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Monetary policy and economic outlook

Russian energy sector – prospects and implications
for European energy supply

Price bubbles – a central bank perspective



EUROJÄRJESTELMÄ
EUROSYSTEMET

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Monetary policy and economic outlook

7 December 2006

The world economy has continued to grow at a brisk pace, but there are clear signs of a slowing in the pace of growth in some industrial countries. US growth has eased as a consequence of the slower housing market, while in Japan growth has been subdued by more sluggish private consumption. In the euro area, growth has remained relatively robust, primarily due to the recovery in investment. The broadly based growth in the Finnish economy has continued. The fall in the price of crude oil has slowed inflation worldwide in recent months.

According to data on the third quarter of 2006, there has been a slight deceleration in the pace of economic growth in some of the main industrial countries (Chart 1). At the same time, the improvement in confidence has come to a halt, although industrial confidence is in

general still strong (Chart 2). Outside the major industrial economies, the brisk pace of growth seems to be continuing, contributing to a fairly rapid pace of growth in the world economy, at around 4%. The fastest phase of growth in the world economy is, however, already over, and the focus of growth is shifting. The emerging economies are continuing to grow rapidly, while in the United States in particular output growth in the near future is likely to be slower than in recent years. In the euro area, too, the recovery in growth has already given way to a more even trajectory.

Since August, there has been a marked drop in the price of crude oil, largely due to the dissipation of short-term uncertainties over supply. This has led to lower inflation in the major economic areas in September–October (Chart 3). This was particularly marked in the United States, where slower growth and reduced

Chart 1.



inflation pressures have convinced the financial markets that the period of tightening monetary policy is now at an end. In Japan, the expected gradual raising of the exceptionally low policy rate has been slightly delayed. In the euro area, the markets expect the ECB to continue to raise interest rates in the first half of 2007. Thus, the interest rate cycles of the major economic areas are currently at different phases. Monetary policy nevertheless continues to be accom-

modative in both the euro area and Japan.

The risks relating to world growth have not disappeared in recent months. They include the imbalances in the world economy, primarily concerning the large current account deficit and low level of household savings in the United States and the considerable current account surpluses of many emerging economies. The US housing market has long been subject to risks, and

Chart 2.

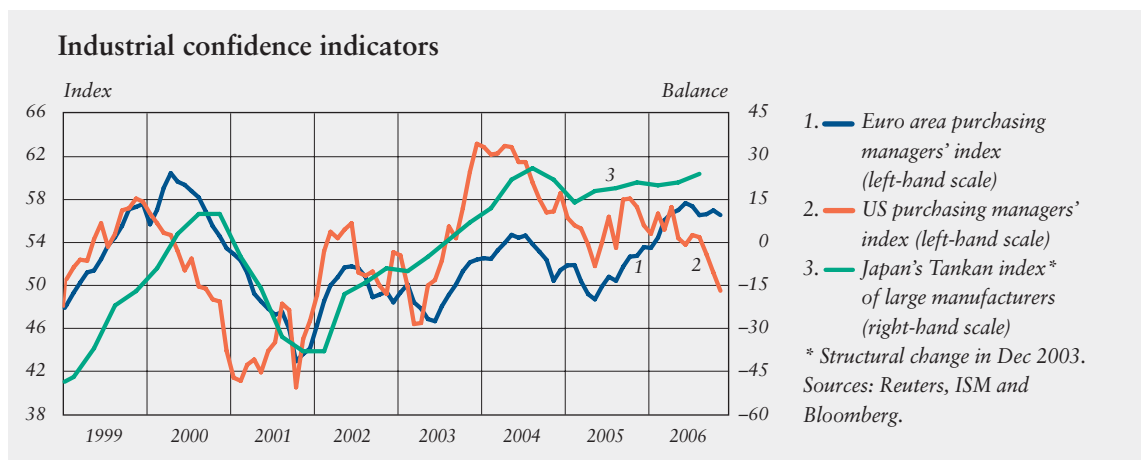
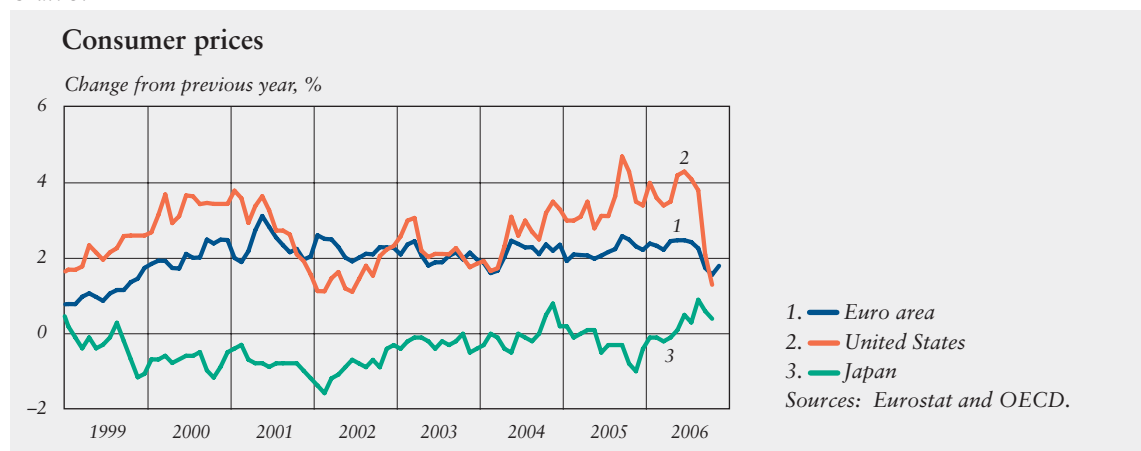


Chart 3.



these have to some degree begun to be realised. Although, to date, the slow-down in the US economy appears to be moderate, the risk of a total halt to growth has not disappeared. Indeed, there is at present an exceptionally large degree of uncertainty surrounding the short-term future for the US economy. In addition, uncertainty still remains surrounding the future price of oil and other commodities, and the implications this has for inflation.

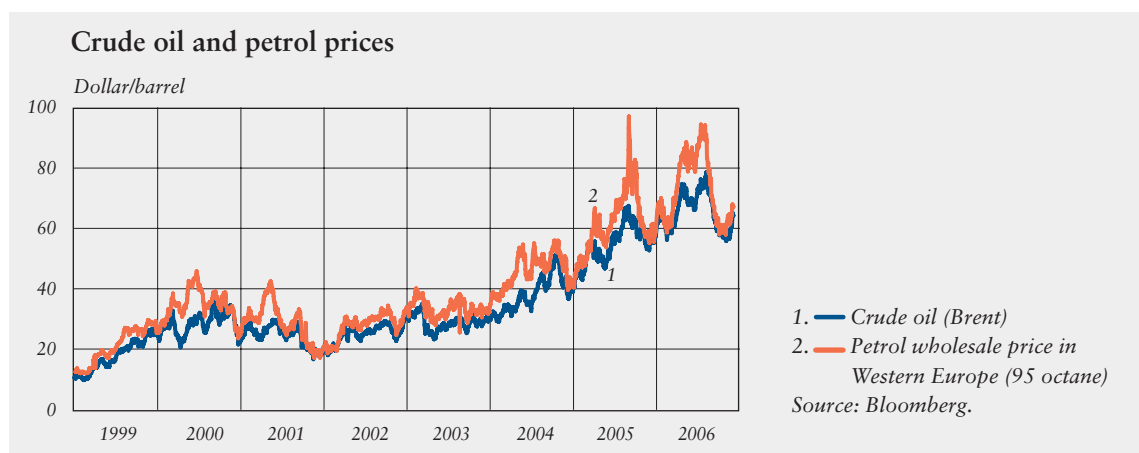
In contrast to the pattern of recent years, euro area growth is being sustained primarily by domestic demand, while the growth impact of net imports is declining as a result of the slower pace of the world economy. On the other hand, there is to date little sign of a recovery in private consumption. At present it looks possible that euro area growth, too, peaked in the first half of 2006. Present evidence nevertheless suggests growth will continue at a reasonable pace in the near future.

The Finnish economy has continued to grow strongly, supported by both domestic demand and exports. Survey data indicates that both business and household confidence remain bright. The decline in the unemployment rate has, however, come to a halt. The drop in oil prices has slowed inflation in Finland, too, although service price inflation has picked up somewhat during 2006.

A marked drop in the price of oil

The price of crude oil began to come down in August 2006, and the dollar price is currently around 20% below the summer peak (Chart 4). Petrol prices have also fallen steeply. There are several reasons for the fall in oil prices: the decline in geopolitical uncertainty in the Middle East, the accumulation of large inventories of crude oil and oil products, and the reduction of demand pressures due to the easing of growth in the world economy. In particular, uncertainty

Chart 4.



over the scarcity of free production capacity in the OPEC countries appears to have eased in recent months.

The drop in the price of oil has caused an easing in the pace of inflation in all major economic areas. This trend has been further strengthened by comparison with the same period last year, as the price of oil was rising in autumn 2005 due to the hurricanes in the United States. The drop in the price of oil and petrol could boost household consumption via the increase in real purchasing power. This could in turn increase future domestic inflation pressures, particularly in oil-importing countries. However, the recent halt in the downward trajectory of oil prices means the positive impact on world growth is likely to be relatively small.

Despite the recent decline, the price of oil is likely to remain relatively high, and eg the futures market supports the general expectation that there will be no

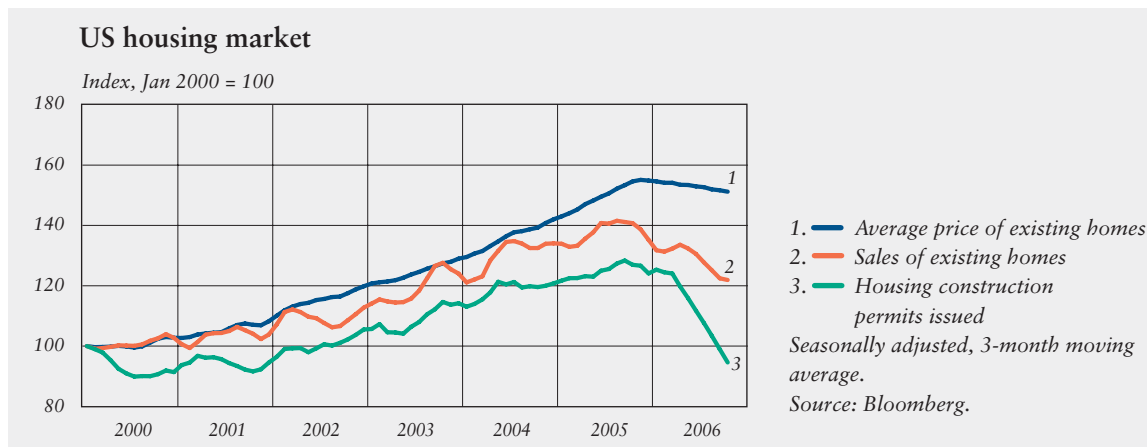
further drop in prices. OPEC apparently believes prices have fallen far enough, as it was able to reach rapid agreement on production cuts to begin in November 2006. The uncertainty surrounding the supply of crude oil has not disappeared, and there is therefore no current prospect of the price of oil falling to the levels prevailing at the turn of the millennium.

US housing market recession dampens growth

US economic growth slowed more quickly than expected in the second and third quarters of 2006. Third-quarter growth was 2.2% (at annual rate) compared with the previous quarter. Relative to the previous year, growth was 3.0%.

The main factor behind the slower US growth is the contraction in housing construction. Housing prices have begun to fall as a result of declining sales and a marked increase

Chart 5.



in unsold properties (Chart 5).

Although there were already signs of activity slowing down in the US housing market towards the end of 2005, the trend recently has been stronger than expected. The latest sales figures hold out no hope of a recovery in the US housing market in the near future.

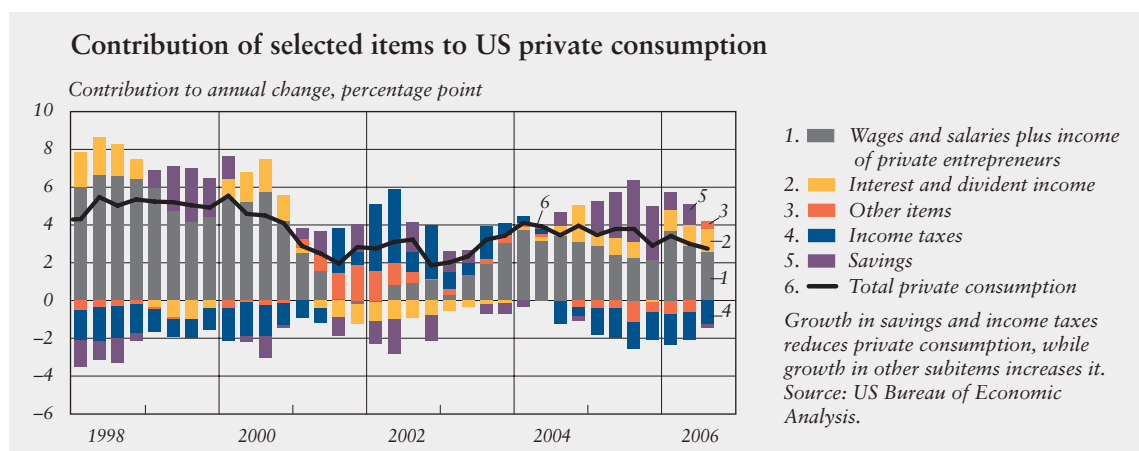
Despite the weaker activity on the housing market, US household consumption has shown little sign of slowing down in 2006. Thus, the wealth effect from falling housing prices has so far had little effect in depressing consumption. Household consumption has recently been supported particularly by a growth in incomes underpinned by the accelerating pace of wage rises (Chart 6). In contrast, the pro-growth effect of the tax cuts in the early years of the decade and the decline in the household savings ratio in 2005 has ceased during 2006. Even so, the savings ratio has remained negative,

and in the third quarter it stood at -1.3% of disposable income.

US inflation slowed markedly in September–October as a result of the fall in the price of oil. At the same time, however, underlying inflation (inflation excluding food and energy) has remained fairly high since the acceleration that began in spring 2006. Meanwhile, the pace of increase in unit labour costs has accelerated, with a more rapid rise in labour costs and slower improvement in productivity. This could sustain inflationary pressures.

