EuropaWatch

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Economic Research Department

Economic expansion well rooted
German consumption tilted to the upside
Subdued inflationary pressures despite the pick-up in economic activity
ECB tightening, beyond 4%

Contents

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1. Editorial

As monetary policy gets closer to neutrality, uncertainty about the peak in ECB official interest rates increases. The lack of consensus about this point reflects not only different perceptions about the macroeconomic outlook and the balance of risks in the euro area, but also different views about the level of the neutral interest rate. In our view, the "neutral interest rate" in the euro area stands around 4% rather than the 3.5% estimated by others based on an excessive downward revision of their estimates of the potential growth of the euro area.

Furthermore, we expect ECB interest rates to peak beyond 4.0% due to strong activity as well as upside risks on inflation and concerns over strong growth of financial aggregates. In our baseline scenario interest rates will reach 4.25% after the summer.

In order to assess the monetary policy stance, we have created a policy-stance measurement for the euro area based on the weighted sum of possible ECB's inflation and output stabilisation objectives. The indicator is forward-looking and aims at reproducing the ECB´s objectives in the medium term. According to this indicator, the current level of interest rates, together with its expected future path (reaching 4.25% at the end of 2007), is consistent with attaining the objectives of price and output growth stability in the medium term, although we cannot rule out a slightly more aggressive policy path if upward risks on growth were to materialize.

Certainly, rates pressure fades on a baseline inflation forecast. We have revised the inflation forecast for the next two years downwards, albeit modestly. We foresee a 1.8% HICP inflation rate both for 2007 and 2008. However, upside risks to the inflation outlook still remain. One risk is a possible tilt upwards in the growth of labour compensation at a time of relatively intense resource utilization. As the economic expansion matures and slack narrows down further, inflation pressures could arise. This is not, however, what we expect to happen given the recent pickup in productivity growth. Additionally, there is another upward risk factor that should be taken into account, namely inflation expectations at high levels.

So, our interest rate forecast reflects our positive view about economic growth in the euro area over the next two years. Our main message on the macroeconomic side is that, after the strong acceleration in 2006, economic expansion is well rooted. According to the IA BBVA UEM, expansion continues in the euro area, but at a slightly more moderate pace. Our indicator is at historical maximums and the good performance of both real and expectations components point to a positive economic outlook for the near future. Moreover, a higher cyclical synchronization of GDP among countries is expected after the recent rebound of France and Italy. Looking ahead, the pent-up demand suggested from the low ratio of private consumption over GDP in Germany should eventually be translated into higher consumption growth. All in all, the euro area is facing a long-lasting cyclical upturn and the margin of spare capacity is narrowing. There are upside risks on growth, mainly stemming from a stronger rebound of private consumption than was expected. Nonetheless, the international scenario poses several downside economic risks: mainly lower than expected global growth or higher oil prices.

Additionally, financial stability does matter to central banks, especially to the ECB which has highlighted some concerns in movements on credit and asset prices. To date, strong monetary and credit growth has not triggered an investment or consumption behaviour very different from the pattern seen in previous cycles. Furthermore, the debt levels built up by European households and corporations still seem far from those of other mature countries that have recently faced increases in interest rates. Instead, the increasing role of non–monetary financial institutions in financing activities may have non-negligible implications in terms of leverage, liquidity conditions and risk allocation. While we doubt that policy rates are appropriate measures for addressing the risks associated with the strong growth of new financial products /intermediaries, we foresee an upward bias on interest rate given the ECB's concern over financial stability.
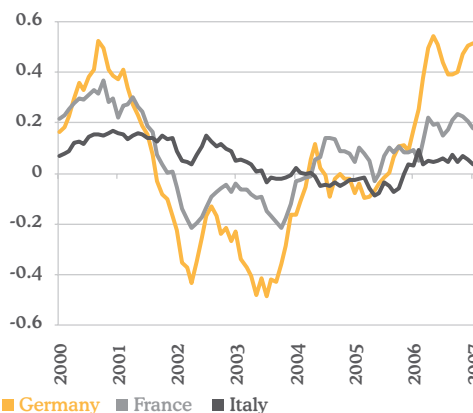
Chart 2.1.
Euro area: GDP growth and surprises

■ GDP growth
■ Surprise
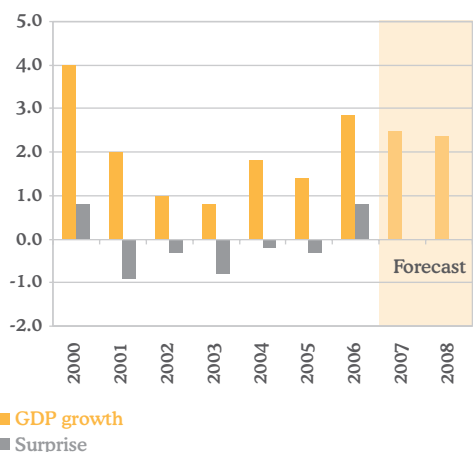
Source: Eurostat and Consensus Forecast

Chart 2.2.
World trade volume and euro area exports
annual percentage change

■ World trade
■ Euro area exports
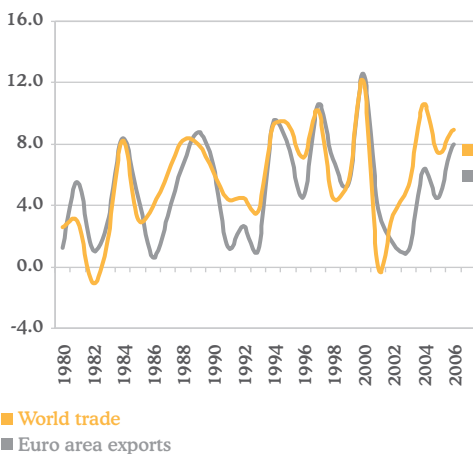
Source: Eurostat ans IMF

Chart 2.3.
IA BBVA MA (3) by country

■ Germany ■ France ■ Italy

Source: BBVA

2. Economic expansion continues

Economic growth in the euro area performed better than expected in 2006. We cannot rule out another surprise on the upside for 2007.

Our estimates for growth in the euro area in 2007 and 2008 stand at 2.5% and 2.3%, respectively. Compared to economic growth in 2006 (2.8%), this represents only a modest moderation in the pace of growth registered a year ago, when the euro area economy significantly surpassed the consensus forecast. The broadly based recent rebound in economic growth for the fourth quarter (0.9% quarter over quarter) provides more ammunition for our positive view about economic growth in the euro area over the forecast horizon. Additionally, more recent (soft and hard) data in our IA BBVA index of economic activity show that, the index remains near an all-time high and that the economy continues to expand.

In 2006, against a background of persistently high energy costs and increased concerns over a slowdown in US activity, the euro area registered a record GDP growth (2.8%). In fact, economic growth in European economies seems to have been notably decoupled from US growth, given the moderate effects of the US downturn on the euro area.On the contrary, those unfavourable developments have been outweighed by other factors, namely strong global growth and favourable domestic financial conditions - the expansion of credit to households and non-financial corporations - albeit showing some sings of moderation, have been growing at high rates. The underlying dynamics of the euro area economy is expected to be sustained in the near future.

We would consider a prolonged expansion to be the most probable scenario. This scenario assumes that the external environment of the euro area will continue to expand at a robust pace and that, compared to 2006, commodity prices, on average, will decline moderately, and exchange rates will fluctuate around 1.30. Also the scenario envisages that the euro area will still benefit from favourable domestic conditions, especially from the improving labour market and relatively loose domestic financial conditions for households and businesses

Is the current rebound of activity just a cyclical upturn? Or does it reflect to any extent a structural improvement in the growth trend?

In our view, the euro area is facing a cyclical upturn. The margin of spare resources in the euro area economy is narrowing rapidly. It is difficult to know precisely if the economy is now operating close to full capacity, but some factors suggest that the margin within firms is limited. Survey measures suggest that capacity utilization is running well above their averages. Also a decreasing unemployment rate, even below some measures of the non-accelerating inflation unemployment rate (NAIRU), suggests some labour market tightness in the euro area.

Also, although productivity growth is picking up we consider that it is too early to forecast a recovery in it's long-term trend and, as a consequence, in potential growth.

We can only conclude that the declining trend of productivity growth during the last few decades has stopped. A significant extent of the current productivity growth in the euro area can be considered cyclical and it is too early to predict a pick-up in the long-term trend of this factor.. The nature of productivity growth has important implications for potential growth and monetary policy however, growth in productivity is not broad-based. Only the sectors that traditionally show a higher productivity (manufacturers and some services) have experienced this rise.

Finally, Germany is acting as a major engine behind euro area growth. Although we think the German VAT hike could delay the pick up in private consumption, we cannot rule out a stronger rebound than expected in 2007.

The German economy grew strongly in 2006 (2.9%), even faster than average. Growth in this country represents almost one third of euro area growth over the last year. Some figures point to a positive outlook for the German economy. Foreign trade continued its very dynamic trend. Private fixed investment, including construction, is being central to the boom after growing at the fastest growth since German unification. There has also been a modest rebound in labour productivity, and German households actually decreased their savings rate in a context of significant improvements in labour conditions. In spite of this, we foresee that the German economy will grow by 2% in 2007, given the expected moderation in fixed capital investment and some refrain in private consumption rebound derived from the VAT increase.

Nonetheless, we cannot rule out a positive surprise in private consumption. Weak private consumption has been a major factor in slowing German recovery. The uncertainties surrounding the VAT hike in Germany give us arguments for some caution in forecasting a significant rebound in German household consumption. However, there seems to be no evidence that a boom in spending occurred at the end of 2006 – perhaps because some prices have already been increased, deterring consumption frontloading. So - a very negative impact on consumption in 2007 seems less likely.

Certain supporting factors will continue to maintain high investment growth rates in 2007 and 2008, albeit somewhat lower than in 2006.

Recently, real investment over GDP ratio, a highly procyclical variable, has increased to maximums. The strong momentum of investment has reflected the positive outlook of business surveys, the healthy financial position of the corporate sector and a positive contribution of residential investment. In a context of strong global growth and after an exhaustive business adjustment process, businesses finally decided to take advantage of the extraordinary favourable financial conditions and increase investment.

We consider that factors determinant in investment decisions, namely demand expectations, expected performance of labour and non-labour costs, financing costs and the return on alternative assets, will all continue to be supportive to investment, although to a lesser extent than in 2006.

