
CIS	Commonwealth of Independent States	OECD	Organisation for Economic Co-operation and Development
CPI	consumer price index		
EBA	Euro Banking Association	OeKB	Oesterreichische Kontrollbank (Austria's main financial and information service provider for the export industry and the capital market)
EBRD	European Bank for Reconstruction and Development		
EC	European Community		
ECB	European Central Bank		
Ecofin	Economic and Financial Affairs Council (EU)	OeNB	Oesterreichische Nationalbank (Austria's central bank)
EEA	European Economic Area		
EFC	Economic and Financial Committee (EU)	OPEC	Organization of the Petroleum Exporting Countries
EIB	European Investment Bank	ÖBFA	Österreichische Bundesfinanzierungsagentur – Austrian Federal Financing Agency
EMS	European Monetary System		
EMU	Economic and Monetary Union		
EONIA	Euro OverNight Index Average	ÖNACE	Austrian Statistical Classification of Economic Activities
ERM II	exchange rate mechanism II (EU)		
ERP	European Recovery Program	POS	point of sale
ESA	European System of Accounts	PRGF	Poverty Reduction and Growth Facility (IMF)
ESAF	Enhanced Structural Adjustment Facility (IMF)	R&D	Research & Development
ESCB	European System of Central Banks	RTGS	Real-Time Gross Settlement
ESRI	Economic and Social Research Institute, Dublin	SDR	Special Drawing Right (IMF)
EU	European Union	SDRM	Sovereign Debt Restructuring Mechanism (IMF)
EURIBOR	Euro Interbank Offered Rate	SEPA	Single Euro Payments Area
Eurostat	Statistical Office of the European Communities	SPF	Survey of Professional Forecasters
FATF	Financial Action Task Force on Money Laundering	STEP2	Straight-Through Euro Processing system provided by the Euro Banking Association
FDI	foreign direct investment		
Fed	Federal Reserve System (U.S.A.)	STUZZA	Studiengesellschaft für Zusammenarbeit im Zahlungsverkehr G.m.b.H. – Austrian Society for Payment System Research and Cooperation
FMA	Austrian Financial Market Authority		
FOMC	Federal Open Market Committee (U.S.A.)		
FSAP	Financial Sector Assessment Program (IMF/World Bank)		
		S.W.I.F.T.	Society for Worldwide Interbank Financial Telecommunication
FWF	Fonds zur Förderung der wissenschaftlichen Forschung – Austrian Science Fund		
		TARGET	Trans-European Automated Real-time Gross settlement Express Transfer
GAB	General Arrangements to Borrow		
GATS	General Agreement on Trade in Services	Treaty	Treaty establishing the European Community
GDP	gross domestic product	UCIT(s)	undertaking(s) for collective investment in transferable securities
GNP	gross national product		
GSA	GELDSERVICE AUSTRIA Logistik für Wertgestionierung und Transportkoordination GmbH (Austrian cash logistics company)	ULC	unit labor cost
		UN	United Nations Organization
		UNCTAD	United Nations Conference on Trade and Development
HICP	Harmonised Index of Consumer Prices		
HIPC	Heavily Indebted Poor Countries	VaR	value at risk
HOAM.AT	Home Accounting Module Austria	WBI	Wiener Börse Index (all-share index of the Vienna stock exchange)
IBAN	International Bank Account Number		
IBRD	International Bank for Reconstruction and Development	WEF	World Economic Forum
		WIFO	Österreichisches Institut für Wirtschaftsforschung – Austrian Institute of Economic Research
ICT	information and communication technology		
IDB	Inter-American Development Bank	wiiw	Wiener Institut für internationale Wirtschaftsvergleiche – The Vienna Institute for International Economic Studies
IFES	Institut für empirische Sozialforschung GesmbH – Institute for Empirical Social Research, Vienna		
		WKÖ	Wirtschaftskammer Österreich – Austrian Federal Economic Chamber
ifo	ifo Institute for Economic Research, Munich		
		WTO	World Trade Organization

Legend

x   =   No data can be indicated for technical reasons

..   =   Data not available at the reporting date

0   =   The numerical value is zero or smaller than half of the unit indicated

Discrepancies may arise from rounding.

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Monetary Policy & the Economy   quarterly

This quarterly publication, issued both in German and English, offers analyses of current cyclical developments, medium-term macroeconomic forecasts and studies on central banking and economic policy topics. It also summarizes the findings of macroeconomic workshops and conferences organized by the OeNB.

Focus on European Economic Integration   quarterly

The Focus on European Economic Integration (FEEI) is a channel for communicating the OeNB's ongoing research on Central, Eastern and Southeastern European (CESEE) countries, thus reflecting a strategic regional research priority of the OeNB. Contributions primarily deal with macrofinancial and monetary integration and also include economic country analyses. As from 2009, the FEEI is published quarterly.

Statistiken − Daten & Analysen   quarterly

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

econ.newsletter   quarterly

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

Financial Stability Report   semiannual

Issued both in German and English, the Financial Stability Report contains first, a regular analysis of Austrian and international developments with an impact on financial stability and second, studies designed to provide in-depth insights into specific topics related to financial market stability.

Workshops – Proceedings of OeNB Workshops

three to four issues a year

The Proceedings of OeNB Workshops were introduced in 2004 and typically comprise papers presented at OeNB workshops at which national and international experts, including economists, researchers, politicians and journalists, discuss monetary and economic policy issues. Workshop proceedings are generally available in English only.

Working Papers

about ten papers a year

The OeNB's Working Paper series is designed to disseminate, and provide a platform for discussing, findings of OeNB economists or outside contributors on topics which are of special interest to the OeNB. To ensure the high quality of their content, the contributions are subjected to an international refereeing process.

Economics Conference (Conference Proceedings)

annual

The Economics Conference hosted by the OeNB is an international platform for exchanging views and information on monetary and economic policy as well as financial market issues. It convenes central bank representatives, economic policymakers, financial market players, academics and researchers. The conference proceedings comprise all papers presented at the conference.

Conference on European Economic Integration (Conference Proceedings)

annual

This series, published in English by a renowned international publishing house, reflects presentations made at the OeNB's annual conference on Central, Eastern and Southeastern European issues and the ongoing EU enlargement process (formerly East-West Conference).
For further details see *ceec.oenb.at*

Annual Report

annual

The Annual Report of the OeNB provides a broad review of Austrian monetary policy, economic conditions, new developments in the financial markets in general and in financial market supervision in particular as well as of the OeNB's changing responsibilities and its role as an international partner in cooperation and dialogue. It also contains the OeNB's financial statements.

Intellectual Capital Report

annual

The Intellectual Capital Report is a review of the OeNB's intellectual capital and its use in the OeNB's business processes and services. The report clarifies the relationships between different types of human, relational, structural and innovation capital and describes various determinants that influence the OeNB's intellectual capital. The report provides an integrated view of the OeNB and serves to assess the consistency of the OeNB's intellectual capital with its knowledge-based strategic orientation.

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