The US growth outlook is still fairly bright, although the pace of growth is easing as private consumption subsides. If the continued low saving ratio were to start to climb, however, this could slow growth in private consumption more than forecast, particularly if there were to be a simultaneous and marked weakening in the labour and housing markets.

Chart 6.



Share prices up; less movement in exchange and interest rates

Of the major economic areas, the United States and Japan have not altered their key interest rates since the summer, while in the euro area the policy rate has continued to rise (Chart 7). In the United States, the signs of slower growth have increased market participants' belief that the period of tighter monetary policy is coming to an end. In Japan,

meanwhile, interest rates are expected to continue their gradual rise.

Long-term interest rates in the major economic areas have fallen slightly during the autumn (Chart 8). The tightening of monetary policy in the euro area has led to the 12-month money market rate rising close to the 10-year rate, and at times even above it. In the United States, this has been the situation for around a year already. Based on CPI-linked bonds,

Chart 7.

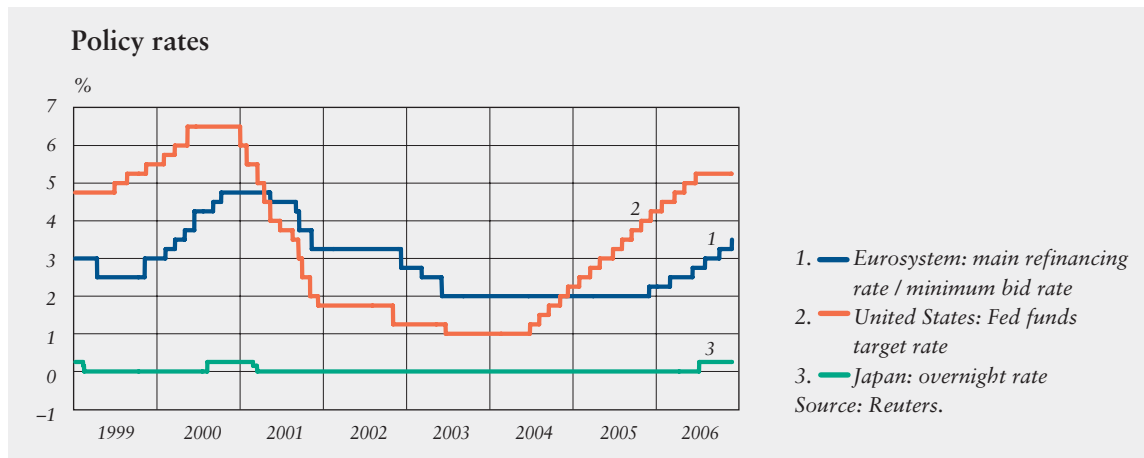
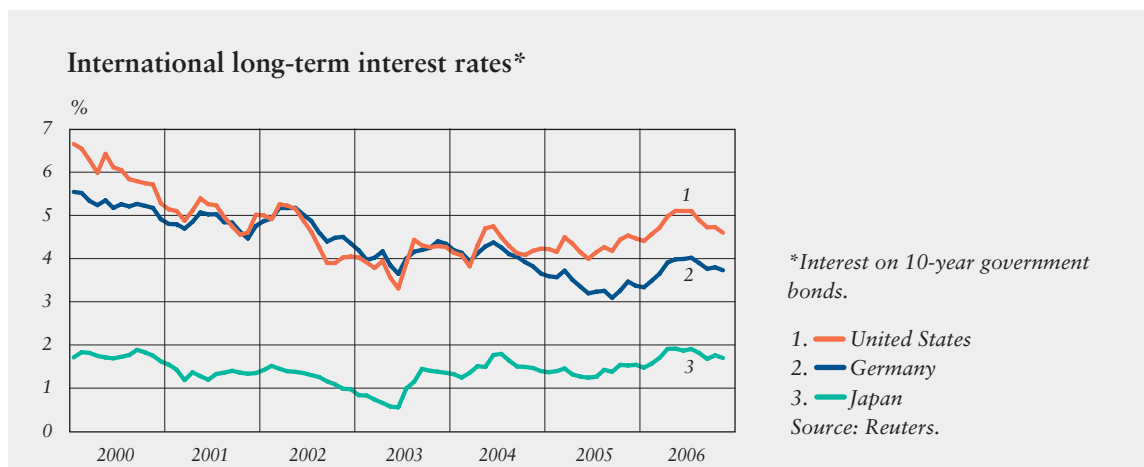


Chart 8.



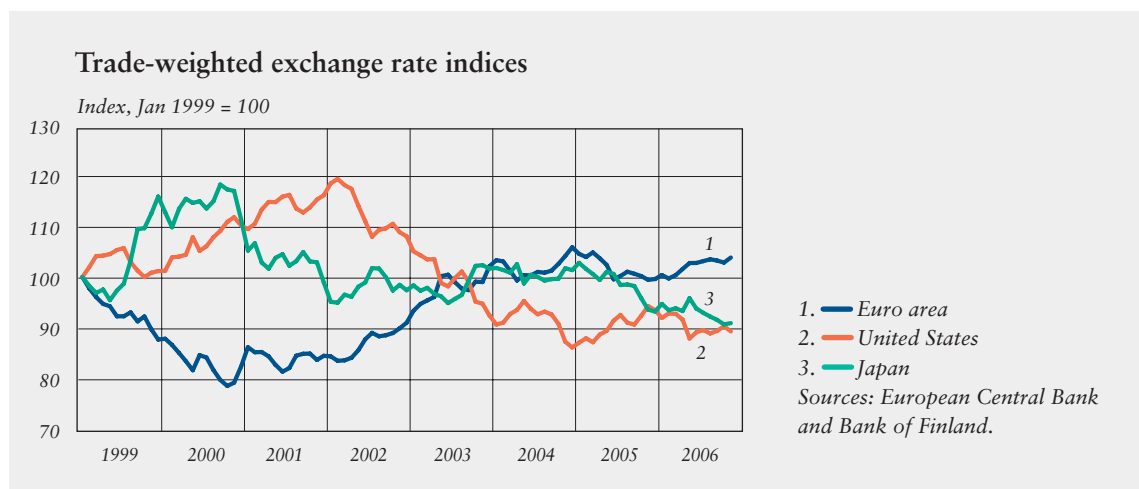
it would appear the financial markets' long-term inflation expectations have in recent months receded somewhat, especially in the United States, most probably as a consequence of the drop in the price of oil.

Stock markets have developed very positively during the autumn, with share prices rising in all major economic areas. The rise in share prices reflects market participants' confidence in continued strong corporate earnings development. At the same time, indicators of future stock market uncertainties have continued to decline and are now very low historically. This reflects a fairly rapid recovery in investors' readiness to take on risk after the dip that occurred during the financial market turbulence of the spring. The drop in the price of oil has also presumably had a positive impact on share prices. All in all, it would seem the stock markets expect world growth to

continue at a relatively brisk pace, while the risks of significantly slower US growth or accelerating inflation are not considered to be very great.

On the foreign exchange markets, movements in the euro and the US dollar, measured by the trade-weighted currency index, have been small in recent months, although the euro has appreciated slightly in recent weeks. Meanwhile, the Japanese yen has begun to depreciate again following the spring pause (Chart 9). This is presumably partly because rate-hike expectations have been slightly delayed as a result of the weakening outlook for the Japanese economy. At the same time, the recovery of readiness to take on risk has once again encouraged investors to use cheap yen-denominated loans to fund higher-yielding investments abroad. These carry trades attempt to exploit interest rate differences between currencies and could

Chart 9.



The acceleration in euro area growth in the first half of the year was largely due to the recovery in investment.

contribute to the weakening of the yen against currencies with a higher expected return on investment.

Signs of slower growth in Japan, China still growing briskly

Economic growth in Japan faded slightly in the second and third quarters of 2006. In the third quarter, quarterly growth was around 2% (at annual rate). The slower rate of growth is largely due to a marked cooling off in private consumption growth. Third-quarter growth was due almost entirely to inventory accumulation and increased exports. Indeed, viewed from the perspective of the near-term outlook, the structure of recent growth could be unfavourable, especially if the fading of world growth puts the brakes on Japan's export growth and there is no recovery in private consumption. Meanwhile, Japanese inflation remains sluggish after several years of deflation.

Chinese economic growth continued briskly in the third quarter of 2006, at around 10.5% on the same period in 2005. Growth was, however, almost one percentage point down on the previous quarter, largely due to slower investment growth. The slower pace of growth could be a sign that the actions of the central bank and other authorities, eg to dampen lending growth, are beginning to bear fruit.

Euro area growth slowing after a strong first half

There was a marked acceleration in euro area growth in the first half of

2006. Second-quarter growth was almost 4% up on the first quarter (at annual rate). This was the fastest growth in the euro area for five years. In large measure, the faster growth in the first half of the year can be attributed to a recovery in investment, whereas private consumption growth was subdued, particularly in the second quarter. Euro area growth slowed to around 2% in the third quarter, although private consumption growth was relatively robust.

Viewed country by country, euro area growth in the first half of 2006 was broadly based. At the same time, national differences in the pace of growth between the large euro area countries were smaller than in previous years. Second-quarter growth in Germany, Spain, France and the Netherlands was within the range of 4–5% on the previous quarter (at annual rate), while Italian growth was under 2%. The Italian economy is still suffering from structural problems, and the country has lost further ground in respect of foreign trade competitiveness relative to the other large members of the euro area. In most of the smaller countries in the euro area second-quarter growth was around 4%. Advance data on the third quarter suggests growth was particularly weak in France, while the engines of euro area growth would appear to be Germany and Spain.

Euro area growth has continued at a reasonable pace in the second half of 2006, if slightly more slowly

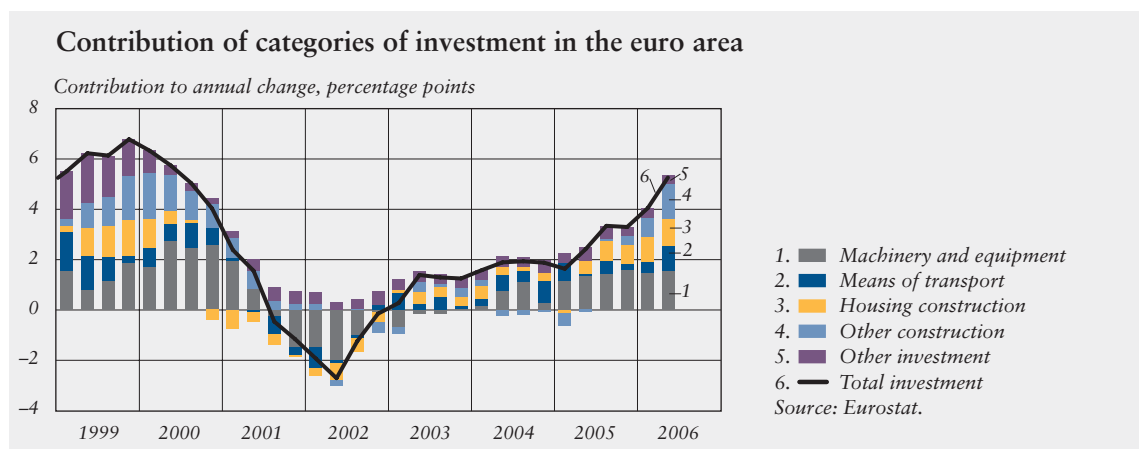
than in the second quarter. Business confidence has remained strong at the same time as industrial output and company order books have continued their strong growth. Earnings development in euro area companies has also continued to be mainly favourable in the third quarter. Thus, the slower US growth does not so far appear to have been reflected in the outlook for businesses in the euro area.

Euro area exports have also continued to perform strongly during the autumn, which means the negative impact on exports of the earlier euro appreciation has at least so far been fairly negligible. Exports have grown, particularly to the new EU member states, China and the oil-producing countries. Exports to the United States have, in contrast, declined, due to the slowdown in US growth. The euro area current account has, however, gone slightly into deficit, as imports, too, have grown strongly.

There are some signs that private consumption growth in the euro area has picked up in the second half of the year. Both retail trade and consumer confidence indices have remained high compared with recent years. Euro area labour market trends have also been positive in 2006, although the fall in the unemployment rate has come to halt during the autumn at just under 8%. Second-half household consumption has been further supported by the increase in real income caused by the drop in the price of oil. In addition, German households are likely to bring forward some of their consumer durables purchases from early 2007 to the end of 2006, as the turn of the year will bring an increase in value-added tax in Germany.

The recovery in investment activity in the euro area has been gaining strength since the beginning of 2005 (Chart 10). In 2006, investment growth has gathered pace

Chart 10.



The recent strong economic growth in the euro area has improved the financial position of general government.

across a fairly broad front, as there has been a strong increase in investment in equipment and machinery and in construction investments. The increased level of investment has been helped by corporate confidence in the recovery of the euro area economy and continued strong growth in the world economy. Moreover, the financial environment for investment has been favourable, as corporate earning capacity has generally been good and interest rates low.

The recent strong economic growth in the euro area has improved the financial position of general government. According to the forecast by the European Commission, the general government deficit ratio will contract in 2006 by almost ½ percentage point to 2%, and this trend is expected to continue in the immediate years ahead. General government debt is, in turn, forecast to decrease by around 3.5 percentage points to 67% of GDP between 2005 and 2008. General government finances have been boosted particularly by higher tax revenues due to the favourable business cycle. However, Germany, Italy, France, Greece and Portugal are still within the sphere of the euro area's Excessive Deficit Procedure. Of these countries, the most positive trend in general government finances has been in Germany, and for all the others apart from Italy the Commission forecasts the deficit will be reduced in 2006.

Euro area inflation dampened by drop in the price of oil

Inflation according to the harmonised index of consumer prices (HICP) for the euro area remained above 2% in summer 2006, but slowed considerably in September–October to around 1.6–1.7%. This was due almost entirely to the fall in energy prices during the autumn and their high level in the comparable period a year earlier.