Chart 2.4.
Euro area: gross fixed capital formation
as per cent of GDP

■ Total
■ Non residential

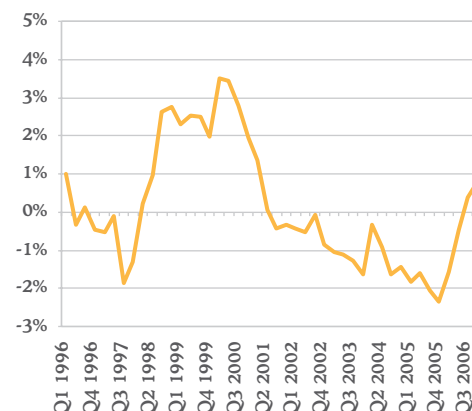Source: Eurostat and BBVA

Chart 2.5.
Germany: private consumption
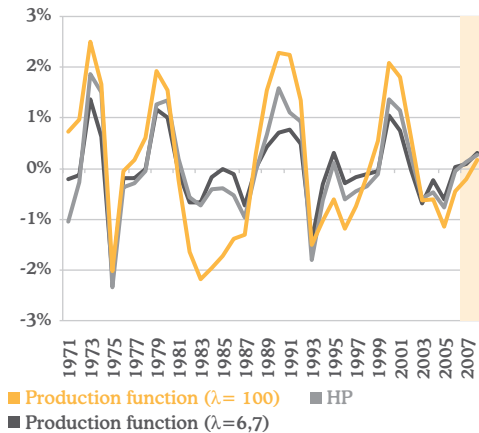as per cent of GDP

Source: Destatis

Chart 2.6.
Germany, real compensation of employees
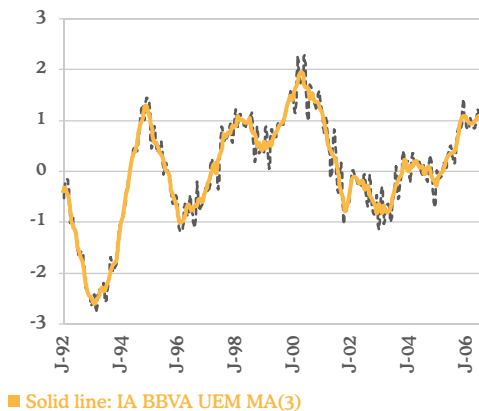percentage annual change

Source: Destatis

Chart 2.7.

Euro area: alternative output gap measures

Production function (λ= 100)   HP
Production function (λ=6,7)

Source: BBVA

Chart 2.8.

IA-BBVA UEM

Solid line: IA BBVA UEM MA(3)

Source: BBVA

Thus, although business expectations remain at high levels, they are showing signs of stabilization. The real cost of external financing, even remaining low by historical standards, is increasing somewhat in line with rising official rates. As long as the expansion matures, the share between profits and wages can be expected to be less "biased" to profits than at present. In this environment, we consider that gross fixed investment could grow at rates around 4% (from 5% in 2006).

Consumption remains the key component for sustainable expansion. Fundamentals will be a catalyst for acceleration in the growth of household spending.

The main issue for growth is the pattern household spending will follow. The underlying picture for household spending appears to be one of moderate expansion, similar to the picture for 2006. In 2007, economic and financial conditions should underpin household expenditure. The evolution of the labour market is relevant to economic conditions and in this respect; the continuous improvement in the labour market is encouraging. Employment has accelerated over the recent period to more than 1,2% annual rate, doubling the rate growth over the previous four years. Additionally, labour force participation rate has continued to increase – mainly among population groups where participation has been lower- and the unemployment rate has decreased to historical levels (7.5%). All in all, this positive performance may be related to the progress made with structural reforms in the labour market. Since employment expectations shows a positive trend, household expenditure growth is set to continue for the time being.

We expect that the good employment prospects will translate into more favourable developments in disposable income. The rise in wage income after years of stagnation (in Germany collective wage agreements will be higher than in 2006) combined with lower energy prices, may more than offset some of the negative effects of higher interest rates and higher taxes in some countries (mainly Germany and Italy)..

Certainly, apart from economic conditions, financial developments are also playing a growing role. In fact, the recent slowdown in consumer and housing credit is reflecting the less accommodative financial conditions now prevailing. Also, household wealth, particularly financial, is expected to have a more modest performance than in the recent past.

Finally, the low average growth rate of household consumption in the euro area and especially in the German economy should be taken into account. Nowadays, the private consumption ratio over GDP in Germany is estimated to be more than 2 percentage points below its long-term average. This figure suggests a high pent-up demand, which could translate into higher consumption growth eventually. The VAT hike could defer the expected pick up in household spending, that in Germany, contrary to other countries, will be additionally supported by household wealth.

Risks to our baseline scenario are on the upside. Domestic risks stemming from higher than expected private consumption more than offset downside risk posed by external factors.
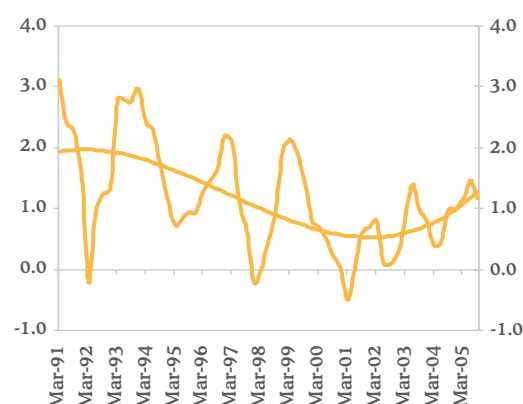
With respect to the international environment, the risk scenario points towards lower economic growth associated to a less dynamic external demand, around the world or the US economy, an additional depreciation of the dollar/euro exchange rate or higher oil prices.

Regarding the US economy, one of the biggest risks to our base scenario of gradual slow-down is a significant impact of housing on the labour market and on consumption, through lower housing wealth. However, we consider that the risk of recession is extremely low. Consumption will continue solid, supported by strong fundamentals – net worth continues to increase as well as recovery in real disposable income – and the business sector balance sheet remains robust.

With respect to oil prices, we think that geopolitical risks, the factor that could trigger the worst scenario, will not play a major role. Instead, in the medium term we consider that supply and demand conditions will prevail. At certain oil price thresholds non-OPEC countries have incentives to increase their production.
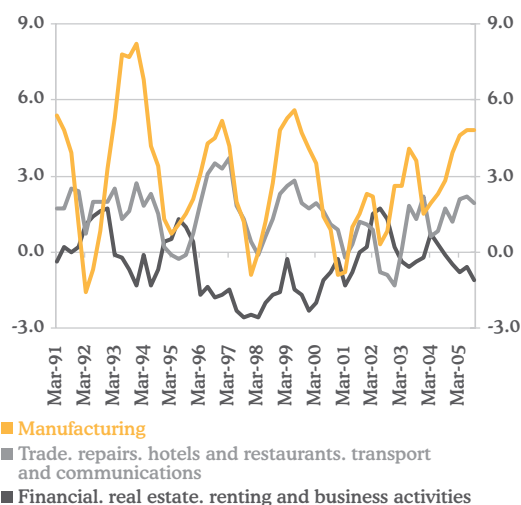
Chart 2.9.
Euro area: productivity growth
annual percentage change

Source: ECB

Chart 2.10.
Euro area: productivity growth
annual percentage change

■ Manufacturing
■ Trade. repairs. hotels and restaurants. transport and communications
■ Financial. real estate. renting and business activities

Source: ECB

Table 2.1. Euro area: GDP growth and inflation forecasts

% YoY rates	1t06	2t06	3t06	4t06	1t07	2t07	3t07	4t07	2004	2005	2006	2007	2008
Private consumption	1.8	1.8	1.7	2.2	1.9	2.1	2.0	2.1	1.3	1.4	1.9	2.0	2.2
Public consumption	2.4	2.0	1.8	2.0	1.9	2.0	2.0	2.2	1.1	1.3	2.1	2.0	1.9
Gross Fixed Capital Formation	4.2	5.4	4.7	4.9	4.7	3.3	3.7	4.2	1.8	2.7	4.8	4.0	3.7
Inventories (*)	-0.1	0.1	0.5	0.0	0.1	0.0	0.1	0.0	0.2	0.2	0.1	0.0	0.0
Domestic Demand (*)	**2.3**	**2.7**	**2.9**	**2.7**	**2.6**	**2.4**	**2.4**	**2.5**	**1.6**	**1.8**	**2.6**	**2.5**	**2.4**
Exports	9.2	8.3	7.1	8.9	6.5	6.2	6.0	5.1	6.3	4.5	8.5	5.9	5.1
Imports (goods and services)	9.5	8.0	6.7	7.6	6.0	6.1	5.9	6.0	6.2	5.5	8.3	6.0	5.7
External Demand (*)	**0.0**	**0.2**	**-0.1**	**0.6**	**0.3**	**0.1**	**0.1**	**-0.3**	**0.1**	**-0.3**	**0.2**	**0.0**	**-0.2**
GDP	**2.2**	**2.9**	**2.7**	**3.3**	**2.9**	**2.4**	**2.5**	**2.2**	**1.7**	**1.5**	**2.8**	**2.5**	**2.3**
Inflation	**2.3**	**2.5**	**2.1**	**1.8**	**2.0**	**1.7**	**1.6**	**1.9**	**2.1**	**2.2**	**2.2**	**1.8**	**1.8**

(*) Contribution to growth
Source: Eurostat and BBVA

# Higher Migration in the European Countries, some Macroeconomic Aspects

Labour supply will fall in Europe, reducing potential growth in the future. Could immigration mitigate the reduction in the active population?

Inflows of foreign born could affect economic growth as they add to the labour supply thereby augmenting the sources available in the economy. Also, a higher labour supply could push down or contain wage growth, reducing the cost of production. Immigration could also have an effect on the demand side, as apart from consuming traditional goods and services, immigrants could even create a demand for new goods from their countries of origin, which normally do not have an outlet stimulating new investment in this kind of business.

Regarding the labour supply, the European Commission has projected a decline in the European population after 2027, due to low fertility rates, as well as a decline in the native population in 2011. This decline in the labour supply could have negative consequences for economic growth. The ECB has estimated that real GDP per capita growth will decelerate to 1.4% on average for the period between 2031 and 2050 representing a further drop from the 1.7% reached between 1995 to 2005,[1] due to reduction of the working age population and under the assumption that the productivity and employment rate will remain constant to the average level of 1.0% and 0.8% respectively, observed in the period 1995-2005. Given this outlook for the population in Europe, the question arises if immigration flows could contribute to mitigate the problem of the ageing population and help to maintain (or even increase) potential levels of output

Using uniform statistics from OECD and Eurostat, we analyse the migration over EU 15 counties.[2] The criteria used to define someone as an immigrant is if he was born in the host country or not (foreign born). Emigrants who return to their countries of origin are not classified as foreigners and do not affect the statistics.

Chart 1
### EC Population projection for EU-15
(in millions)
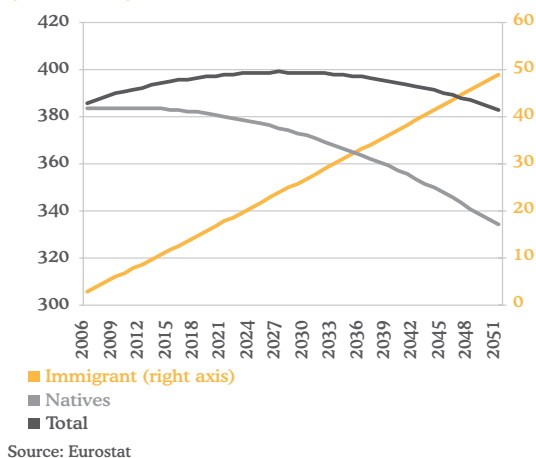
Source: Eurostat

Immigration has increased significantly in Europe in recent years, having a positive effect on demographic developments

In recent years European countries have experienced a rapid growth of net immigration, passing from 500,000 net inflow of immigrants in 1998 to 1,6 millions in 2005. The peak was the year 2003, when net inflow reached 2 million.[3] Since 2000, EU-15 has had on average a yearly net migration rate of 4.2 per thousand. This implies that in 2005 the foreign population in the EU-15 represented approximately 7.7% of the population. Thus, immigration has been an important source of population growth, more notorious in countries where the migration shock has been strong.

Chart 2
Contribution to population growth (1996-2006)
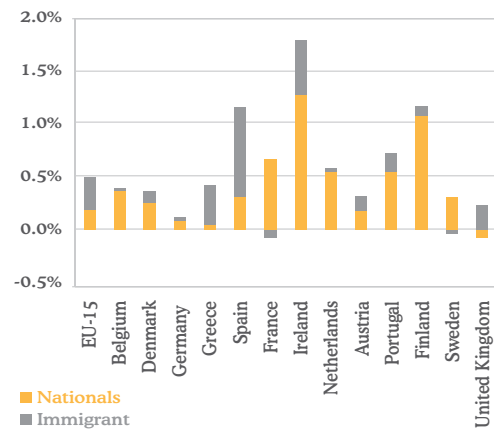
Source: Eurostat

Southern European Countries have suffered the biggest immigration shocks

The choice of Destination countries has changed. There has also been a change in the direction of the migration flow. Some countries, such as the southern European countries, which traditionally had a high emigration rate, are now taking in a lot of immigrants. In recent years (2000-2004), Spain has experimented the biggest immigration boom showing a net migration rate of 13 per thousand on average over the period. In Ireland, Italy and Portugal significant net migration rates also rose to 9.6, 5.6 and 5.4 per thousand, respectively. Immigration to these countries can be explained by the economic performance (the case of Spain and Ireland), and is also influenced by past ties and geographical proximity.

Countries of origin have also varied. New members of the European Union such as Poland, and Eastern European countries have become an important source of immigration. Thus, Poland, Romania, Bulgaria, Russian Federation, Ukraine and Turkey in 2004 were in the top 10 sources countries of immigration of several EU-15 members.

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[1] This estimation can be found in the articule "Demographic Change in the Euro Area: Projections and Consequences." Published in Monthly Bulletin of October 2006.

[2] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom
[3] Guardia, N and Pichelman, K. (2006) "Labour Migration Patterns in Europe: Recent Trends, Future Challenges". European Commission.

Table 1. Inmigration data

|	Stock of Foreign Born as Percentage of total pupulation		Percentage of Foreign Born in Total Labour Forces		Education Level gap between Foreign Born and Native**		
					Less than upper secondary	Upper secondary	Tertiary level
	1999	2005	1999	2005	(2002-2003)		
Belgium	8.4	7.8	10.4	11.5	14.5	-7.8	-6.7
Denmark	3.5	3.9	4.4	6.5	3.1	-5.0	1.8
Germany	8.7	8.9	10.8	12.2	33.5	-24.2	-9.3
Greece	2.6	5.2	6.4	8.5	-4.7	5.6	-0.9
Spain	1.8	8.3	3.8	11.2	-15.0	11.3	3.6
France	5.7	4.8	11.7	11.3	30.4	-21.9	-8.4
Ireland	3.2	6.8	7.8	9.9	-18.8	-6.8	25.6
Italy	2.2	3.9 *	0.9	3.1	N.A.	N.A.	N.A.
Netherlands	4.2	4.9	8.7	11.1	11.8	-11.8	-0.1
Austria	8.7	9.6	12.3	15.3	23.6	-20.3	-3.3
Portugal	1.4	2.7	4.8	7.4	-23.7	17.0	6.8
Finland	1.2	1.8	2.1	2.6	4.3	3.6	-7.9
Sweden	4.7	4.8	9.9	13.3	5.7	-10.1	4.4
United Kingdom	3.8	5.5	8.0	9.6	13.5	-27.6	17.4

* Data for 2003
** Gap denined as percentage of immigrant in the correspond level of eductaion minus percentage of native in the same level
Source: OECD

The situation of immigrants in the labour market has improved, reducing the gap in the unemployment rate

We are now going to focus our analysis on Spain, Ireland, Austria, Greece, Portugal and Italy, countries where the immigration shock seems to have been stronger in recent years.[4] Traditionally, the age structure of the immigrant population has been different to that of the native population. In the case of the EU-15 the immigrant population shows a younger structure and a higher proportion of working age population. Foreign population as a percentage of the active population has risen to 8% in the EU-15 in the 2004. It implies that the immigrants are a significant group in the labour market and increase the potential labour supply.

Chart 3
Participation rate gap
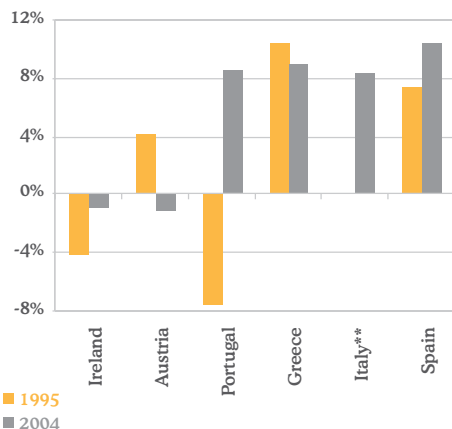
*Gap defined as participation rate of inmigrant minus rate of native
** For Italy data from 1994 are not available
Source: Eurostat and OECD

[4] For Italy and Portugal, in some cases the data is not available.
[5] It means that immigrant has higher participation rate than natives.

Foreign-born citizens have also improved the inclusion in labour market. Participation rate have experimented a rise over the past years, taking the gap to positive,[5] except in Ireland and Austria.

The improvements in participation rate did not translate completely to a low unemployment rate amongst foreign born. Foreign-born citizens still have higher unemployment rates than native, and the difference in most countries is still significant. In spite of this, the gap has diminished in an important number of countries.

Chart 4
Unemployment rate gap between Native and Foreign born*
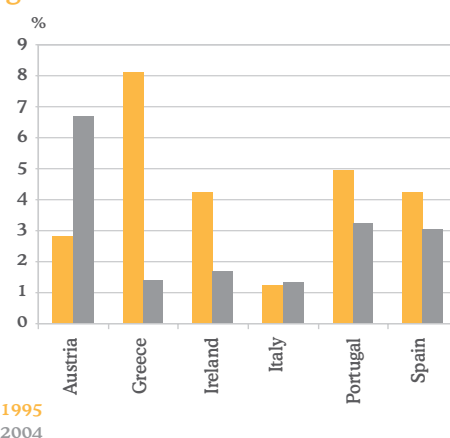
* Gap defined as unemployment rate of inmigrant minus rate of native
Source: OECD

A major improvement has taken place in Greece, where the unemployment rate of natives increased between 1995 and 2004; meanwhile in the foreign-born the reduction was 5.4 p.p. In Spain and Ireland, the unemployment rate of immigrants experienced a significant reduction in this period (13.2 pp and 10.1 pp, respectively), helping to reduce the gap, although the situation for natives has also improved, thanks to the economic performance. Nevertheless, employment of immigrants is more vulnerable; this could be explained by the higher proportion of immigrants classified under the figure for fixed-term labour contracts.

In some countries, the immigrant population is noted for its low level of skills. Although, in countries where the immigration shock has been strong (Greece, Spain, Ireland and Portugal) the gap is negative in the level of education.[6] In Ireland, the gap in tertiary education is positive, helping the economic performance of the country.

Nonetheless, as the level of education of foreigners is sometimes difficult to evaluate or convalidate in the country of adoption, they are often employed in sectors which do not require a high level of education. Immigrants are mainly employed in blue-collar jobs in sectors such as mining and manufacturing, construction, hotels and restaurants, and

[6] Percentage of native population is higher that immigrants.
[7] Cubero, J and Fernández, C. (2006) "Inmigración: Un choque asimétrico", Situación España, October.

household services, associated with low skills and easy training. Also, employment in this sector is usually seasonal, which makes it less attractive for natives.

## The contribution of migration to per capita GDP growth has been modest but positive

Immigration implies an increase in the supply of resources available in the economy (labour supply), so ceteris paribus raises potential output. It could be concluded that the immigration factor implies higher economic growth. However, this conclusion is not always true. As can be seen from the graph below, countries fall into two main categories those that have experienced a high GDP growth and a strong immigration shock such as Spain and Ireland (orange circle), and those that have not experienced high economic expansion in spite of high immigration levels, such as Portugal, Austria and Italy (grey circle).

Following "**Growth accounting**" approach,[7] which consists in decomposing the GDP per capita into productivity, the inverse of the unemployment rate, participation rate and working age population, we try to find the implication over the GDP growth. Assuming that productivity is equal for both, natives and immigrants, in the EU-15 it is shown that over the last decade, the contribution of immigrant to per capita GDP growth has been positive but modest. Among those countries analysed the estimated impact is higher in Spain (0,3 pp over the last decade). In Greece and Ireland is slightly lower, and negative in Austria.

All in all, the positive contribution of immigrant came, in general, by the increases of the working age population and participation rate. The contribution of migration flows through employment rate was very modest, even in some case (Austria and Ireland), it has subtracted from growth.