The extent to which the strong rise in the price of oil in recent years has been passed onto the prices of other products in the euro area is still very limited. The pace of rise in the prices of other industrial products and of services has remained almost unchanged in 2006. There has also been no sign so far of any increase in wage pressures in the euro area. Although the pace of increase in labour costs has accelerated somewhat, productivity growth has also been relatively brisk. As a result, unit labour costs, which influence future inflationary pressures, have risen relatively slowly. Even so, there is still a risk of higher inflation. This relates primarily to the passing on of the earlier rise in the price of crude oil into the prices of other products and to the supply-side restrictions caused by the favourable economic and employment trends. The next few months could see higher inflation, primarily due to the increase in value-added tax being introduced in Germany at the turn of the year.

The volume of money and credit in the euro area has continued growing rapidly in autumn 2006, indicating ample monetary conditions. Particularly strong has been the growth in corporate lending, whereas growth in households' demand for housing loans has eased somewhat. The high level of corporate lending partly reflects the recovery of investment in the euro area, while the slower growth in housing loans is in part a consequence of higher interest rates.

The Governing Council of the European Central Bank has continued the policy begun at the end of 2005 of reducing the accommodation of monetary policy. At the beginning of December 2006 the policy rate was raised to 3.50%, an increase of 1.50 percentage points in the past year. Despite the raising of the policy rate, monetary policy continues to be accommodative. By raising the policy rate, the Governing Council is

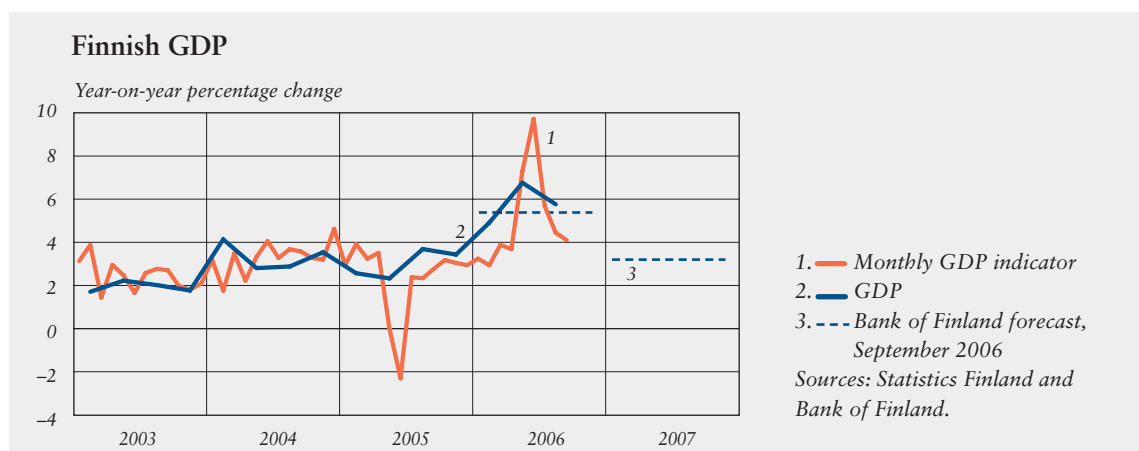
seeking to forestall longer-term risks to price stability. The financial markets expect the ECB to continue raising the policy rate in the first half of 2007.

Finnish economy still going strong

The Finnish economy continued to grow strongly in the first half of 2006 (Chart 11). Growth from the same period the previous year was approximately 5.6%, but this figure was boosted by the paper industry labour dispute in the first half of 2005. Based on the monthly GDP indicator, the economy continued to grow fairly briskly in the third quarter; but in Finland, too, there have been some signs of a slowing in the pace of growth.

The strength of Finnish growth has been broadly based. Positive household confidence, growth in aggregate wages and rising asset values have supported growth in private consumption. At the same

Chart 11.



time, the outlook for industry has also remained bright and the strong performance of Finland's export markets – particularly Russia and the euro area – has sustained export growth.

The downward trend in Finland's unemployment rate has come to a halt during 2006 at around 8%. At the same time, there has been an increase in the number job

vacancies and employers have experienced a shortage of skilled labour, particularly in the construction sector. This suggests that a significant proportion of Finnish unemployment is currently structural.

The Finnish housing market has gradually cooled during the second half of 2006. Annual growth in the stock of housing loans has slowed and the number of house sales has

Chart 12.

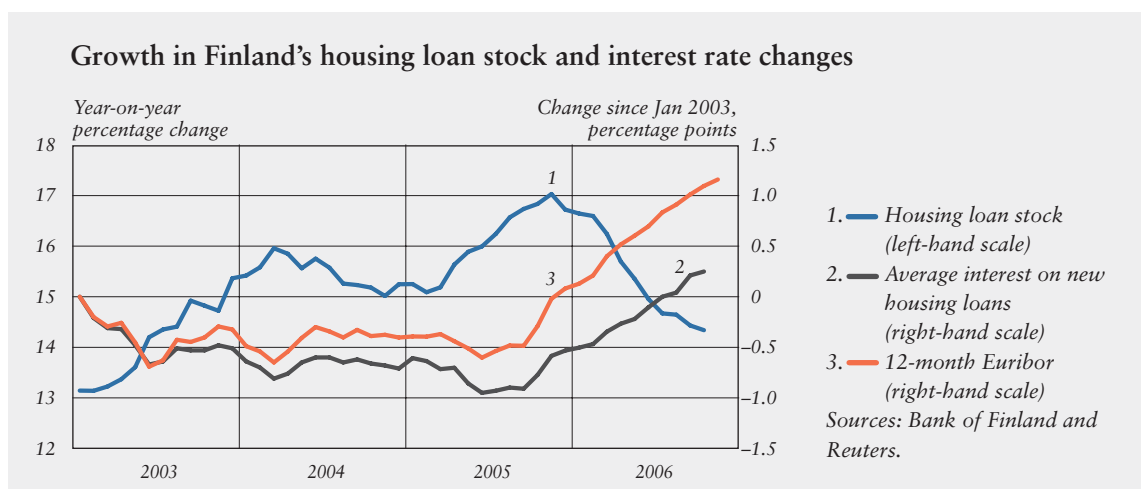
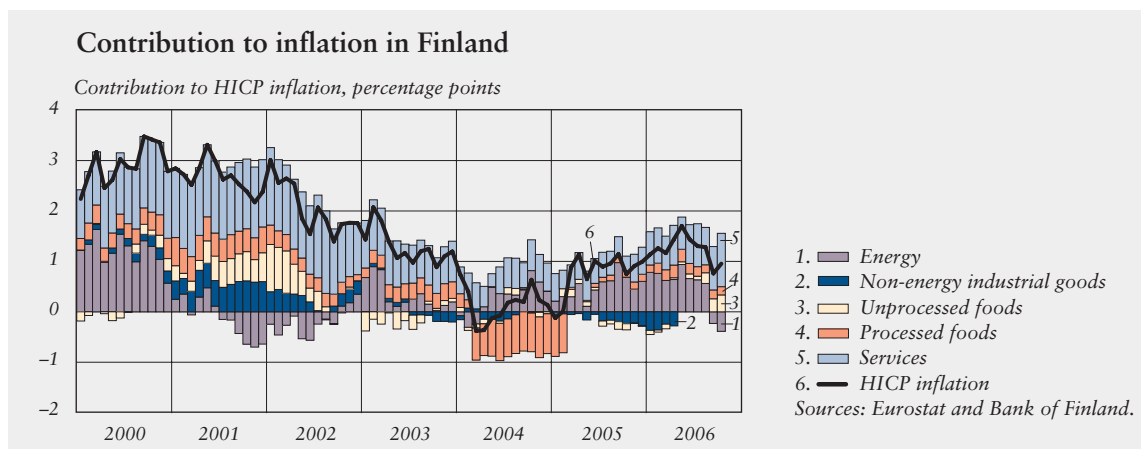


Chart 13.



declined relative to 2005. Despite the slowdown, the housing loan stock has continued to grow relatively briskly, particularly in view of the rising trend in interest rates that began at the end of 2005. This is partly because there is a time lag in the rise in the 12-month Euribor (the most common reference rate in Finland) being passed on to the interest charged on housing loans (Chart 12). The deceleration in the pace of growth in the housing loan stock can be expected to continue as the higher interest rates filter through into interest charged on housing loans.¹

General inflation lower in Finland, but service prices rising faster

The fall in the price of oil has slowed the pace of inflation as measured by the harmonised index of consumer prices in Finland, too. Finland's annual inflation in September–October was under 1%, while in the summer it was still in the region of 1.5%.

In product categories other than energy the average price rise has been fairly steady in recent months (Chart 13). Prices for non-energy industrial goods have remained more or less stationary, due eg to increased competition. In contrast, the upward trend in service prices has gradually

accelerated during the course of 2006. The main reason for this has been the upturn in telecommunications service prices following years of declining prices.

Wages in Finland have been rising faster in 2006 than the average for the euro area. The rise in unit labour costs has, however, remained moderate due to favourable productivity development, and the inflationary pressures from rising wages have therefore been small so far.

Keywords: inflation, monetary policy, economic situation

¹ The household sector debt burden is dealt with in *Financial stability*, Bank of Finland Bulletin special issue (2006).

Russian energy sector – prospects and implications for European energy supply

17 October 2006

Russia is a globally important oil and gas producer. Russian energy is especially important to the import-dependent EU countries. Recently, Russia has expressed its interest in expanding its export markets outside Europe and has raised gas prices for several European countries. Not surprisingly, energy ranks high in both Russia's economic and foreign policy. EU dependency on Russia appears to be growing due to rising energy imports, and energy is likely to occupy a central role in the EU-Russia dialogue in the foreseeable future.

Russia is a globally important oil and gas producer

As a non-member of OPEC, Russia has increased its oil production significantly in recent years. During 1998–2005, Russia's oil output growth accounted for almost 40% of the increase in world oil supplies. After Saudi Arabia, Russia is the second largest oil producer in the world. In 2005, Russia accounted for 12.1% and Saudi Arabia for 13.5% of total world oil production. Russia's known reserves, however, are much smaller than Saudi Arabia's and its oil industry is still in many respects underdeveloped. Russia's known oil reserves account for only 6% of the world's known reserves, while Saudi Arabia's account for 22% (Table 1).

After the collapse of the USSR, oil production in the former Soviet states declined significantly throughout the early 1990s. Following the 1998 financial crisis, Russian oil production started to climb again. In fact, production has increased by over 50% since 1999. Since the end of 2004, however, production growth has slowed down. In 2005, Russia's oil production was 9.6 million barrels per day (bpd), which was still less than during the peak years of the Soviet era, and it grew by less than 3% year-on-year.

Russian oil exports are now at a much higher level than during Soviet times. As domestic demand decreased sharply throughout the 1990s, Russia has managed to increase its crude oil exports much faster than its production. In 1999–2004, exports grew on average by two-digit numbers annually, but, as with



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Table 1.

The 10 countries with the largest oil reserves in the world, end of 2005				
<i>Largest oil reserve</i>	<i>Reserves (billion barrels)</i>	<i>Share of reserves, %</i>	<i>Production 2005 (million bpd)</i>	<i>R/P (years)</i>
<i>Saudi Arabia</i>	264.2	22.0	11.0	65.6
<i>Iran</i>	137.5	11.5	4.0	93.0
<i>Iraq</i>	115.0	9.6	1.8	>100
<i>Kuwait</i>	101.5	8.5	2.6	>100
<i>United Arab Emirates</i>	97.8	8.1	2.6	97.4
<i>Venezuela</i>	79.7	6.6	3.0	72.6
<i>Russian Federation</i>	74.4	6.2	9.6	21.4
<i>Kazakhstan</i>	39.6	3.3	1.4	79.6
<i>Libya</i>	39.1	3.3	1.7	63
<i>Nigeria</i>	35.9	3.0	2.6	38.1

Source: British Petroleum (2006).

production, a change occurred at the end of 2004. In 2005, export volume actually fell to 5.1 million bpd, a 2% decrease year-on-year.

Russia also produces oil products, although there is little refining capacity in the country. Refining declined sharply after the fall of the Soviet Union and then started to develop slowly after 1998. The quality of processing is also low. While Russia accounted for 12% of world oil output in 2005, its share of refining capacity was only 6%. Most of its refined products are consumed domestically, only a third being exported.

Russia's domestic consumption of oil has fallen from the Soviet period. It is now approximately 60% of what it was as recently as 1992, due to the general output decline in the 1990s and the restructuring of infrastructure inherited from the Soviet Union. The share of oil in energy production has decreased.

Currently, domestic consumption is increasing slowly, at an annual rate of 1–2%.

Russia holds the largest natural gas reserves in the world

In 2005, Russia held more than a quarter of the world's total reserves of natural gas (Table 2). In contrast to oil, Russian gas reserves are expected to last a long time (see R/P ratio in Table 1 and Table 2), some 80 years at current production levels, despite the fact the vast majority of gas is extracted from three giant Siberian fields (Medvezhye, Urengoy and Yamburg), at least two of which have already passed peak production. In terms of production, Russia accounted for 22% of the world total in 2005.

Russia is also the world's largest consumer and exporter of natural gas. Approximately two thirds of gas produced is consumed in the domestic market, at regulated prices far lower than those at which gas is sold abroad. Residential and industrial sectors demand an almost equal share of the gas used in Russia, with transport as the third major consumer. Gas is also the most important fuel in electricity production in Russia. In the future, natural gas is expected to become ever more significant domestically, as the share of gas in Russian total primary energy supply is forecast to rise from 52% in 2000 to 56% in 2030 (IEA 2004).

Table 2.

The 10 countries with largest natural gas reserves in the world, end of 2005				
Largest gas reserve	Reserves (trillion m ³)	Share of reserves, %	Production (billion m ³)	R/P (years)
Russian Federation	47.8	26.6	598.0	80
Iran	26.7	14.9	87.0	>100
Saudi Arabia	6.9	3.8	69.5	99.3
United Arab Emirates	6.0	3.4	46.6	>100
USA	5.5	3.0	525.7	10.4
Nigeria	5.2	2.9	21.8	>100
Algeria	4.6	2.5	87.8	52.2
Venezuela	4.3	2.4	28.9	>100
Iraq	3.2	1.8	–	>100
Kazakhstan	3.0	1.7	23.5	>100

Source: British Petroleum (2006).

In the Soviet past, Russian gas exports mostly went to Eastern Europe. Today, the focus has shifted to the EU countries and Turkey, which bought 80% and 12%, respectively, of Russian exports outside the CIS in 2005. The remainder went to non-EU European countries. World energy consumption is forecast to lean more to natural gas in the future. As Russia realises some or all of its current export infrastructure development plans (see Box), exports may become less concentrated on the European continent. In the near future, however, EU countries will most likely continue to be the main importers of Russian gas.