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Chart 5
Net migration in thousands and GDP growth (2000-2005)
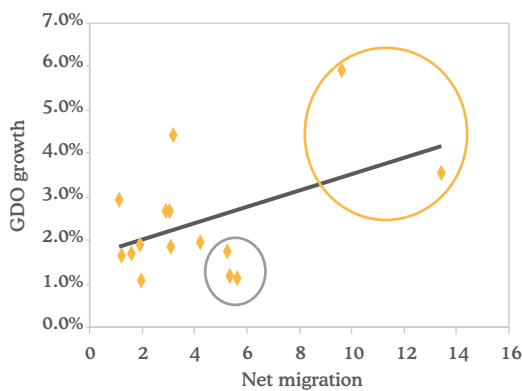
Source: OECD

Table 2. Contribution to GDP per capita growth in percentage

		GDP per capita growth				Inverse of unemployment rate			Participation rate			Working age population		
			L/Ls*Ls/PE*PE/P				L/Ls			Ls/PE			PE/P	
		Total	Productivity	Native	Immigrant	Total	Native	Immigrant	Total	Native	Immigrant	Total	Native	Immigrant
EU-15	1996-00	2.4	1.5	0.9	0.0	0.5	0.6	0.0	0.5	0.5	0.0	-0.2	-0.2	0.0
	2000-05	1.3	0.8	0.5	0.0	0.0	0.2	-0.1	0.5	0.4	0.1	-0.1	-0.1	0.0
	1996-05	1.7	1.0	0.6	0.1	0.3	0.3	0.0	0.5	0.5	0.1	-0.1	-0.1	0.0
Austria	1996-00	2.8	2.7	0.1	0.0	0.3	0.2	0.0	-0.2	-0.2	0.0	0.1	0.1	0.0
	2000-05	1.0	1.1	0.3	-0.4	-0.4	0.0	-0.4	0.2	0.4	-0.2	0.1	0.0	0.1
	1996-05	1.9	1.7	0.2	-0.1	-0.1	0.0	-0.1	0.1	0.3	-0.1	0.1	0.0	0.1
Spain*	1996-00	3.6	0.3	3.2	0.1	1.6	1.7	0.0	1.4	1.3	0.1	0.3	0.2	0.1
	2000-05	2.2	0.4	1.3	0.5	0.1	0.1	-0.1	1.5	1.3	0.2	0.2	-0.1	0.3
	1996-05	2.7	0.4	2.0	0.3	0.7	0.7	0.0	1.3	1.2	0.1	0.3	0.0	0.2
Greece	1996-00	3.0	1.8	1.1	0.1	-0.4	-0.4	0.0	1.2	1.2	0.0	0.4	0.4	0.0
	2000-05	4.0	2.8	1.1	0.2	0.6	0.5	0.0	0.8	0.8	0.0	-0.2	-0.3	0.1
	1996-05	3.5	2.4	1.0	0.2	-0.1	-0.1	0.0	1.1	1.0	0.1	0.1	0.0	0.1
Ireland	1996-00	7.8	3.1	4.7	0.1	1.8	1.8	0.0	2.0	2.0	0.0	0.9	0.9	0.0
	2000-05	3.8	2.7	1.1	0.1	-0.1	0.2	-0.3	0.8	0.7	0.1	0.4	0.2	0.2
	1996-05	5.6	2.6	2.7	0.2	0.9	0.9	0.0	1.4	1.4	0.1	0.6	0.5	0.1
Portugal	1996-00	3.2	1.6	1.6	0.1	0.7	0.7	0.0	1.2	1.2	0.0	-0.3	-0.4	0.0
	2000-05	0.3	0.6	-0.2	-0.2	-1.0	-0.7	-0.3	0.6	0.6	0.0	-0.1	-0.1	0.1
	1996-05	1.6	1.0	0.5	0.1	-0.1	-0.1	0.0	0.9	0.9	0.0	-0.2	-0.3	0.1

* Data from Spain are from national sources, data from the other countries are from Eurostat
L= employment, LS= labour force, PE= working age population, P= total population
Source: BBVA and Eurostat

3. Inflation under control

In our view, the ECB will be fairly comfortable with the inflation outlook in the medium term. We foresee a 1.8% HIPC inflation rate both for 2007 and 2008, in line with ECB inflation objective (even taking into account the VAT hike). However, risks are on the upside.

Inflation in euro area was contained during 2006, and the year ended with a 2.2% inflation rate. Oil prices shaped the path of headline inflation in 2006 through the weight of energy in consumer's spending. Core inflation, which is less volatile given that it does not include energy prices nor fresh food, remained low during the year with an average growth of 1.5%. This pattern of growth is clearly different from that observed in 2001 to 2003, when core inflation accelerated following the year 2000 oil shock and presented rates similar to headline inflation (about 2.5%). Note that all core components accelerated in that period, but as services have the largest weight in core inflation, this explains their larger share. Services inflation accelerated in 2001 and 2002, possibly due to strong wage hikes, but has moderated in more recent times. Also processed food positively contributed to core inflation during 2002 to 2004, mainly due to the important tobacco tax hikes of those years. The situation for the forthcoming years is different. The German VAT hike will certainly have an impact on inflation, both core and general, but eventually this effect will disappear. Wage moderation will continue, and we expect wage increases in line with productivity gains. This will contribute to a contained core inflation.

One the worrying factors is inflation expectations. Data from the EC Business and Consumer Survey shows that since 2005, along with improvements in economic conditions, agents expect higher prices. The more recent escalade in price expectations is in part the result of the announced VAT hike in Germany, which could be biasing the results of the survey. Although this tax increase will have an impact on prices, expectations could be upwardly biased. On the other hand, mid-term implicit inflation expectations, computed as the difference between indexed and non-indexed bonds, remained fairly stable a bit above 2%. We can say that the market does not expect (on average) high inflation in the following years. Analysts surveyed by ECB also expect inflation levels near the 2% objective. For 2007 and 2008, (average) expected inflation is 2.1% and 1.9% respectively. The risk of excess inflation in the mid-term (5 years ahead) has moderated a bit,[1] but remains higher than 2002-2003 values (though not much higher). This implies that analysts believe that HICP inflation above 2% is more likely to occur than in previous years (a probability of 45%).

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[1] Our measure of inflation risk is calculated form ECB's Survey of Professional Forecasters. It is the sum of the probability that inflation is equal or above 2% five years ahead.

Chart 3.1.
**Consumer inflation**
HICP - year growth rate

Forecast

■ Headline
■ Core
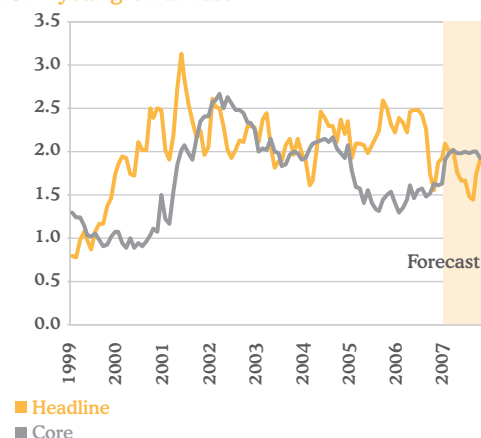
Source: BBVA

Chart 3.2.
Euro area: price expectations

■ PMI Output Price* (left)
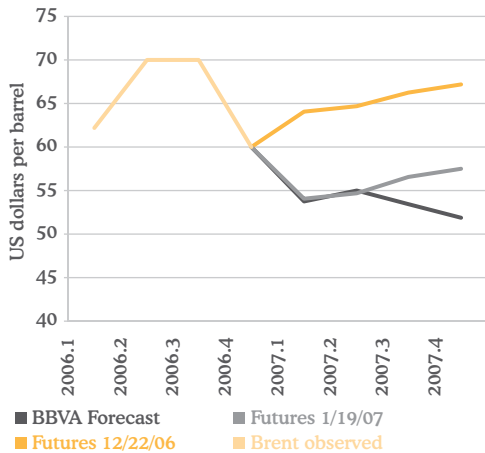■ Consumer Expectations (right - balance of answers)

* An index reading above 50.0 indicates an overall increase in the variable
Source: DG Economic and Financial Affairs - European Commission, NTC Economics and BBVA

Chart 3.3.
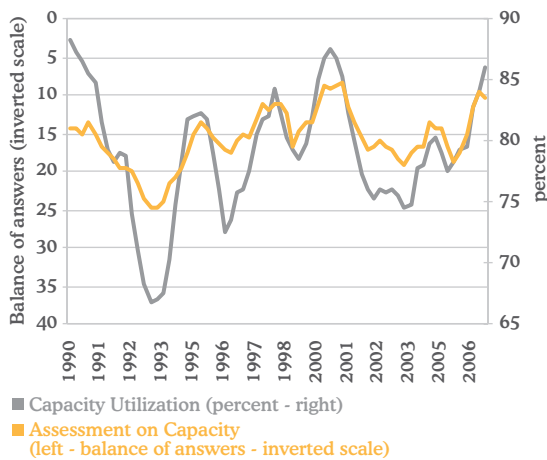**Labour costs**
year growth rate

■ Hourly Labour Costs
■ Comp per Employee
■ real Hourly Labour Costs
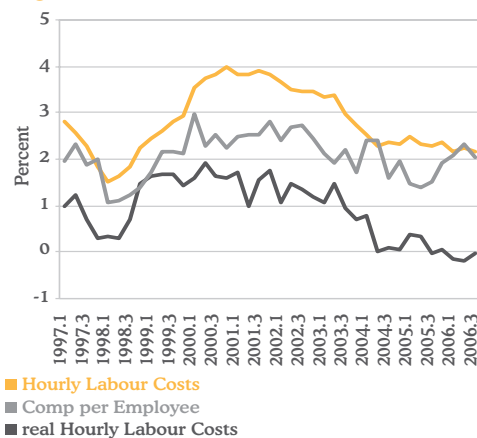
Source: ECB

Chart 3.4.
Brent forecasts

BBVA Forecast
Futures 1/19/07
Futures 12/22/06
Brent observed

Source: Bloomberg and BBVA

Chart 3.5.
Production capacity in industry

Capacity Utilization (percent - right)
Assessment on Capacity
(left - balance of answers - inverted scale)

Source: DG Economic and Financial Affairs - European Commission

Chart 3.6.
Labour constraints
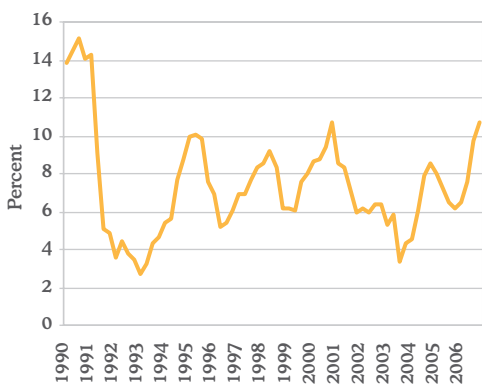
Percent of answers indicating labour as factor limiting production
Source: DG Economic and Financial Affairs - European Commission

In the near term, our expected path of commodity prices and the impact of the increase in the German VAT play a major role in our inflation forecasts and the inflation profile.

We calculate that the German VAT increase will rise headline and core inflation by 0.4pp. We have observed some frontloading of the German VAT in the latter months of 2006, which could lower these figures, translating into a lower than expected impact on inflation for 2007. In fact, the low inflation observed in Germany in January (preliminary data) reinforce the frontloading hypothesis.[2] Furthermore, the path we expect for Brent and other commodities, with modest but sustained decreases, will not only have a direct impact on headline inflation, but also a favourable base effect. Our oil price baseline scenario points to a modest decrease in Brent both in 2007 and 2008, with prices near $53 and $49 on average for each year respectively This leads us to anticipate a 1.8% inflation rate both for 2007 and 2008, in line with the ECB's inflation objective. Given that base effects will be important, the path of inflation during 2007 will be different each month, with year inflation reaching the minimum of 1.37% in August, something that may influence ECB's monetary policy decision in September.

In our opinion, main risks on inflation stem neither from commodity prices nor from VAT hike, but from domestic factors. In particular, although wage demands do not seem too high, tight labour markets could trigger wage pressures.

Despite the increases in commodity prices and the improvement in economic conditions, in 2006 real wages hardly changed. In 2006 nominal Hourly Labour Costs grew at 2.2%, a rate that prevails since 2004. Unlike other periods with good economic performance and high growth, wages remained roughly restrained. And this occurred with a flourishing labour market that presented a sharp decrease in the unemployment rate and increases in the activity rate. Real wages (measured as the ratio of hourly labour costs to harmonized IPC, both seasonally adjusted) have hardly changed since 2004. This wage moderation could be partly explained by the structural reforms carried out at the end of the 1990's, which did not became fully operational until recently. Additionally, the late take-off of the economy after the 2001-2003 recession contributes to this evolution. On the other hand, immigration could have played a role in the evolution of wages. Immigration flows are indeed significant in some countries and net immigration explains more than four fifths of the population growth for the past few years. Therefore, worker's competition for a vacancy could have intensified (especially if immigrants' reserve wage is lower than that of natives) which could have decreased the bargain power of workers and unions. However, this is just an hypothesis. Economic theory is still trying to resolve the causal effects of immigration on wages, something that is nowadays subject to intense debate. The wage demands by unions seen so far, like IG Metall's, do not seem extremely high, and we expect a final agreement somewhat above inflation but in line with productivity gains. In essence, although wages will accelerate a bit in 2007 they will remain well contained.

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[2] However, the discount season, which could be specially important this year due to the mild winter, blurs the January data.
[3] BBVA's Employment Synthetic Indicator which is a weighted sum of expected employment in EC's Industry, Construction and Retail surveys.

Nonetheless, favourable labour market conditions could eventually fuel a stronger acceleration on wage growth. Employment is growing and there is generalized optimism in the labour market. BBVA's Employment Synthetic Indicator has increased since mid 2005,[3] reaching values close to those of 2000 when the economy reached a peak. Therefore, firms are expecting to incorporate more workers into the production process. The question is whether this will be possible given that the unemployment rate is close to minimums (with the activity rate growing). In fact, labour has gained importance as a limiting factor to production according to the EC Industry Survey, also reaching levels not seen since 2000. Not only labour could be a constraint, capacity utilization is also close to maximums. Although we see no risk for second-round effects, the strong momentum of the economy (which could soon reach full capacity utilization), the low unemployment rates and the optimism in labour market together with expectations of higher prices by consumers, put the balance of risks on the upside for future inflation.
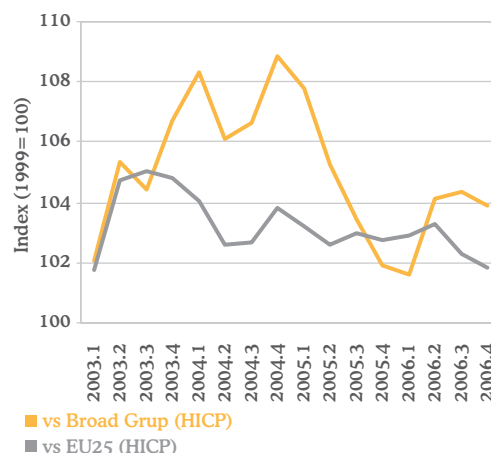
Chart 3.7.
Employment Synthetic Indicator* (BBVA)

* Resumes: manuf. constr. and retail employment EC Survey Data
Source: BBVA

Chart 3.8.
Euro real effective exchange rate

vs Broad Grup (HICP)
vs EU25 (HICP)

Source: DG Economic and Financial Affairs - European Commission

An Inspection into Second Round Effects

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Oil prices about to double in two years, with minimum impact on wages. A natural question is whether there is something different this time about this oil shock (or in the way the economy responds to it), or if its effect is just delayed and we will soon see increasing demands for higher wages.

Chart 1. Wages and oil
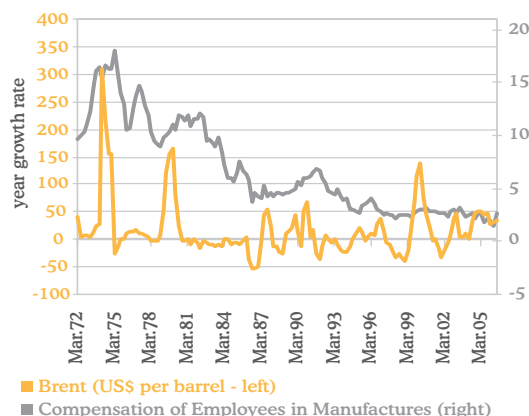
Source: Eurostat and BBVA

An easy way to quantify the impact of oil shocks on inflation and wages is to use a sort of "correlation measure". According to this measure the pass through has reduced.

In order to assess whether this time is different, we must include in our analysis both this shock as well as previous ones.

An easy way to quantify the impact of oil shocks on inflation and wages is to use a simple pass-through coefficient, defined as the ratio between the inflation or wage growth to oil price growth for a given horizon (eight quarters in our case). These results, shown in Table 1, should be taken with care since they are just a sort of correlation measure, not necessarily implying a causal effect. With this in mind, we nevertheless can see that the pass-through coefficient has reduced substantially. After the two oil shock that hit the world economy in the 70's, wages and consumer prices increased roughly 0.15% for every 1% of oil-price increase. However, for the shocks of 1999 and 2004 this figure reduced to 0.05% for each 1% increase in oil-price.

Table 1. Pass-through coeffcients

(% change over 8 quarters)

	1974-1	1979-1	1999-3	2004-3
wage* pass-through	15.7	14.5	5.0	5.2
price pass-through	12.8	15.5	3.5	5.4

* Hourly Labor Cost in Manufactures
Source: BBVA

An analytic inspection of the pass-through points to an interrelation or feedback between wages and prices that could be interpreted as the wage-price spiral, in the period 1972-92. For the period 1993-2006 this wage-price spiral is absent.

We now analyse whether there has been a change in the transmission of oil shocks using Vector Auto-Regression models. Using our sample, which runs from the first quarter of 1971 to the second quarter of 2006, we estimate a VAR for the year growth rate of Brent (in US dollars), Consumer Price Index and Hourly Labour Cost in Industry.

First of all, we test whether there has been a structural change in the relations of the variables. The existence of a structural change in inflation has been widely studied and documented.[1] These studies find that inflation presents structural changes associated with a change in the way the monetary authorities conduct their policy. Our estimations show that wages and consumer prices have two breaks, and that the breaks occur in the same periods, the end of 1982 and the end of 1992.[2] With this in mind, and knowing that the process of convergence for countries in the euro area accelerated since the Treaty of Maastricht and that monetary policy got more oriented to inflation targeting, we split our sample in two, one that goes from 1971 to the end of 1992 and the other from 1993 to 2006. Lag order selection criteria points to a VAR in two lags for both periods, which yields a parsimonious model for our three variables (the year growth rate of Brent, CPI and Hourly Labour Cost index in industry).

Table 2 shows the p-values for the Granger causality tests for both periods. As expected, for the period that runs from 1971 to 1992, both Brent and wages contained important information for the prediction of consumer prices. The test strongly rejects the exogeneity hypothesis. We can say the same for the link between consumer prices and wages. These results point to an interrelation or feedback between wages and prices, that could be interpreted as the wage-price spiral present in most economies in this period. Brent, on the other hand, does not carry relevant information for the prediction of wages once we control for consumer prices. For the second period, we observe that none of the previous relations hold. Prices and wages are exogenous and none of the other variables contribute to a better prediction. The wage-price spiral is absent in this period.

[1] See for example, Altissimo, F.; M. Ehrmann; F. Smets. "Inflation persistence and price-setting behaviour in the EMU: a summary of the IPN evidence" ECB Occasional Paper No. 46, 2006. and Gadzinski, G.; F. Orlandi. "Inflation persistence in the European Union, the EMU and the United States" ECB Working Paper No. 414. 2004.
[2] These brakes dates are similar to the ones found in previous studies.

Table 2. Granger Causality Tests
(p-values)

|	1972Q3-1992Q4	1993Q1-2006Q2
CPI does not GC Brent	0.0326	0.0146
Wage does not GC Brent	0.1052	0.8734
Both variables do not GC Brent	0.0972	0.0523
Brent does not GC CPI	0.0484	0.1047
Wage does not GC CPI	0.0093	0.4757
Both variables do not GC CPI	0.0026	0.1794
Brent does not GC Wages	0.6739	0.5124
CPI does not GC Wages	0.0005	0.3803
Both variables do not GC Wages	0.0001	0.6788

Source: BBVA

Chart 2 shows the impulse-response functions for each variable after a unit shock of Brent. We employed the triangular decomposition (which is very similar to the popular Choleski decomposition) because it permits to shock both systems (samples) with the same magnitude.[3] We can see that the dynamics are not very different between both periods. Although the response of CPI and wages in the more recent time is smaller, which would point to a reduction of the effect of Brent on prices and wages, confidence bands overlap, and we cannot make strong claims on the difference of the effects. Note however that the different dynamics of Brent prices could be responsible for this behaviour of wages and prices. Now oil price movements are more persistent, with gradual and more lasting escalades, translating this persistence to the other variables. On the other hand, confidence bands allow us to be more confident on the difference in the response of wages. During the seventies and eighties, wages presented a positive response to oil movements, while now, such response is no so clear.

A large number of explanations are compatible with the hypothesis that the euro area economy now responds differently to oil shocks yielding a reduction in the pass-through form oil to general prices and wages.

First, the production process in Europe became less oil dependent and more flexible to incorporate alternative energy sources. The impact on prices of an oil-price shock will eventually depend on the capacity to adopt these different energy sources and their price (which depends

on the elasticity of supply of each of this sources). Second, the whole economy has switched to less oil dependent activities, thus reducing the impact of oil in the aggregate. For example, services, which is less dependent on oil than industry, now represents a much larger share of the economy than three decades ago.