Oil and gas in the Russian economy

The oil and gas industry is of crucial importance to the Russian economy. The increase in world oil prices since 1999 has accelerated Russia's GDP

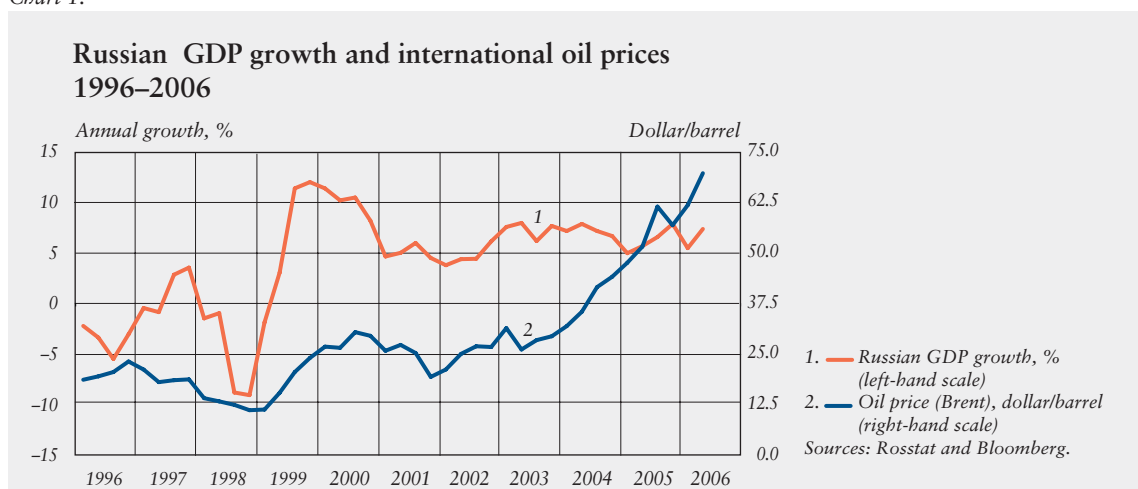
growth during the present decade.

According to an estimate made at the Bank of Finland, a 10% permanent increase in international oil prices is associated with a 2.2% increase in the level of Russian GDP (Rautava 2004). The world market price for oil has risen over six fold from 1999 to mid-2006 (Chart 1).

According to the Russian government, the energy sector actually accounted for about 30% of Russian GDP in 2005. Oil and gas exports accounted for 56% of Russia's total export income in 2005 and grew by almost 50% year-on-year. The employment effect is, however, much smaller. According to Rosstat, in 2005 only 1.6% of the employed worked in the mineral extraction sector, mostly in hydrocarbons.

As oil prices have continued to grow rapidly, export revenues have also grown rapidly since 1999. In the

Chart 1.



first nine months of 2006 oil export revenues increased by nearly a third from a year earlier and accounted for 46% alone of the total value of exports. At the same time, gas export revenues have also significantly increased due to export price hikes. They grew by over 40% compared to the corresponding period in 2005. The growing export incomes are fuelling the economy with liquidity and keeping the current account in surplus (Chart 2). In the first half of 2006, the current account showed a surplus of USD 57 billion, or 13% of GDP, making it among the largest surpluses in the world. Russia is thus a major financier of global deficits.

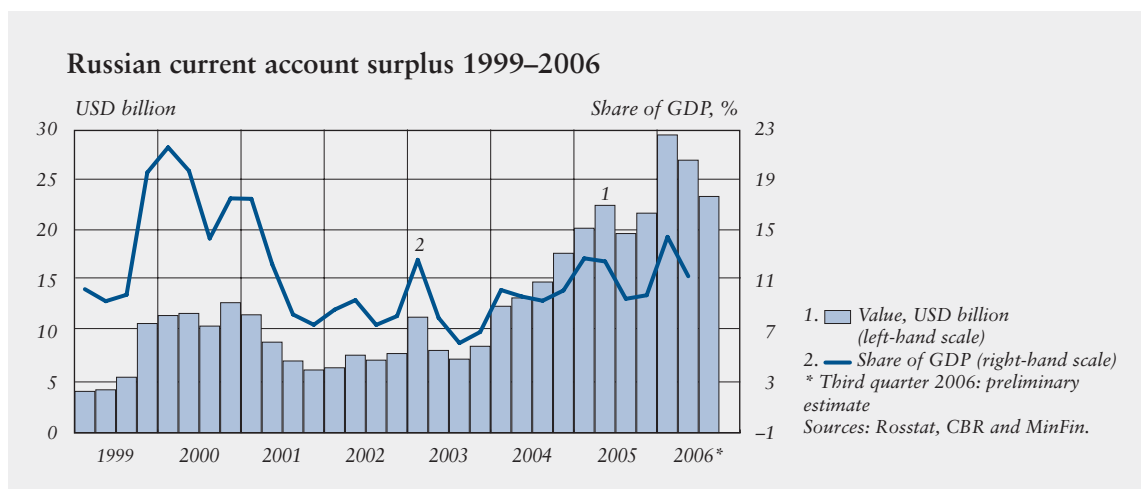
The sizeable export revenues have boosted Russia's foreign exchange reserves, which stood at USD 261 billion at the end of September 2006. Moreover, about half the federal budget revenues are

currently from oil and gas. In order to neutralise liquidity flows, Since the beginning of 2004, Russia has been accumulating a Stabilisation Fund by high taxation of the oil sector. At present, the effective marginal tax rate on crude oil exports is approximately 90%.¹ The Stabilisation Fund has grown rapidly and at the beginning of October stood at USD 71 billion. It currently equals approximately the Russian federation's total external debt (Chart 3).

Although Russia has sterilized excess liquidity by different means, inflation remains high. Annual

¹ The Russian oil sector is taxed heavily through different schemes. On top of general taxes (eg VAT, profit tax and social tax) there are four sector-specific taxes for oil. Firstly, there is the mineral resource extractions tax, which taxes oil extraction. Secondly, there is the crude oil export duty, which is progressive with respect to Urals oil prices. Thirdly, there are export duties on petroleum products, which are adjusted every third month. Finally, there are excise duties charged on gasoline, heating oil and motor oil. A large proportion of oil sector-specific tax revenues are deposited in the Stabilisation Fund.

Chart 2.



inflation in 2005 was 10.9%; in September 2006 it had come down to 9.5%, partly due to the small appreciation in the nominal exchange rate. Rising prices for housing, petrol and certain foodstuffs also added to inflation last year. The rouble's real effective exchange rate in January–September gained 8.1% year-on-year and is forecast to appreciate further.

Limits of Russian oil production and exports

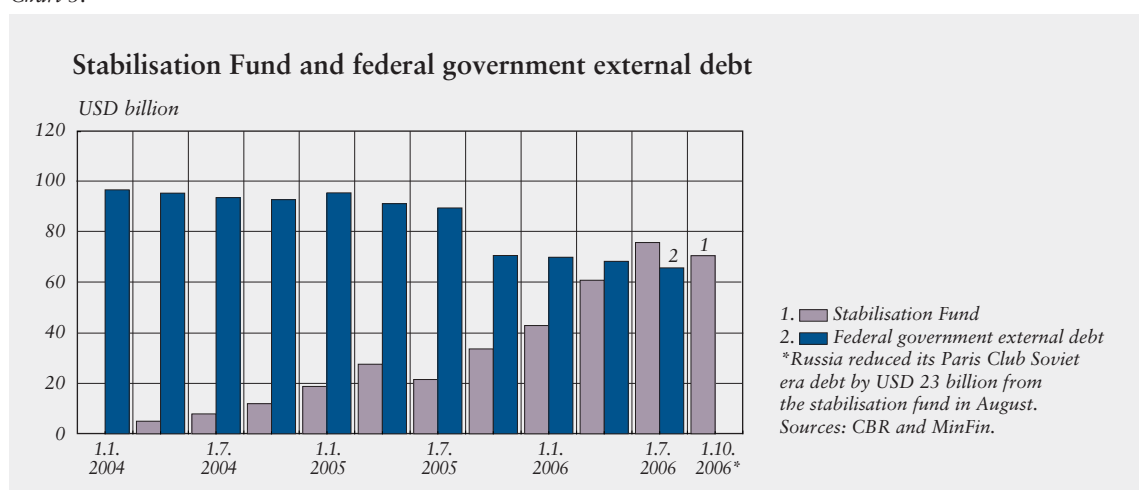
Russia's oil production is likely to stay at its current high level in the near future, but there is a great deal of scepticism over whether Russia can continue as such a large oil producer in the long term. In the first place, although Russia is the second largest producer of oil at the moment, it is only seventh in terms of known reserves (see Table 1). In terms of its reserve-production ratio, Russia scores much lower than the other

major producers. At the current rate, Russia would empty its known reserves in 22 years. However, most experts believe that Russia's actual oil reserves are much larger, as the geological research available was conducted mainly during the Soviet era.

The majority of known oil reserves are located in the Ural Federal District, where they are easy to access. Undiscovered oil reserves are expected to be concentrated more in the Siberian and Far Eastern Federal Districts, where the oil is also deeper in the ground. As oil wells in the Ural Federal District are drying up, oil companies are forced to look for new wells in more remote locations, but so far they have not been keen on investing in exploitation to any considerable extent.

Secondly, investments in oil production have declined in the last few years. Most private producers have focused solely on exploiting

Chart 3.



The government does not trust the ability of the private sector to manage the oil companies in the national interest.

current fields. Much of the drilling is still based on Soviet-era technology, which can be up to 30 years old, and needs to be replaced in order to increase productivity. According to the International Energy Agency, Russia urgently needs to modernise its oil production capacity: the Agency estimates that the oil sector needs roughly USD 14 billion annually to keep up with the modest growth projected in the country's energy strategy. Many specialists have also warned that Russia is at risk of a production crisis in the future due to the dearth of investment in geological research.

Thirdly, recently increased state involvement in the energy sector casts doubts on the investment climate and market rules in the sector. The government has increased the tax burden on natural resources (especially oil) while the price of oil has been high. Tighter and more progressive tax schemes for the export of both crude oil and oil products entered into force in 2004 and are being revised in autumn 2006, which is likely to strengthen state control of natural resources and increase tax revenues even further. However, the introduction of tighter taxation seems also to have reduced oil companies' interest in investing and especially in striving for increased exports, despite the current high world market price for oil.

The increased state involvement can also be seen as the government's

response to some of the threats to oil production. It seems that the government does not trust the private sector's ability to run the sector in the public interest, ie to increase long-term investment, boost export growth, and provide abundant tax revenue.

The question remains as to whether increased state involvement is good for the oil sector. It could increase investment in exploration and development, which private companies have so far largely neglected. The involvement has also increased tax revenues. However, it can also have many negative consequences. The tax claims against Yukos were selective and are widely regarded as politically motivated, although other oil companies (eg TNK-BP and Sibneft) also received smaller charges for tax arrears. Many observers have noted how selective law enforcement in Russia can be and how it increases uncertainty for all business in Russia.

Finally, the question of foreign involvement in Russian oil business needs to be highlighted. Increased state involvement in the sector has included protectionist characteristics. Natural resources are seen as a Russian national treasure, or strategic sectors, and the government has become less amenable to foreign companies exploiting them. However, the government is also fully aware of the fact that only a few Russian companies have enough capital, and

the required technology, for the investment needed to develop the oil sector. Therefore some albeit limited foreign involvement seems to be accepted.

Official statistics and estimates show that the growth in oil production is slowing down. However, the assumed decrease in growth in the longer term varies widely. The Russian energy strategy approved by the government envisages moderate growth up to 2020, while one of the most pessimistic views was expressed by the energy consultancy agency Wood Mackenzie (Chart 4). It expects Russian oil production to actually decline after 2010, based on its pessimistic prognosis for investment in production facilities and new exploration.

While production is still forecast to increase, domestic demand is estimated as increasing more slowly.

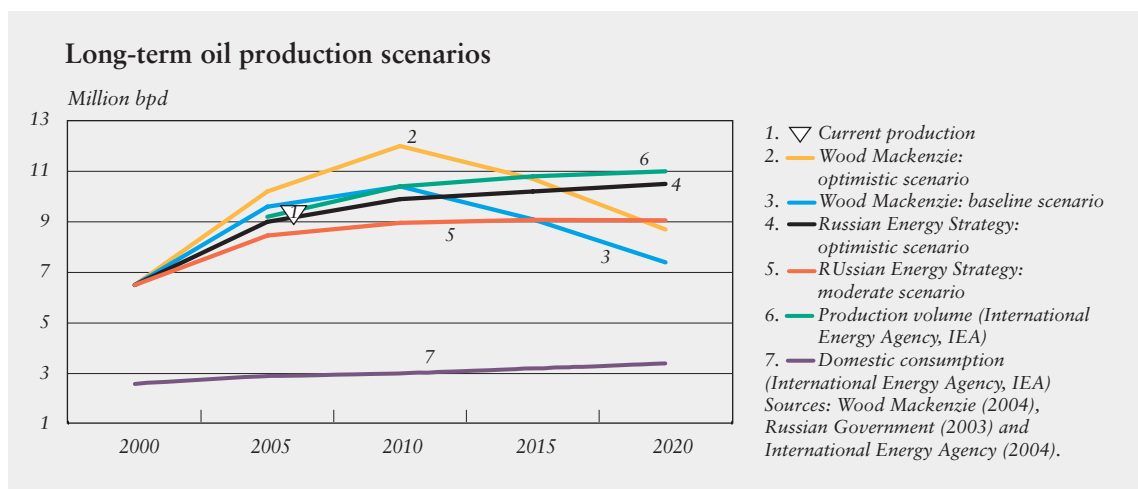
According to the government's energy strategy up to the year 2020, Russia aims to fulfil its primary energy demand mainly through coal and gas, keeping the share of oil stable.²

Russian domestic demand for oil is calculated at 3.0 million bpd for 2010, 3.4 million bpd for 2020 and 4.0 million bpd for 2030. The annual increase in demand for oil is thus 1.6% in 2002–2030, with the main increase in consumption coming from the transport sector. This demand, though rising, is still low compared to demand in the Soviet era.

In its economic projections up to the year 2015, made in late 2005, the Russian Ministry of Economy forecasts both oil and gas exports as growing by less than 10% over the next 9 years. The reasons for this low

² In the short run, the government plans to meet primary energy demand largely through nuclear power, but the projected increase for 2000–2030 is very small compared to gas and coal.

Chart 4.



rate of growth include, firstly, slow production growth. Secondly, domestic demand is on the rise, albeit slowly. Thirdly, there will be less crude oil to export as more oil and gas are gradually be refined domestically (Chart 5).

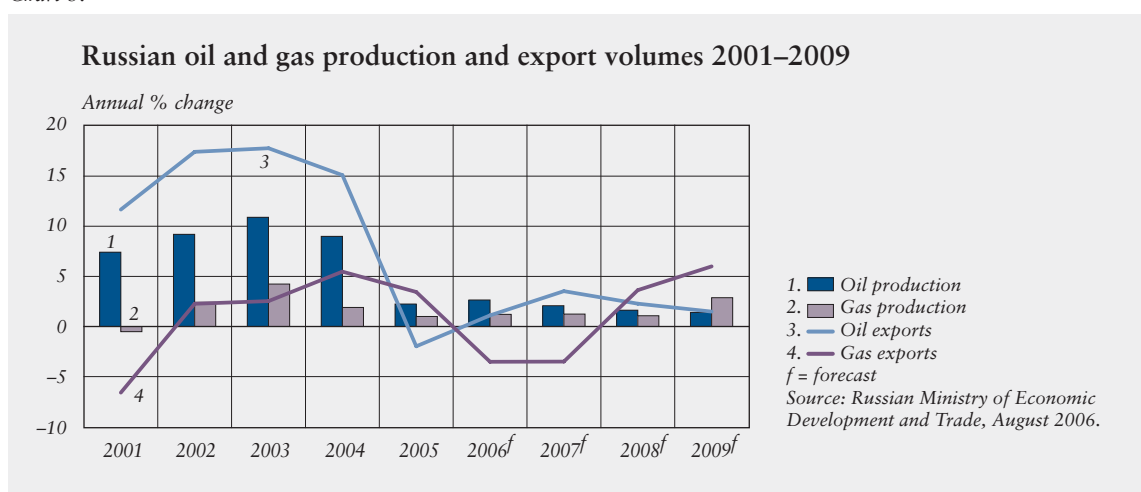
Today, Europe is Russia's largest oil export market, and Russian oil accounts for roughly a third of the European Union's oil imports. Russia has clearly stated that it wants to diversify its oil trade by increasing its exports to other areas. This aim is revealed in plans to construct new pipelines to the Pacific Ocean and to Murmansk. According to the Ministry of Industry and Energy, Russia aims to export roughly a third of its oil outside Europe in the future. In 2004, the share was only about 7%. This aim, and the fact that Russia's export growth is declining, suggests that Russia's oil reserves will not be as significant a source for

Europe's increased energy needs as in recent years.

The lack of export capacity, especially in state pipeline-monopoly Transneft's network, has boosted train and river exports in the last few years. In 2004, pipelines accounted for 60% of crude oil exports, while 33% was exported by rail. The pipeline network has expanded little since the collapse of the USSR, and most of the work has been aimed at reducing bottlenecks. Table 3 shows the expansion plans for the Transneft network presented at the end of 2004 by the Ministry of Industry and Energy.

To increase capacity and get around the bottlenecks in the Bosphorus straits and the Friendship pipeline through Ukraine to Europe, the government has planned some alternative export routes. The first new oil terminal was built at Primorsk on the Gulf of

Chart 5.



Finland. The adjacent Baltic Pipeline System is already running at full capacity. The Primorsk terminal is currently the largest oil exporting harbour for Russian oil.

The Russian government has also pushed ahead with its plan to extend the present pipeline grid eastwards. At the end of 2004, it announced its decision to construct an oil pipeline stretching over 4,100 kilometres from Taishet in eastern Siberia to Nakhodka on the Sea of Japan. The planned capacity of this pipeline is about 1.6 million bpd, which corresponds to nearly a third of Russia's current crude oil exports. The government is also considering building an offshoot from the Taishet-Nakhodka pipeline to China. A pipeline from western Siberia to the Kola peninsula (Murmansk) has also been discussed. This project would significantly reduce the cost of

transport from Russian oil fields to the American market. It is, however, unclear whether this pipeline is still included in present plans.

Potential gas production and export growth

According to the national energy strategy, natural gas production is expected to increase from 598 billion cubic metres (bcm) in 2005 to 730 bcm under the optimistic, and 680 bcm under the pessimistic, scenario by 2020. Even in the optimistic case, the annual average growth rate of Russian natural gas production from 2002 until 2020 would be only 1.4%.

The monopoly position of Gazprom is one reason for the pessimistic near-term growth projections. Critics have long called for restructuring of this company giant, currently one of the 10 biggest in the world judged by market

Table 3.

Planned capacity of Transneft export pipeline grid, 2003–2020, volumes in millions of bpd

<i>Transneft export pipelines</i>	2003	2005	2010	2015	2020
<i>Primorsk terminal (BPS)</i>	0.6	1.2	1.2	1.2	1.2
<i>Baltic and Polish terminals</i>	0.1	0.3	0.3	0.3	0.3
<i>Ukraine-Europe (Friendship)</i>	1.3	1.3	1.3	1.3	1.3
<i>Black Sea grid</i>	1.3	1.3	1.3	1.3	1.3
<i>Caspian Sea grid</i>	0.4	0.6	1.3	1.3	1.3
<i>Taishet to Nahodka</i>			0.6	1.0	1.6
<i>Western Siberia to Murmansk</i>				1.0	1.6
Total	3.7	4.7	6.1	7.5	8.7

Source: Ministry of Industry and Energy.

The present infrastructure will probably be unable to cope with a major increase in gas exports.

capitalisation, but any serious effort by the Russian government to actually take up this task is yet to be seen. Furthermore, due to subsidised gas and electricity prices at home, Gazprom faces inadequate cash flow for any large infrastructure improvements. Thus, a serious lack of restructuring and investment plagues efforts to increase gas exports to any considerable extent.

Although arguments here also vary, the current infrastructure probably cannot handle any sizeable increases in export volumes of gas either. Any new infrastructure will take years and resources to build, although there are a number of plans in existence (see Box for a list of projects). To this we should also add the cost of ships suitable for LNG transportation, plus the costs for the purchasers of building the re-gasification facilities at the receiving end.

Furthermore, the new planned export capacity would have to be filled with gas not shown in the official production growth estimates. The new export pipeline plans listed in Box together indicate the need for up to 135–155 bcm of additional gas annually. There are also uncertainties even in those projects that have already proceeded the farthest. For instance, the North European Gas Pipeline between Russia and Germany would pass through the economic area of Finland and Sweden, implying that an environ-

mental impact evaluation has to be conducted and approved before anything can be built. Sweden, in particular, has expressed its intention to scrutinize the proposal closely.

According to the US Energy Information Agency, all major consumers (including the EU, the US, India and China) expect to increase their consumption and import of gas in the next two decades. World consumption of natural gas is expected to increase by nearly 70% from 2002 to 2025. At the same time, total former Soviet Union demand and production are both forecast to grow slightly over 2% annually. Globally, Qatar, Algeria, Iran and Russia are expected to provide most additional gas. Qatar alone should account for almost one quarter of the increase in the inter-regional gas trade between 2004 and 2030, Russia for less than 10% (IEA 2006).

Implications for energy supply in Europe

High oil price and supply uncertainties have led to many countries trying to diversify their energy sources and in the long term decrease their demand for oil. Though the recent oil price peak is also being driven by supply uncertainties, the price is basically being driven by the rapid growth in consumption of both emerging markets like India and China and traditional markets. World supply of crude oil grew by only 1% in 2005. In fact, the fastest growth

Box.

Planned oil pipes

1. **Baltic pipe, 2nd phase (Energy strategy 28 August 2003)**
 - 1st and 2nd phase together 62 million t/ year
 - ready in 2006
2. **West Siberia – Kola peninsula (Energy strategy 28 August 2003)**
 - to the US market
 - 2,800–4,000 km
 - 120 million t/year (80 million t/year by 2020)
3. **East Siberia – Pacific Ocean ESPO**
 - to Japanese and Far East markets
 - 4,200 km
 - 50 million t/year
 - ready by 2010
4. **East Siberia – Daqing (China)**
 - 2,100 km
 - 30 million t/year
 - ready by 2010
5. **Combining Druzhba and Adria pipelines**
 - adds export capacity to the Mediterranean by 15 million t/year

Planned gas pipes

6. **Russia – Turkey ‘Blue Stream’**
 - Gazprom, ENI
 - 1,200 km
 - is ready
 - capacity by 2010 from the current 4.5 to 16 bn m³/year
7. **North-European Gas Pipeline NGP**
 - Gazprom, BASF, E.ON; contract 8 September 2005
 - 1,200 km
 - 27.5 bn m³/year
 - ready by 2010
8. **NGP 2nd phase**
 - 27.5 bn m³/year
 - ready by 2013
9. **West Siberia – China (RBK 3 August 2006)**
 - Gazprom, CNPC; contract 21 March 2006
 - 3,000 km
 - 30–40 bn m³/year
 - ready by 2011
10. **East Siberia – China (Jamestown 31 March 06)**
 - Gazprom, CNPC; contract 21 March 2006
 - 30–40 bn m³/year
 - ready by 2011
11. **Russia – Serbia (Turkish Daily News 29 July 2006)**
 - Gazprom, Srbijagas
 - 400 km
 - 20 bn m³/year

At present, 38% of energy consumption in the EU is based on oil, and this figure is expected to remain more or less unchanged between now and 2025.

was in the former Soviet states, and especially Russia. Despite the significant recent slowdown in production growth, Russia still has a role to play in increasing the world supply of oil.

According to the US Energy Information Agency, the world consumption of oil is expected to increase by 34% from 2004 to 2025 (EIA 2006). The situation is different in Europe. Currently, 38% of EU energy consumption is based on oil, and in 2025 the forecasts assume the share will remain largely the same. Oil consumption in the 25 EU countries (EU25) is estimated by the Commission as growing only by 3% in the whole period 2005–2025 (EUCOM 2005).

Norway, the second largest oil provider to the EU25 after Russia, faces declining production levels. Norwegian oil production has decreased an average 3% annually in 2002–2005. Libya and Saudi Arabia (3rd and 4th largest providers of oil for the EU25), have increased their production by 4.7% and 4.6% annually in the same period. As North Sea oil production has reached its peak, EU oil imports will grow faster than consumption in the future. It is hard to say what will happen to Russia's share of EU imports, but it will probably not change much. But Russia is clearly not an inexhaustible source of oil.

Western Europe's reliance on imported gas is projected as growing

from a third of total gas consumption to 50% by 2025. EU25 gas consumption is projected to grow by 39% in the period 2005–2025 (EUCOM 2005).

In western Europe, plans to rely on producers whose gas would need to be imported in liquefied form are constrained by the necessary infrastructure investments in LNG terminals and special ships, and also burdened by security and environmental risks. In addition to the EU, countries such as the United States, China, India and Japan will also be competing for the same supplies. Some growing gas producers pose major political risks compared with Russia.

Many infrastructure projects have been suggested. On one hand, there is a perceived need to reduce dependency on Russia in energy transports from Central Asia. On the other hand, Russia wants to decrease its dependency on transit countries. At the same time Gazprom, while keen to maintain its monopoly transit position in Russia, has a commercially natural but in many eyes politically problematic goal of extending downstream, both to control pipelines and, increasingly, to enter retail markets. If at all, the liberalisation of entry to Russian pipelines and Gazprom's entry downstream can be achieved as parts of the same solution.

There is no world market price for gas, which is not a fungible commodity. Russia has through

Gazprom maintained price discrimination, based both on purchasers' wealth and, at least previously, on political considerations. Generally, new EU member states have paid less than the old ones. This seems to be changing, which has consequences both for cost levels and for the perceived need to diversify supplies.

Investment needed in the entire energy sector

Though often lumped together, the oil and gas sectors differ a great deal. The oil sector is larger and more export-oriented. It brought in 46% of all export revenue in the first half of 2006, while the gas sector brought in 14%. On the other hand, Russia's oil reserves are smaller relative to production than its gas reserves, which are the largest in the world. Well managed, the gas sector's significance in the economy will increase.

Despite recent developments, the oil sector remains to a large extent privately owned, while the gas sector is nearly fully state owned. After a steep decline in the 1990s, oil sector volumes grew rapidly until 2004, while the gas sector, which never experienced a similar collapse, has grown only modestly. The oil sector, producing a fungible commodity, is of global importance, while the gas sector is of importance for regions close to Russia. The emergence of LNG will change this only slowly.

Russia's energy is and will remain important for the European

Union. For both oil and gas, Russia is the largest provider to the EU25, which has benefited from the increases in Russian oil and gas exports during the last decade. For oil, if the need is perceived, diversifying supplies is in practice easier and cheaper than for gas, due to the different infrastructure requirements.

The Russian side of the equation also holds potential problems. Crude output is expected to grow modestly at best, while – barring very major improvements in domestic energy efficiency – domestic consumption will increase. It is not self-evident that Russia will increase its export volumes of crude oil, at least significantly. The sector badly needs investment. For close on the last twenty years, the Russian oil industry has generally focused on production – rather than development and exploration – due to the unstable investment climate, political instability and high taxation of oil. This lack of upstream investment has had a negative effect on the medium and long-term development of the oil sector. There are doubts about the sustainability of even current Russian oil production, as reflected in the reserve to output ratios mentioned above. There are also immediate-term problems with developing the pipeline network. Oil companies have often complained that the existing pipeline monopoly places heavy constraints on their export potential.

The doubts are somewhat similar for the gas sector. The sector

Well managed, the gas sector's importance in the Russian economy will increase.