Aside from a reduced dependency of the economy on oil, other factors contributed to keep inflation under control. On one hand, the credibility of ECB and the way it conducts the monetary policy has kept inflation expectations anchored. On the other, the continuous efforts of European authorities to reduce the degree of indexation in wages favoured a reduction of the wage-price spiral. In addition, strong foreign competition both in the goods market and in the labour market, restrained prices and wages hikes. International trade has expanded worldwide, and the euro area faces an increasing flow of imports, specially from the Far-East, which restricts the possibility of firms to rise their prices. Chart 3 shows that the growth rate of the price of services was higher than that of goods. Since most services are non-tradable they are less subject to foreign competition than goods. Also, an increasing flow of migrants from outside the euro area (Eastern Europe, Latin America and Africa) decrease the bargain power of workers and unions, reducing the demand for higher wages.

Chart 3. CPI by type of good
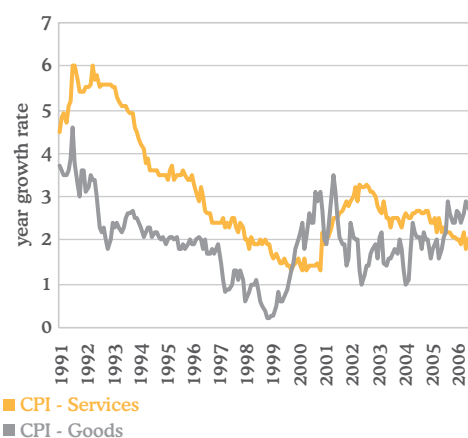
Source: Eurostat and BBVA

With all the above being said, we have reasons to believe that the impact of oil shocks on prices and wages has eased, and our estimations point in that direction.

Several changes have taken place in the economic structure of euro area, not just those involving oil, wages and prices. Our estimations cannot discriminate between

[3] The order of the variables is: Brent, CPI and Wages. This order would imply that Brent is not contemporaneously affected by a shock on the other two variables. Prices is contemporaneously affected by Brent but not by wages. And wages is affected by both. Our results do not vary much if we invert the order of prices and wages

changes due to a modification in the pass-through from other changes in the economic environment. Nevertheless, our results show that the reduced form dynamic relations between the variables could have changed, and the economy of euro area now behaves somewhat differently form how it did in the seventies and eighties. In this new economic context, we don't expect strong wage pressures from an oil shock. Nevertheless, the constant concern of ECB about monitoring second round effects is completely logical. After all, its job is to keep inflation and inflation expectations well anchored, contributing in this way to a reduced pass-through.
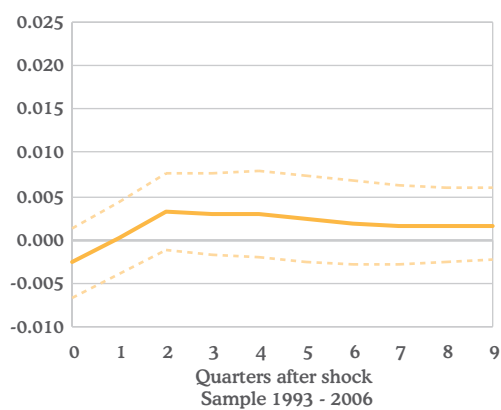
Chart 2. Impulse-Response Functions of Wage to a unitary Brent Shock
Bayesian Confidence Bands calculated using non-informative priors
Left Panel: period 1971-1992; Right Panel: period 1993-2006
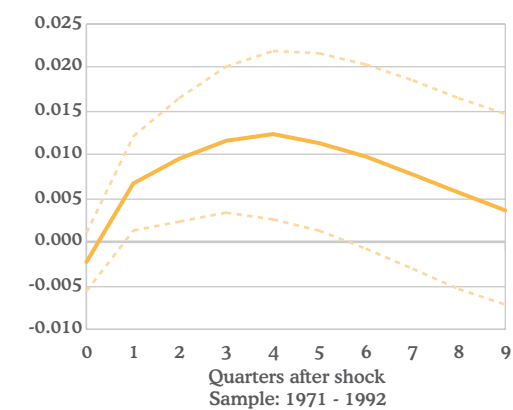
(unit shock of Brent - triangular decomposition)

(unit shock of Brent - triangular decomposition)

4. ECB: consolidating neutrality

As official interest rate gets closer to its neutral level, the ECB is moderating the pace of tightening. In the baseline scenario the ECB will raise interest rates to 4.25% by September 2007.

The ECB will proceed with the tightening cycle in the coming months, raising interest rates again in March, June and September by 25 bp. Although the outlook for inflation has improved in recent months mainly due to energy prices and a lower than expected impact of the VAT hike, monetary policy remains accommodative, with current interest rates at 3.5% still below "neutral levels". Furthermore, risks on price stability remain on the upside. Positive growth momentum, with no clear evidence of structural productivity gains, could trigger inflationary pressures as long as the spare capacity diminishes. Additionally, concerns over financial stability persist against a background of strong monetary and credit growth.

After the summer, the ECB may decide to pause if money and credit growth moderates as a result of the impact of accumulated rise of interest rates. This decision may also be influenced by the level of headline inflation in the euro area, situated well below the ECB objective and with no signs of significant pressures in the medium term.

We recognise that is very difficult to assess when the ECB may pause. In fact, we assign a non-negligible likelihood to an scenario of pausing in June (4%), although we consider the most likely one the ECB raising to 4.25%. The key will be in growth.

According to our indicator of the stance of monetary policy, [1] this path is consistent with a neutral stance, given the central projection for output and inflation.

Concerns over financial stability and/or unexpectedly high growth could result in an official rate above 4.25%.

A stronger than expected demand in the euro-zone, linked to the existence of pent-up demand in private consumption, could lift the official rate above 4.25% in 2007.

Persistence of strong money and credit growth could affect ECB rates in the same way to the extent that higher leverage could be used to complement earnings and disposable income, thus fuelling expenditure. This has occurred in the recent past in a number of countries.

The excessive accumulation of liquidity in the world economy and its possible implications in price and financial stability has become a major cause of concern among central bankers.

Liberalization, as well as the development and globalization of financial markets has made them more effective in allocating resources and risks across sectors and regions over time, removing liquidity constraints in some countries or/and sectors. Also, given the pro-cyclicality of the financial system, it tends to amplify fluctuations in real economic activity.

In recent years, a combination of several factors (ie, liberalization and globalization of product and factors markets, strong focus of monetary authorities in price stability, etc) have helped to keep inflation under control over the world, giving little or no need for monetary tightening. But ample liquidity could have fuelled strong monetary and credit growth, higher asset prices and low level of rates, spreads and risk premiums, keeping the cost of borrowing artificially low.

[1] See "Prospects for the Euro-Area Economy through the lens of a DSGE model" in this publication.

Chart 4.1.
Stock markets

■ Eurostoxx 500
■ S&P (right)

Source: Bloomberg

Chart 4.2.
Housing prices
YoY rate

■ Germany
■ Euro area

Source: ECB and Destatis

Chart 4.3.
Euro area: corporate spreads

■ AAA ■ AA ■ BBB ■ Total ■ A

Source: Bloomberg

Chart 4.4.

Euro area: factors contributing to change in credit standars to enterprises. Bank's margin


- Riskier loans
- Average loans
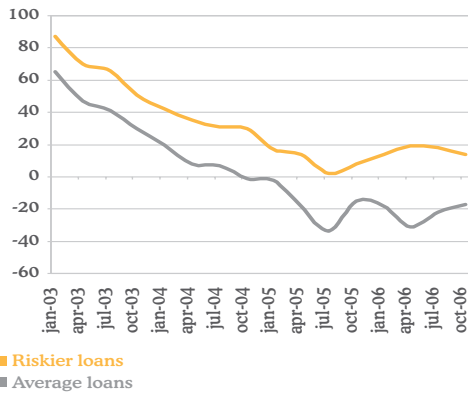
Source: ECB (Bank lending survey)

Chart 4.5.

Euro area: factors contributing to change in credit standars to enterprises. Other factors

- Size of the loan
- Collateral requirements
- Maturity of the loan
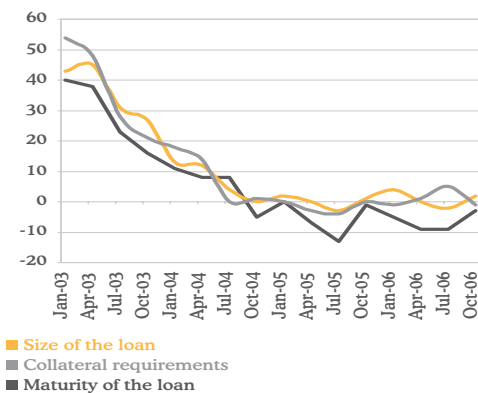
Source: ECB (Bank lending survey)

Chart 4.6.

Euro area: estimates of the ˝real money gap˝. As a % of real stock of M3

- Corrected for "portfolio shifts"
- Official data
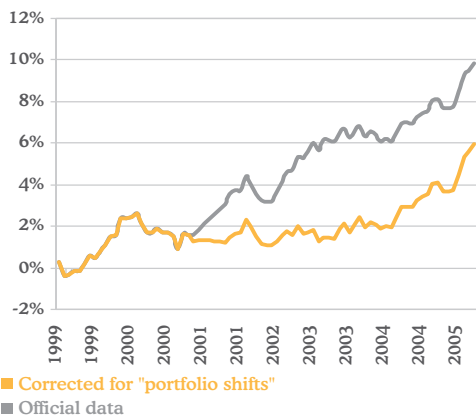
Source: ECB and BBVA

In particular, officials fear that the "search for yield" in a very low policy interest rates environment and the strong growth of financial products linked to derivatives could lead risk-taking too far, increasing financial imbalances and raising leverage to unsustainable levels.

The euro area seems to exhibit some of the "consequences" of ample liquidity i) signs of asset inflation (housing market, stock market, bond markets, etc), ii) easing bank credit standards, and iii) strong monetary and credit growth.

As in many other countries, the abundance of liquidity in global financial markets, together with higher saving rates in some emerging economies has contributed to maintain long-term interest rates and credit spreads at very low levels in the euro area. In fact, the decline of long-term interest rates has been particularly acute in the euro area, compared to other economic areas. Thus, rising short-term interest rates have resulted in flatter market yield curves.

The "search for yield", abundant liquidity and the development of derivative markets, which allow a better management of risk, have reduced credit and equity risk premia. This fact combined with sound earnings and gains in business efficiency has impelled rises in stocks and bond prices. Housing prices have also registered significant increases in those countries with better employment performance (like Spain, Ireland or France, which have experienced double digit growth).

At the same time, the banking system has notably eased the access of households and corporations to credit, not only through a significant reduction of bank lending margins, even on riskier loans, but also through the easing of conditions in terms of maturity, loans size or credit lines, non-interest charges and collateral requirements. According to the bank lending survey, intense competition among banks is the main factor behind this loosening of conditions. Against this background, the strong bank lending growth to private sectors observed in the last years comes as no surprise. Loans to non-financial corporations are increasing at double digit, in the same way as lending for house purchase until very recently. Particularly striking is the intense rise of credit to non-monetary financial corporations, linked to the rapid development and mounting success of alternative products and vehicles of financing.