*Gazprom
will continue
to put pressure
on international
prices.*

is dominated by a state monopoly, Gazprom, whose track record and prospects have been much debated. According to one view, Gazprom prevents market reforms in the sector and uses its monopoly position ruthlessly, for either economic or political goals. Another view sees Gazprom as having improved its corporate management and argues that it is not at all evident how the potential liberalisation of the sector might proceed. It is also politically difficult to raise domestic gas prices, where most gas is sold. Even for its own corporate interest, Gazprom will therefore continue to put pressure on international prices. The gas sector too, is suffering from a serious lack of investment. And even if production were to increase, transit will continue to raise a variety of problems. Though Russia's aim to diversify its export markets – and to move downstream – is economically justified, it poses a number of problems, not least for the largely gas-based energy strategy in terms of which EU countries have generally been thinking.

There is no doubt that EU-Russia energy relations will remain on the agenda. One forthcoming decision is over the degree to which gas should be treated as a commodity among others, best left for market operators to handle, or if it would be wiser to increase the political character of energy markets further and aim at a situation where the EU

would be a single operator, negotiating directly on prices, volumes and investment. Where might the required competencies lie? How realistic would it be, given the differences in endowments, inherited infrastructures and well-established policy goals, to aim at a common energy policy that would reach beyond some regulatory and infrastructural harmonisation?

Russia has benefited greatly from recent energy prices, both economically and politically. The world has also benefited from recent growth in Russia's hydrocarbon production, especially oil. Overall, Russia has managed its newly-emerging wealth well so far. Both Russian manufacturing and service production are now growing faster than energy extraction. Hydrocarbon production is expected to continue to grow modestly at most. This tends to depress aggregate growth, while perhaps putting it on a more robust foundation in the long run.

Keywords: energy, oil, natural gas, Russia, EU

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Price bubbles – a central bank perspective

27 October 2006

Recent discussions, in academia and among policymakers, have increasingly paid attention to price gyrations in the stock and housing markets. A major concern has been the connection between these price movements and both financial stability and real economic performance. A related concern has been whether – and if so, how – central banks should respond to wide fluctuations in asset values.

This article discusses price bubbles in the stock and housing markets, their effect on the economy, and their importance vis-à-vis the primary objectives of central banks. In addition, we briefly introduce a method that was developed at the Bank of Finland as an aid to identifying and predicting overshooting in asset prices.

What is a price bubble?

A bubble in the price of an asset (eg a share of stock) may refer to a number of phenomena. In the broadest sense, it may refer to the uncertainty associated with rapid economic growth (bubble economy) accompanied by an asset price bubble. A price bubble may also be a situation wherein it is observed, ex post, that asset prices diverge from the essential features (fundamentals) of the real economy, ie economic agents' price expectations turn out to be wrong in light of the fundamentals, perhaps because the agents' expectations of

fundamentals were wrong. On the other hand, it may be the case that the market price of an asset has – for other reasons such as demand pressure – diverted from its reasonably expected (fundamentals-based) price, which leads to a more general asset price bubble. It is in the latter sense – rooted in economic theory – that we use the term in this article.

The most challenging aspect of detecting a price bubble is to determine the appropriate price level vis-à-vis the fundamentals. Generally, the answer has been sought via a pricing model in which all expected cash streams associated with an asset are discounted to the present time to obtain the asset's present value. Any market price that differs from its present value is then considered to contain a bubble. The problem with this approach is in determining the expectations. An expected cash stream is determined by the asset's price, and it is not easy in practice to distinguish between realistic and unrealistic expectations. Thus it is not possible to identify a bubble with complete certainty.

Despite the problems in identifying a bubble, history includes numerous examples of sharp rises in asset prices that have been, ex post, widely agreed to reflect bubbles. As an early example, we could cite the Netherlands' 'tulipmania' of the 1630s. Other examples include the strong rise in US equity prices that ended in 1929 and recent history's 'high-tech bubble' of the late 1990s,



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which saw soaring share prices of ICT companies in particular, because of excessive growth expectations.

What is the significance of a price bubble for the central bank?

Today, most central banks have two primary objectives: to provide a favourable environment for economic growth by maintaining price stability and to promote financial stability. Thus, a matter of prime concern to a central bank is exactly how a rise – or bubble – in asset prices will impact on those two objectives. There are numerous channels for such effects, and these relate to activation of the economy by economic agents, mainly via-à-vis investment and consumption in response to an expanding bubble.

A bubble in share prices will encourage companies to issue additional shares. Share issues improve a company's financial position and provide incentive for new investments. A rise in asset prices will also increase the value of companies' and households' loan collateral and thus enable new, and larger, borrowings (the collateral effect). This in turn stimulates the economy's aggregate investment and consumption. The household asset and liquidity effects are particularly important for private consumption. The asset effect boosts household consumption because their wealth is increased by the bubble. The liquidity effect relates to the increased value of households' financial assets such as shares. In dire straits, a household will

find it easier to sell a liquid asset than an illiquid one such as a dwelling, so that a rise in the value of liquid assets may be perceived by households as a reduction in the uncertainty surrounding their future financial positions. This would boost consumption.

Looking at how the above-mentioned effects are reflected in the economy and what is important for the operations of the central bank, attention is generally focused on three aspects of economic performance: allocation of economic resources, inflation and financial stability.

Via its various effects, a bubble can have a notable impact on the allocation of the economy's resources. During a bubble period, companies' investments may be channelled to sectors where expectations of future cash flows – and hence investment returns – are unrealistic. At the same time, investments that would allocate resources more efficiently may not be realised. A bubble may also boost household consumption too much, in light of actual income flows. When a bubble eventually bursts, the resulting changes in the growth of consumption and investment may be huge. For instance, the bursting of the high-tech bubble in the late 1990s is often ranked as the prime cause of the investment slump in the United States.

A bubble may also be important in terms of inflation. One can conceive of a situation wherein the formation of a bubble and a more

general rise in asset prices leads to an increase in demand while productive capacity remains unchanged. In this way a bubble may portend a shrinkage of available productive resources and hence an acceleration of inflation. However, studies in this area are not of one mind as to whether this is an accurate scenario.¹

The connection between bubbles and financial stability relates to the above-mentioned collateral effect.² Asset price changes associated with a bubble make it easier for both households and companies to go into debt because financing becomes easier to obtain as collateral values rise. Financial stability will be threatened if the wealth increase and related lending decisions are based on unrealistically inflated prices and collateral values. Equally important is the banks' financial position in the event of the bubble bursting. If the banks' balance sheets are strong, they may be well equipped to withstand the inevitable price corrections. If this is not the case, a bubble burst could significantly destabilise the banking system and pose a threat of banking crisis and – in the case of a bank-centred financial system – a credit crunch.

How should the central bank react to a price bubble?

In recent years a much-discussed topic has been whether central banks should

react to big movements in asset prices and, if so, how. Some discussants feel that the central bank should not react at all to these changes while, at the other end of the spectrum, it is argued that the level of asset prices should be part of the central bank's inflation objective. Frequently, opinions on the optimal behaviour of a central bank will vary according to whether a price rise is based on a bubble. But the central bank faces the immediate problem of deciding whether a bubble is actually present; if this is the case, the central bank must then determine its size. A third problem is how the monetary policy tool (policy interest rate) should be used to eliminate the bubble.

Because of the big problems related to defining and dealing with a bubble, the prevailing policy stance of central banks regarding bubbles is passiveness. Accordingly, a central bank will not react directly to a rise in asset prices. Instead, it will wait until the bubble bursts and then deal with the aftermath. There are several arguments for such passiveness.³ The central bank does not have any information that eg the stock markets would not take into account in pricing shares. Thus it is impossible to know how big an error is contained in share prices, for example. This renders it impossible to actively intervene in the market with precise policy actions. A policy over-

¹ Eg Filardo (2000) found evidence of its forecasting power.

² This has been studied by eg Bean (2004).

³ See eg Bernanke and Gertler (2001).

reaction could induce a sizable correction of asset prices and cause a sharp slowdown of the economy. Moreover, the danger of overreaction may also increase as the bubble expands because the scale of required actions is greater after a bubble burst than before. Further, a badly timed monetary tightening could magnify the effects of a bubble burst because monetary policy actions take a long time to affect the economy.

On the other hand, the impact of a bubble via the above channels could be huge, so there is some basis for active policies. In the academic literature on optimal central bank policy, opinions regarding active versus passive policy are sharply divided. Those who favour active policy argue that the central bank should tighten its monetary policy if it is shown that asset prices are rising too fast.⁴ But opinions vary as to the magnitude and timing of such a tightening. One view is that any monetary tightening during the formation of a bubble should be modest, because an overreaction could virtually halt economic growth but still not abort the birth of the bubble. On the other hand, one can argue that a pronounced tightening in the early stage of a bubble is necessary in order to minimise the

⁴ This view is expressed in eg Cecchetti et al (2000).

These situations often involve the 'moral hazard' problem, ie that agents' risk-taking may increase during a boom if it is clear ex ante that the central bank will act to prevent the onset of a bubble or to resolve the problems of the aftermath.

negative impact of a bubble burst on economic growth.

The main problem regarding an active policy regime is the great difficulty of identifying a bubble. For this reason, numerous studies in the area have attempted to develop a variety of bubble indicators. While the need for such indicators is large, developing them has proven to be a huge challenge.

How can we spot a price bubble?

Many ways of spotting a bubble have been proposed. Some of these are based on movements in key stock market numbers, or ratios between stock and bond markets. Other, somewhat more technical, approaches employ econometric methodology. The most attractive approaches to testing for the presence of bubbles at present are those methods that try to measure changes in asset price levels relative to values based on fundamentals.

An indicator based on econometric methodology has also been developed at the Bank of Finland⁵, one that produces frequently updated measures of the level of asset prices. The indicator is used to examine a rolling time-window of data on changes in the relation between asset yields (eg dividends) and prices over at least the past three years. Developments in the ratios are more extensively analysed via time series analysis and unit root tests. The

⁵ Taipalus (2006).

basic idea behind this methodology is simple: over a certain time period, dividends and share prices cannot differ too much from each other. If they do, and eg share prices rise faster than dividends, the indicator will signal the presence of a bubble.

When the indicator is applied to the US stock markets for the period 1871–2004, it works quite well and is able to identify almost all the

significant positive and negative deviations of share prices from the normal level. In Chart 1 the bubble signals show up as indicator values exceeding zero. This happened many times in the late 1990s whereas, according to the indicator, the US stock market is not currently in a bubble situation. The same can be said for the Finnish stock market (Chart 2). Testing the housing

Chart 1.

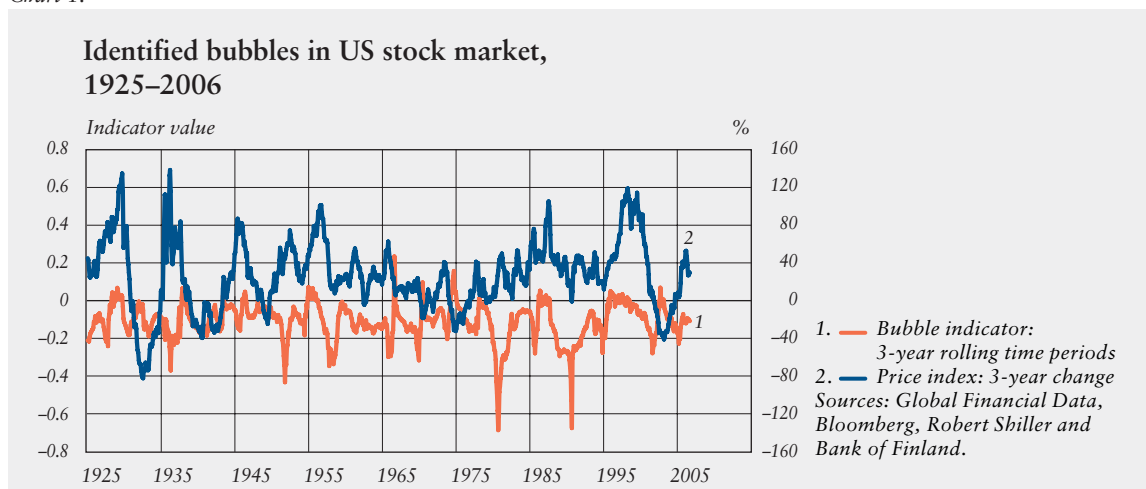
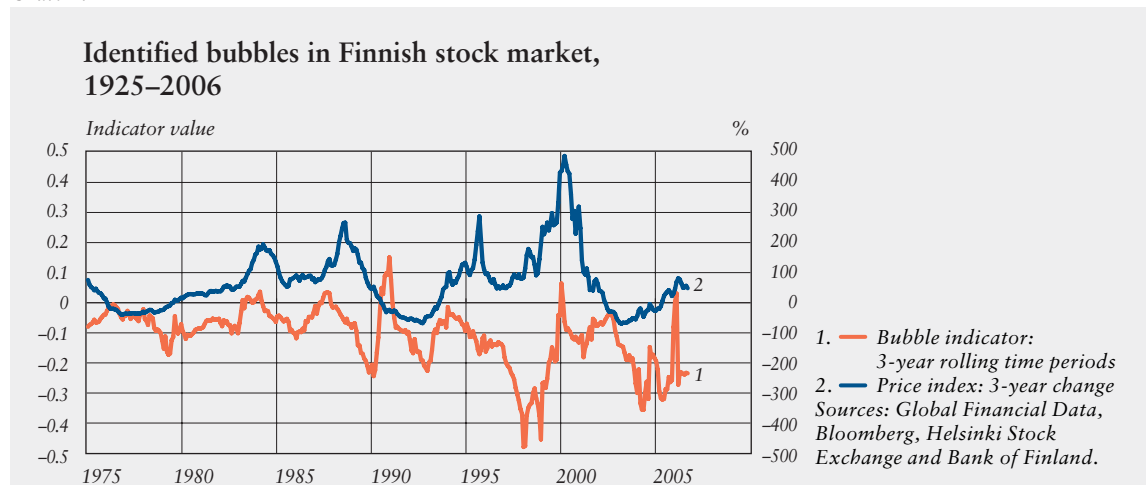


Chart 2.



markets is especially difficult because in many countries rent controls are or have been applied, whereas the indicator method requires market-determined rents. Overall, the indicator seems to offer one option for trying to identify asset price bubbles, albeit further testing is needed.