As a counterpart to the robust credit growth, M3, the benchmark measure of liquidity in the euro area, continues to rise well above the reference value, accumulating a great amount of excess liquidity, measured by the "money gap". Although the relationship between M3 and expenditure has not been very straightforward in the past, the strong M3 growth represents a cause of concern for a central bank with a significant monetarist tradition. Although narrower measures of liquidity (as M1) are decelerating in response to rising short-term rates, the flat yield curve is encouraging a shift among M3 components, instead of constraining its expansion.

Tightening monetary conditions over the last year have not implied a significant restriction in the financial framework for households and corporations. In fact, the financial landscape remains relatively favourable.

Due to low long-term interest rates and credit spreads, booming stock markets, declining bank loans margins and easier credit standards, financial conditions for households and corporations remain relatively favourable in the euro area in spite of rising official rates. Thus, the cost of borrowing for households, while increasing somewhat, remains low by historical standards.

The same conclusion can be drawn from a synthetic measure of cost of external financing for non-financial corporations. The cost of equity has considerably diminished, and bond spreads for all ratings categories

are near minimums. Financial conditions seem to be reacting to a small extent to higher leverage, tightening monetary conditions and expectations of some slow down in the pace of profit growth. This scarce reaction contributes to central bank's worries about a possible undervaluation of risks. Surprisingly, despite this low cost of financing there has not been an upsurge in the issues of equities or other securities by non-financial corporations and they have been growing at rates far below those seen in 2000.

The ECB is increasingly focused on monetary and credit aggregates, Growth of loans to households has begun to curb, presumably as a result of the impact of accumulated interest rate increases.

The ECB is paying strong attention to monetary and credit growth as a source of inflationary pressures. A slow-down in credit to households and, in particular, in loans for house purchase, together with signs of a cooling-off in the housing markets of countries with a higher risk of overheating, have mitigated somewhat the concerns related to loans to households. Furthermore, a slight convergence among countries can be observed, as well as an increase in loans and housing prices in countries with more subdued real estate markets (as Germany), and some deceleration in those with higher rates of credit and housing price growth.

The emphasis now turns to loans to non-financial corporations, which are at historical maximums (13% annual growth rate) and with little sign of levelling-off.

Different factors explain the strong growth of loans to non-financial corporations including the low level of interest rates and the favourable credit conditions mentioned above in terms of margins, size and maturity of loans, collateral requirements, etc. Restructuring measures and efforts to increase cost-efficiency in the banking system, along with the upsurge of the credit derivatives market that has allowed banks to hedge their credit risk, have also improved their lending capacity in recent years.

Apart from supply conditions, demand for loans by non-financial corporations has also substantially increased in recent years. In contrast to previous years, when loan financing was used mainly to restructure and refinance existing corporation debt, corporations are currently devoting funds to finance increasing fixed investment, inventories and financial investment, as well as to finance a mounting number of M&A transactions. Given that corporate investment (including M&A transactions) is likely to maintain its dynamism over coming quarters in an environment of good prospects of earnings and profitability, demand for loans is expected to remain strong.

Finally, some effect of substitution debt-securities financing by bank loans can be observed. For example, in recent years syndicated lending seems, to have replaced issues of debt securities as the primary debt-related financing source for M&A transactions. This explains the low level of securities issues carried out by non-financial corporations in spite of favourable credit spreads. Resource to equity or debt financing has declined compared to other expansive cycles.

To date, strong money and credit growth has not triggered investment or consumption behaviour very different from the pattern of previous cycles. Furthermore, debt levels built up by European households and corporations still seem far from those of other mature countries that have recently faced increases in interest rates without suffering significant consequences in their financial situation.

Chart 4.7.
Real cost of external financing of euro area non-financial corporations

Weighted by flows
Weighted by amounts outstanding
Source: ECB and BBVA

Chart 4.8.
Euro area: debt and equity issuance by non-financial corporations
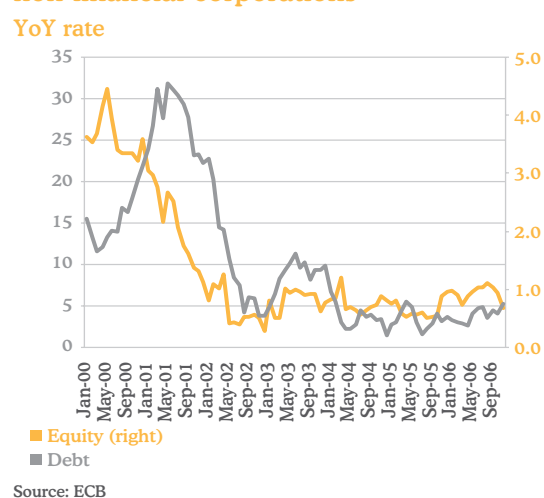YoY rate

Equity (right)
Debt
Source: ECB

Chart 4.9.
Euro area: loans to households and non-financial corporations
YoY rate

Consumption
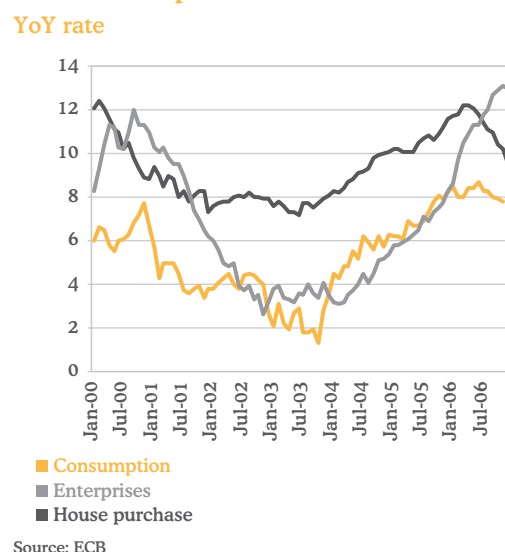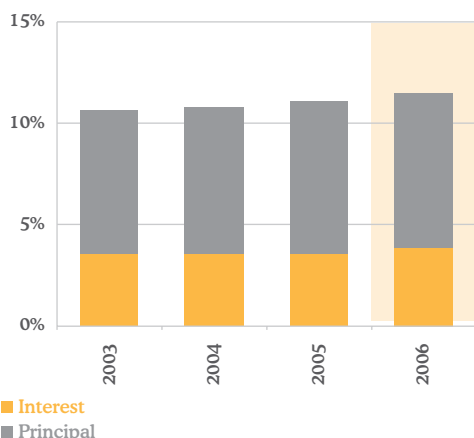Enterprises
House purchase
Source: ECB

Chart 4.10.

Euro area: breakdown of the annual rate of growth of financing to non-financial corporations
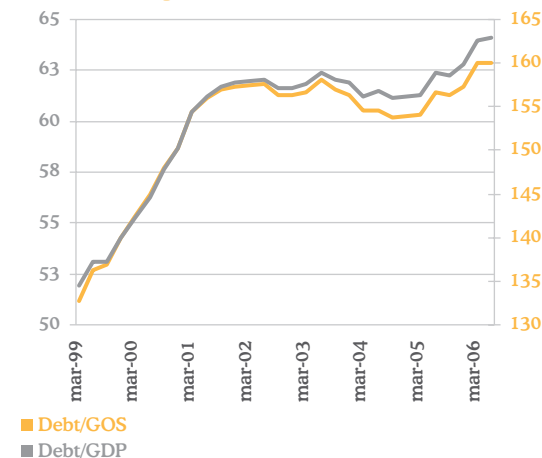
Annual percentage change
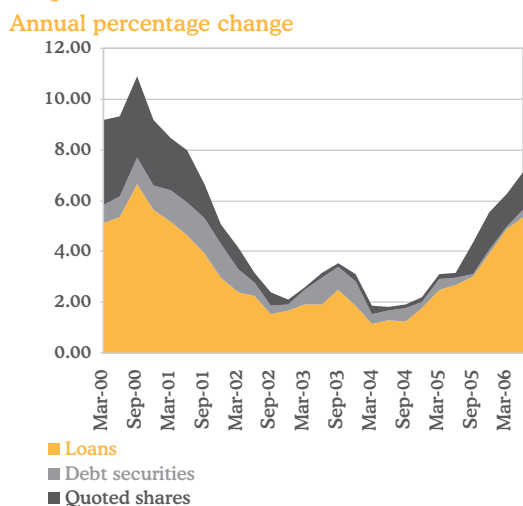
Source: ECB and BBVA

Chart 4.11.

European households debt service burden

In % of disposable income

Source: ECB and BBVA

Chart 4.12.

Euro area: debt ratios of the non-financial corporate sector

Source: ECB and Eurostat

There are no signs that money and/or credit expansion has impelled very robust expenditure, or that these factors may be contributing to a build-up of inflationary pressures. There are a number of factors, some of them already mentioned (wage moderation, anchorage of expectations), helping to maintain inflation at low levels. In fact, inflation expectations for the next two years are very contained, according to European and international organizations and private institutions.

Money and credit developments become a matter of concern to the extent that they may be anticipating risks of financial instability, or precipitating a deterioration of agents´ balance-sheets to unsustainable levels, particularly within a context of rising interest rates. Regarding the former, there are no signs that risks of financial instability could be greater in the euro area than in other areas. In relation to the latter, although household leverage has scaled in the latest years, household debt ratios stand, on aggregate, lower than in other mature countries where households have faced recently significant increases in short-term rates without a relevant impact in their creditworthness and private consumption Moreover, their debt-service ability seems sound. In the non-financial corporation side, debt increase has been more moderate when corrected by gross operating surplus instead by the GDP.

Developments of alternative sources of financing, with an increasing role of non-monetary financial institutions, may have non-negligible implications in terms of leverage, liquidity conditions and risk allocation

We have little information about the magnitude of the activities and the involvement in derivative markets of these institutions, which are assuming a large part of the credit risk the banking system, is transferring. Additionally, there is mounting uncertainty about the impact of a failure of one or some of these institutions, or a shortage of liquidity in the credit derivative markets.

The ECB´s concern over financial stability is understandable in an environment where central banks have a lessened ability to alter financing conditions through official rates and also bearing in mind the higher impact of financial shocks in the real economy

The ECB references to financial stability should be framed within this scenario of uncertainty where, due to globalization among other things, financial shocks have a greater impact on the economy and central banks have less ability to control financial conditions through the management of policy rates.

However, risks associated with strong growth and the development of new financial products/intermediaries could be addressed more appropriately by specific measures not necessarily related to policy rates. (ie: regulatory/supervisory requirements).