The problem with bubble indicators is that they can at best pinpoint the timing and calculate the probabilities of bubbles, but they will hardly ever give the magnitude of a pricing error. This type of indicator is used to best advantage if its information output is examined in conjunction with a variety of

economic-performance indicators. In this connection, what is crucial for the central bank is that it be on the alert for a conjunction of simultaneous signals of instability in different segments of the economy. This means that the central bank should monitor indicators for the different segments of the economy, coalesce the pieces of information, and consider case-by-case exactly what problems might ensue if instabilities do develop. Only in this way will it be possible for the central bank to choose appropriately from its set of alternative actions.

Keywords: bubbles, asset prices, monetary policy, financial stability

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- Taipalus, K (2006) Bubbles in the Finnish and US equities markets. Bank of Finland Studies E:35.

Publications

A complete list of publications is available on the Bank of Finland's website (www.bof.fi).

The Bank of Finland's publication operations are becoming largely electronic, in terms of both publication and distribution.

In future, research papers and other studies, such as discussion papers and the Bank's A and E series studies, will be published only online. An email alert system is due to be introduced, to alert listed readers to the release of new publications.

Back copies of older printed publications still in stock can be ordered from the Bank of Finland (www.bof.fi).

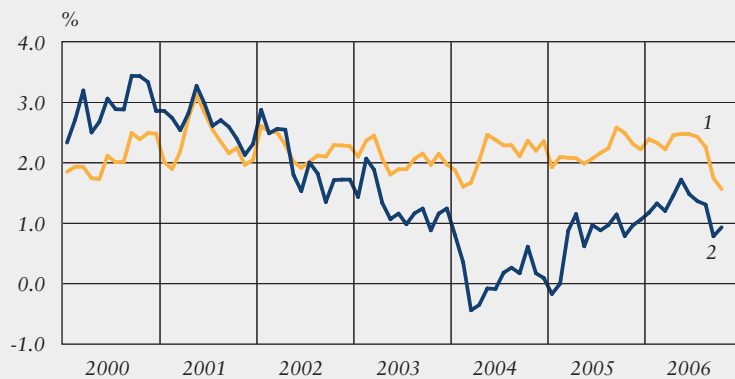
Charts

1. Finland: key economic indicators
2. Price stability in the euro area and Finland
3. Official interest rates
4. International long-term interest rates
5. Bank reference rates in Finland and 12-month Euribor
6. Average lending and deposit rates
7. Stock of bank lending by interest rate linkage
8. MFI loans to private sector
9. Competitiveness indicators for Finland
10. Selected stock price indices in the euro area
11. Listed shares in Finland: total market capitalisation and non-residents' holdings
12. Bonds issued in Finland
13. Public sector balances in Finland
14. Public debt in Finland
15. Finland: goods account and current account
16. Finland: services account and income account
17. Regional distribution of Finnish exports
18. Finnish exports by industry
19. Finland's foreign trade: export prices, import prices and terms of trade
20. Finland's net international investment position
21. Finland: GDP and industrial production
22. Unemployment rate in the euro area and Finland
23. Hourly labour costs in the euro area and Finland
24. Selected asset prices in Finland

1. Finland: key economic indicators



2. Price stability in the euro area and Finland



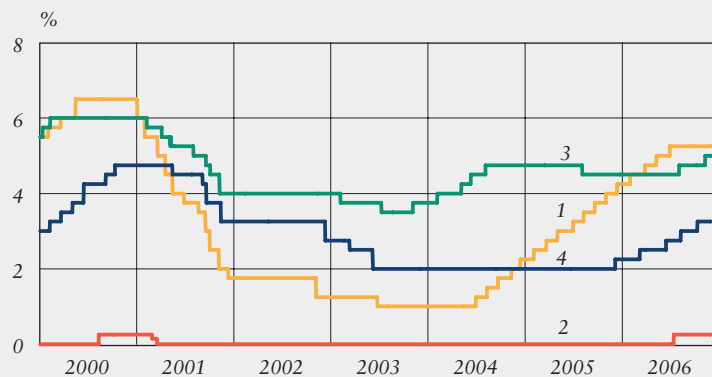
Harmonised index of consumer prices, 12-month change, %

1. Euro area

2. Finland

Sources: Eurostat and Statistics Finland.

3. Official interest rates



1. USA: fed funds target rate

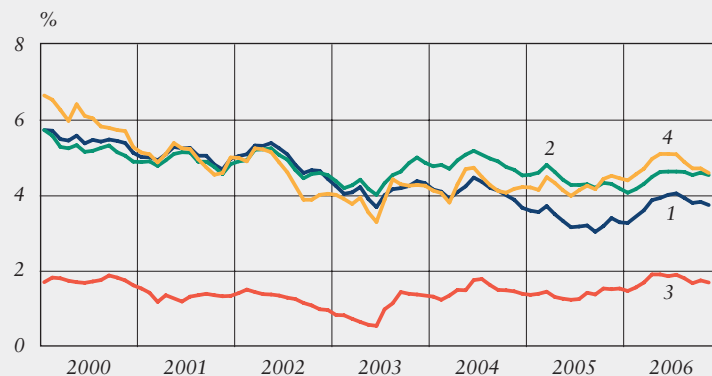
2. Japan: overnight call rate

3. United Kingdom: repo rate

4. Eurosystem: main refinancing rate/minimum bid rate

Source: Bloomberg.

4. International long-term interest rates



Yields on ten-year government bonds

1. Finland

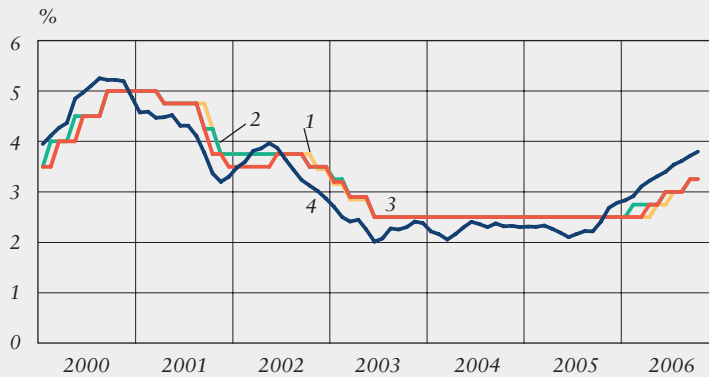
2. United Kingdom

3. Japan

4. United States

Source: Reuters.

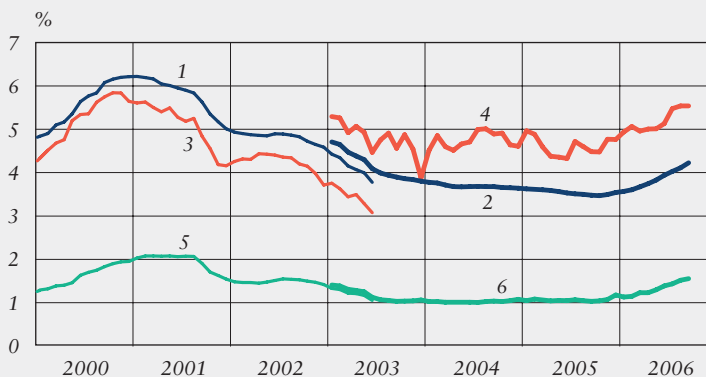
5. Bank reference rates in Finland and 12-month Euribor



1. Nordea prime at the end of the month
2. Sampo prime at the end of the month
3. OKOBANK group prime at the end of the month
4. 12-month Euribor

Sources: Banks and ECB.

6. Average lending and deposit rates

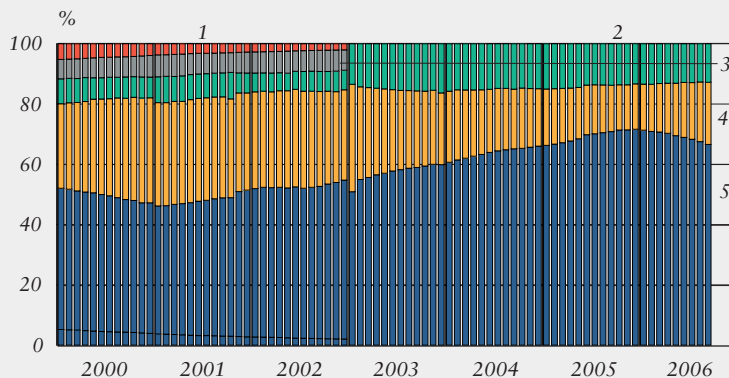


1. Banks' stock of loans
2. MFIs' stock of loans
3. Banks' new loans
4. MFIs' new loans
5. Banks' stock of deposits
6. MFIs' stock of deposits

Source: Bank of Finland.

Data collection changed as of 1 January 2003. Under the new system MFIs include both deposit banks and other credit institutions.

7. Stock of bank lending by interest rate linkage

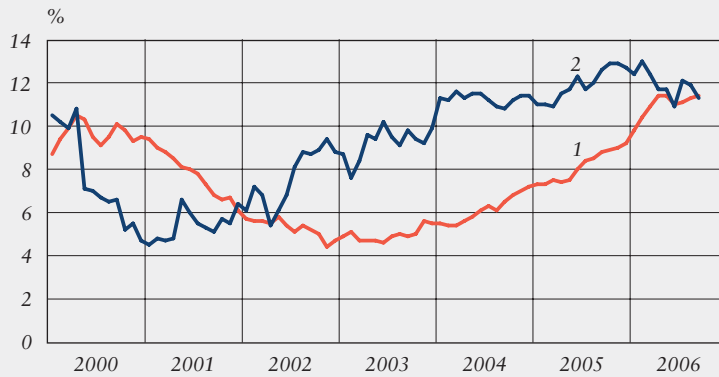


1. Linked to base rate
2. Linked to other rates
(as of 2003 includes loans linked to base rate and fixed-rate loans)
3. Fixed-rate
4. Linked to reference rates of individual banks
(prime rates, etc)
5. Linked to Euribor

Source: Bank of Finland.

Data collection changed as of 1 January 2003.

8. MFI loans to private sector

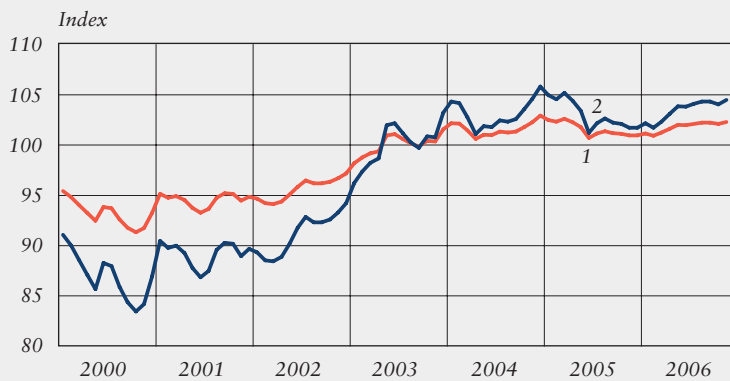


12-month change, %

1. Loans by euro area MFIs to euro area residents
2. Loans by Finnish MFIs to euro area residents

Sources: European Central Bank and Bank of Finland.

9. Competitiveness indicators for Finland



1999 Q1 = 100

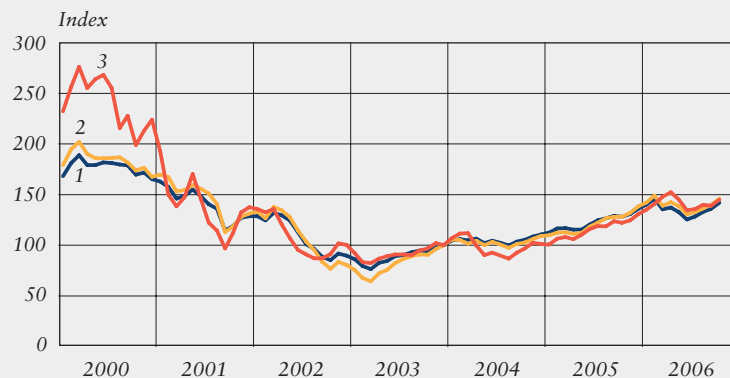
Based on trade-weighted exchange rates.

An upward movement of the index represents a weakening in Finnish competitiveness.

1. Narrow competitiveness indicator including euro area countries
2. Narrow competitiveness indicator excluding euro area countries

Source: Bank of Finland.

10. Selected stock price indices in the euro area

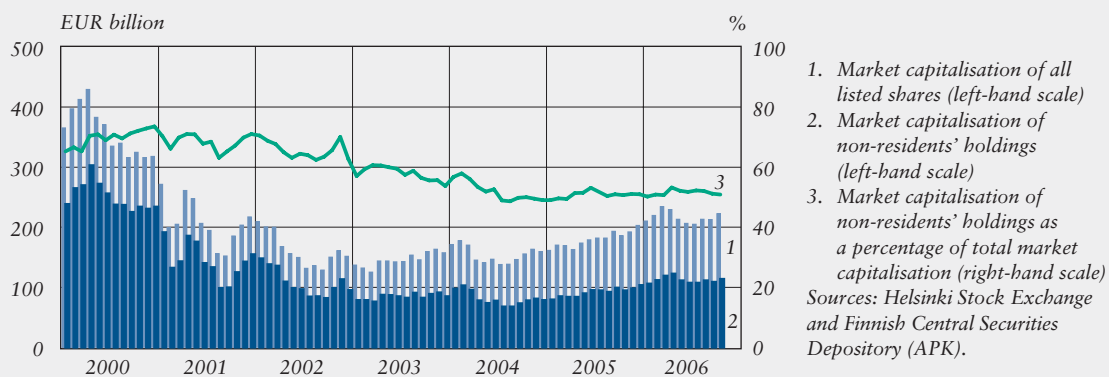


31 December 2003 = 100

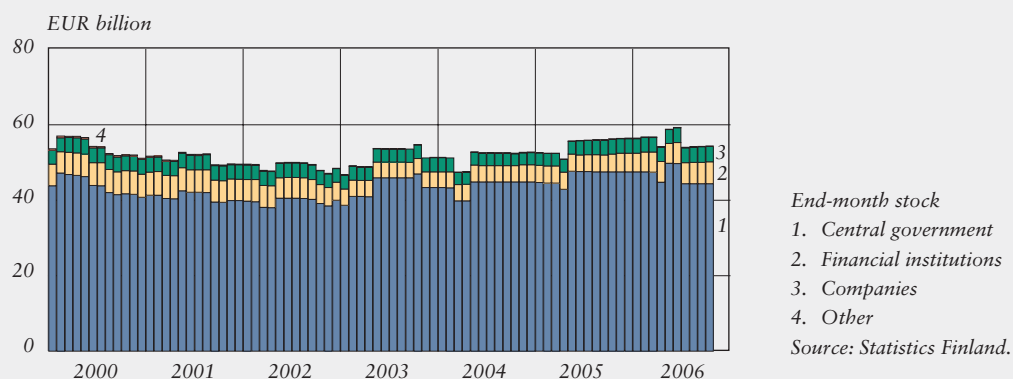
1. Total euro area:
Dow Jones Euro Stoxx index
2. Germany: DAX index
3. Finland: OMX Helsinki
All-Share Index

Sources: Bloomberg and Helsinki Stock Exchange.

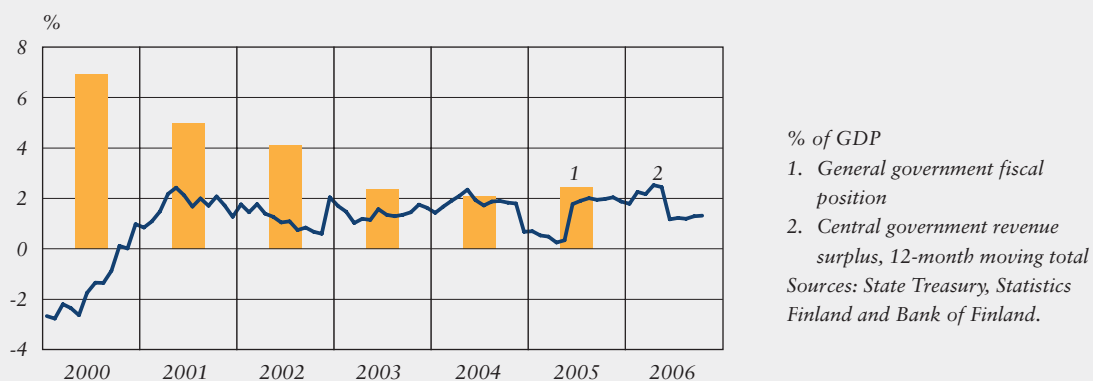
11. Listed shares in Finland: total market capitalisation and non-residents' holdings



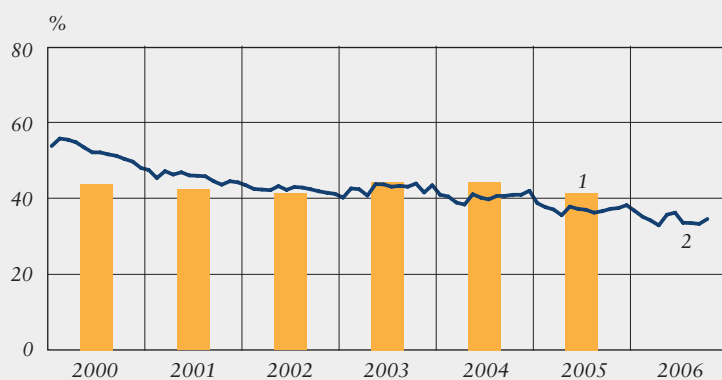
12. Bonds issued in Finland



13. Public sector balances in Finland



14. Public debt in Finland

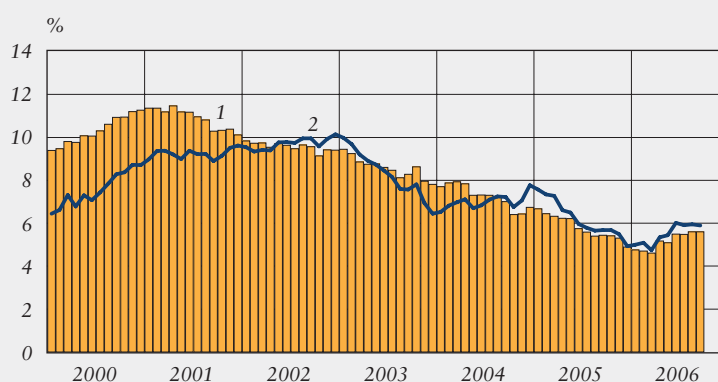


% of GDP

1. General government debt
2. Central government debt, 12-month moving total

Sources: State Treasury, Statistics Finland and Bank of Finland.

15. Finland: goods account and current account

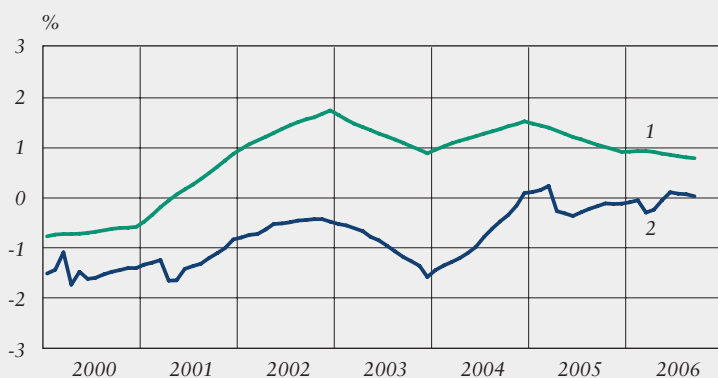


12-month moving totals, % of GDP

1. Goods account, fob
2. Current account

Source: Bank of Finland.

16. Finland: services account and income account

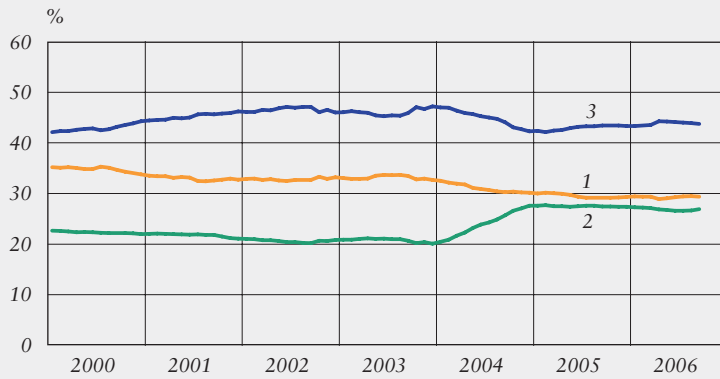


12-month moving totals, % of GDP

1. Services account (trade in goods, fob)
2. Income account

Source: Bank of Finland.

17. Regional distribution of Finnish exports

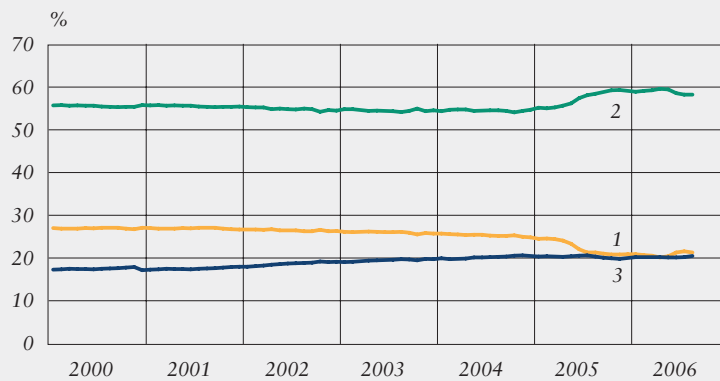


12-month moving totals,
percentage of total exports

1. Euro area
2. Other EU member states
3. Rest of world

Sources: National Board of
Customs and Statistics Finland.

18. Finnish exports by industry

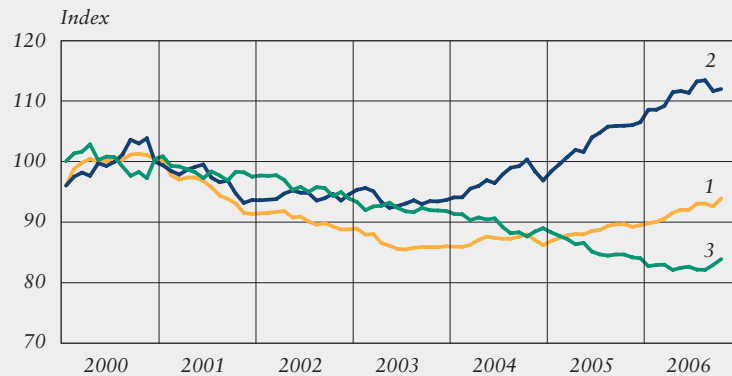


12-month moving totals,
percentage of total exports

1. Forest industries
2. Metal and engineering industries (incl. electronics)
3. Other industry

Source: National Board of
Customs.

19. Finland's foreign trade: export prices, import prices and terms of trade

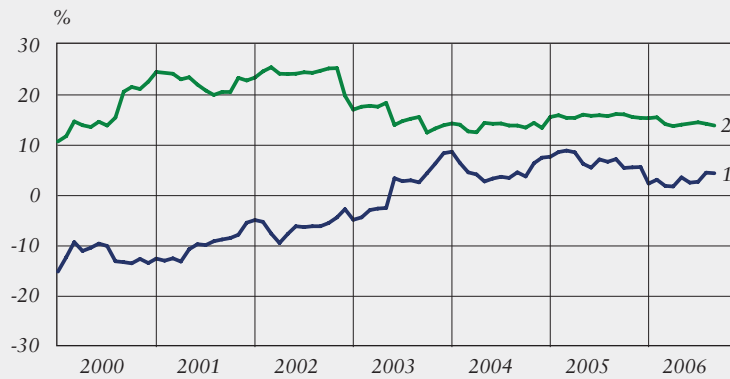


2000 = 100

1. Export prices
2. Import prices
3. Terms of trade

Source: Statistics Finland.

20. Finland's net international investment position



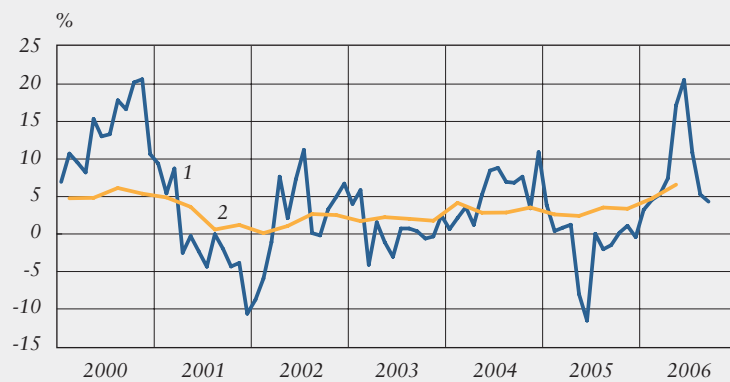
% of GDP

1. Net international investment position excluding equity items

2. Net outward direct investment

Sources: Bank of Finland and Statistics Finland.

21. Finland: GDP and industrial production



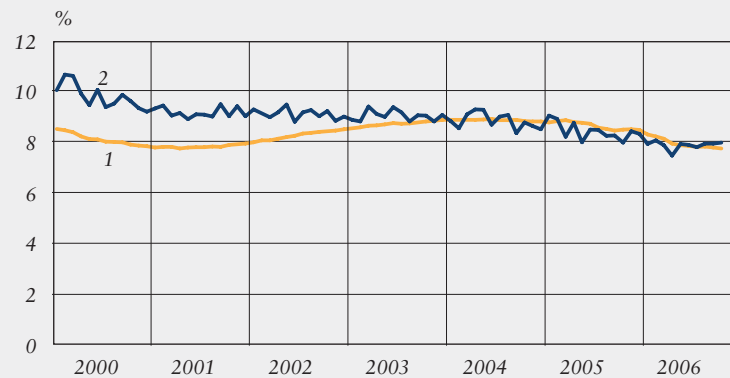
Percentage change from previous year

1. Industrial production

2. Gross domestic product

Source: Statistics Finland.

22. Unemployment rate in the euro area and Finland



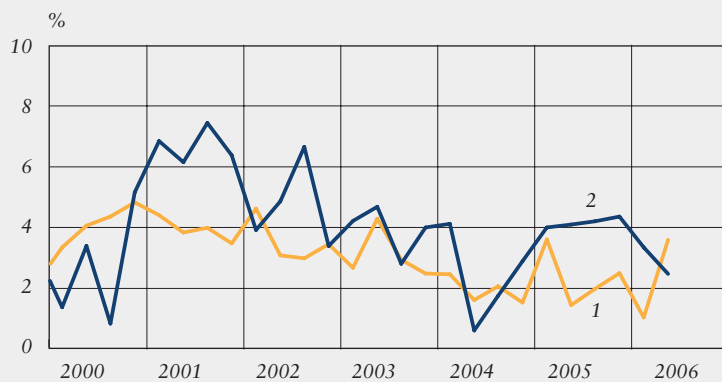
1. Euro area

2. Finland

Sources: Eurostat, Statistics Finland and Bank of Finland.

Data seasonally adjusted.

23. Hourly labour costs in the euro area and Finland



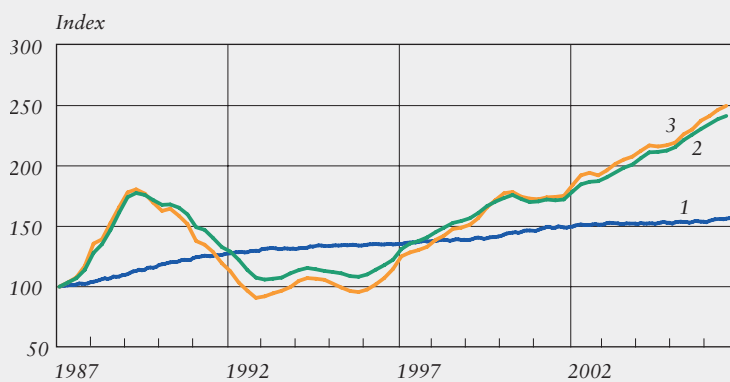
Whole economy excl. agriculture, public administration, education, health and unclassified services.

Percentage change from previous year

1. Euro area
2. Finland

Sources: Eurostat and Statistics Finland.

24. Selected asset prices in Finland



1987 Q1 = 100

1. Consumer prices
2. Housing prices
3. Two-room apartments (secondary market; debt-free price per m²)

Source: Statistics Finland.

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17 May 2006

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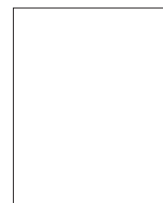
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