5. Special topic: Modern Macroeconomic Modelling

Modern Macroeconomics in Action: Estimating a DGSE Model for Europe

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Introduction

Modern macroeconomics is built around the formulation and estimation of dynamic stochastic general equilibrium (DSGE) models. Since Kydland and Prescott's pathbreaking 1982 paper, economists have applied DSGE models to explain aggregate fluctuations and to perform policy analysis. More recently, researchers have closely linked these models to the data by employing formal statistical methods and by performing forecasting exercises. In this article, we describe the structure of a benchmark DSGE model of the European economy in the tradition of Smets and Wouters (2003), we discuss how such a model can be estimated, and we present some quantitative results to illustrate the many potential applications of this area of research.

A brief description of a DSGE model

DSGE models offer a complete description of a simplified economy. Instead of aiming at capturing reality in its full complexity, something possibly beyond any model's ability, DSGE models concentrate on selecting a few aspects that we find essential and incorporating them in a coherent framework. To achieve this goal, economists build DSGE models from first principles. We present the agents acting in the economy, we specify how they behave and the technology they have access to, we describe the pricing and market arrangements, and we determine the information structure: who knows what and when. Then, we trace the outcome of the agent's interaction over time (what we cumbersomely call the dynamic general equilibrium of the model) as it is subject to random shocks (the stochastic component).

We briefly discuss how we arrange these different elements in the benchmark DSGE model of the Euro area economy that we estimate in this article. The interested reader can find a full description of the model and further explanations regarding its solution and estimation at the web page: www.econ.upenn.edu/~jesusfv/benchmark_DSGE.pdf.

The agents: In our model, we have three types of agents: households, firms, and the government. Households consume, save, hold money and financial assets, and decide how much to work and at which wage given the demand in the economy for their skills. Consumption is subject to habit persistence. Higher levels of consumption in the last period reduce the utility from the same level of consumption in the current period.

In our model, all households look a lot like each other. They are ex-ante homogeneous, and they have access to complete markets to diversify their risk. In general, this does not need to be the case. Depending on how detailed we want the model to be, we could have also included aspects like age, different educational levels, evolving family size, etc. DSGE models with age and families are, for example, important for studying Social Security and to determine the effects of reforming it. However, richer models with heterogeneous households are more difficult to handle. For the purpose of our exercise, we can learn much about the European economy despite having similar households.

Firms produce a continuum of goods that are consumed by households. Each firm produces a differentiated product, i.e., a good that is slightly different from all the other goods in the economy. This differentiation gives the firm a degree of market power. Consequently, the firm can choose the price of the good it produces given the demand it faces from households.

Finally, we have the government. The government taxes labor and capital income and profits to finance its expenditures. In addition, the government determines the short-run nominal interest rate through open market operations by following a Taylor rule that depends on past interest rates, inflation, and the output gap. Depending on the question we want to ask, we could have filled in many more details to capture the behavior of actual governments. For example, we could have specified a Social Security system or a much richer set of taxes. Again, there is much to be learned even from a simple model like ours.

Price setting: As we mentioned before, households and firms set prices subject to their demand curves. However, they face costs in posting their prices. For example, when a firm wants to change its prices, management needs to meet, discuss alternative pricing schemes, and make a final decision. After the decision is taken, it needs to be implemented: new catalogues need to be prepared, the new prices communicated to customers, and so on. All of these costs are sometimes called "menu costs" -an analogy to a restaurant's having to print a new menu whenever it changes the price of its meals. Menu costs introduce nominal rigidities in the economy. Instead of constantly changing prices to adapt to new information sets, firms will change prices only every few quarters. A flexible modelling device that captures these rigidities is to assume that households and firms face the constraint that they have to follow a Calvo's pricing rule. Under this rule, households and firms can reoptimize their prices only with some probability in any given quarter.[1] Otherwise, agents just index their prices to inflation. Price rigidities create a role for monetary policy and an important business cycle mechanism.

The shocks: Behavior over time in DSGE models is driven by random shocks. We include five of these exogenous sources of variation. First, as in Kydland and Prescott (1982), we specify a neutral technological shock that changes the productivity of all firms in the economy in a symmetric way. The neutral technology evolves as a random walk in logs with a drift and a stochastic innovation. Second, we define an investment-specific technological shock. Greenwood, Herkowitz, and Krusell (1997 and 2000) have vigorously defended the importance of technological change specific to new investment goods for understanding postwar U.S. growth and aggregate fluctuations. We also specify the investment-specific technological shock as a random walk in logs with a drift and a stochastic innovation. The two unit roots in the neutral and investment-specific technological change generate long-run growth in the model and cointegration relations among variables like nominal output and nominal investment. Third, we have a shock to intertemporal preferences: how much agents value the present versus the future. This shock captures exogenous fluctuations in the aggregate demand of the economy, determined by factors like demographics, changes in tax structures, etc. Fourth, we introduce a shock to the utility from leisure. This shock is often interpreted as a shock to labor supply. Finally, we have a shock to monetary policy: changes in the interest rate determined by the European Central Bank (ECB) that are not supported by changes in the fundamentals that the ECB follows in a systematic way. This shock may reflect the varying political weight of the different members of the governing council of the ECB or an evolution in the judgment of policy makers about the current situation of the European economy. Formal estimation will impose the

1 Calvo pricing is just one example of different mechanisms to introduce nominal rigidities. We could also have used Taylor pricing (Taylor, 1980), partial adjustment (Rotemberg, 1982), or inattentive agents (Sims, 2001), among other modelling choices.

discipline required to investigate how important each of these five shocks is and to measure their size and properties.

Dynamic equilibrium: Once we have specified the model, we let agents behave according to their objectives: they maximize their utility or their profit, subject to their budget and resource constraints.[2] Then, we impose the consistency conditions that ensure that their actions are compatible (i.e., the number of goods sold in the economy is equal to the number of goods bought). The combination of agents acting according to their objective functions, the consistency conditions, and the shocks the economy experiences generates a random path for the variables of the model. We call this path the stochastic dynamic general equilibrium of the model.

Taking DSGE models to the data

DSGE models depend on the parameters that describe the preferences of the households, the technology of the firms, and the structure of the random shocks. To study the properties of DSGE models, researchers need to determine the values for these parameters. Since DSGE models generally do not have a "paper and pencil" solution, we solve them with a computer. Typically, computers require us to feed them particular parameter values. Moreover, when we forecast or when we perform other quantitative exercises, we also need to select parameter values to produce numerical predictions usable for decision-making.

A formal procedure for selecting parameter values is to use statistical techniques. However, until a decade ago, there was little work on the econometrics of DSGE models. Economists lacked both the computational power and the econometric tools to undertake the estimation of these models. Over the last few years, the landscape has changed dramatically. First and foremost, computers have become much more powerful. Moreover, during the 1990s, researchers developed powerful simulation techniques like Markov chain Monte Carlo (McMc), which we require to estimate DSGE models.

We approach our estimation from a Bayesian perspective. The Bayesian approach is based on the combination of presample information (the prior distribution of the model parameters), which gathers all the knowledge and experience of the researcher, with the likelihood of the model, which specifies the probability of the observed data given some parameter values. This combination is done through the Bayes' theorem and produces the posterior distribution of the model parameters.

The Bayesian approach has proven very successful when estimating DSGE models (see the excellent review of the literature by An and Schorfheide, 2006). First, the Bayesian paradigm is a coherent and complete approach to inference with sound axiomatic properties. Second, the Bayesian approach delivers excellent small sample and asymptotic properties even under misspecification (see Fernández-Villaverde and Rubio-Ramírez, 2004). Third, Bayes' theorem is a flexible procedure to combine sample information with other sources of information that are often available to the researcher. Finally, researchers have found that Bayesian procedures have outstanding numerical properties, even when evaluated by classical criteria.

The general structure of how we estimate our DSGE model is as follows. First, given some parameter values, we solve the model, i.e., we compute the laws of motion that characterize the dynamic equilibrium of the model. Second, with the solution of the model, we use the Kalman filter to build the likelihood function of the model. Then, we combine the likelihood function with our priors about the parameters to form the posterior of the model's parameters.

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2 Currently, many economists investigate situations where agents have problems maximizing their objectives. For example, agents may suffer from cognitive biases or psychological inconsistencies (Rabin, 2002, provides a review of behavioral specifications). All these considerations can also be included in richer DSGE models (see, for instance, Jaimovich and Rebelo, 2006).

Since the parameters' posterior does not belong to any known parametric family, we need to resort to simulation techniques to characterize it. Here is where we apply the Metropolis-Hastings algorithm, the most general McMc procedure. An McMc algorithm is nothing more than a method to generate draws from an arbitrary density, in our case the posterior of the model. With a sufficient number of draws, the empirical distribution of those draws will accurately approximate the theoretical density from which we are drawing.

Once we have approximated our posterior with its empirical counterpart, we can exploit it to do things like point estimation, forecasting, or policy analysis. One great advantage of Bayesian procedures is that through the posterior, they offer a complete description of the uncertainty regarding the parameter values. Instead of one point estimate, as in classical statistics, we have a whole density with much more potentially relevant information. We will explain below how we extract this information in our forecasting exercise.

An estimation exercise

We estimate our DSGE model using quarterly Euro area data from 1971:1 to 2006:2. Our observables are nominal output divided by consumption deflator, manufacturing wages, inflation, and a short-term nominal interest rate. To check the robustness of our results to different sample periods, we also estimate our model with a shorter data sample where we eliminate the turbulent 1970s and concentrate on the period after 1985. We will comment below about where the results diverge between the two samples.

We use flat uniform priors over parameters, with bounds to eliminate parameter values that are not acceptable according to the theory (such as negative discount factors) or that are implausible. Our uniform priors aim to minimize the impact of prior information in our estimates. In other exercises, however, informative priors may be extremely useful (for example, if the sample size is small). Also, we calibrate some of the parameters to match aggregate data. For instance, we set the parameter that controls the firms' market power to generate a demand elasticity of a good to 10 (and hence an average markup of around 10 percent). The likelihood of a large DSGE model is not always fully identified along all dimensions, and the calibration of some parameters increases the quality of the exercise.

Since we have two unit roots in the model, one for each technological process, we rescale the variables to express them in stationary combinations. Then, we solve our model by loglinearizing the equilibrium conditions around the steady state generated by the rescaled variables. Finally, we build the posterior as described in the previous section and we draw 500.000 times from it using the Metropolis-Hastings algorithm.

We summarize the information from the posterior, reporting the mean and standard deviation of selected parameters. Under a quadratic loss function for the researcher, the mean of the posterior is the optimal point estimate. The standard deviation of the posterior is a measure of the uncertainty regarding the parameter value.

Findings about preferences: In our benchmark estimation, we find that the discount factor between the present and the future is nearly equal to 1 (0.9993, with a standard deviation of 0.0005). This is a common finding when we estimate DSGE models. We also find a very high level of habit persistence, 0.991, with a standard deviation of 0.0029. The parameter that governs labor supply is estimated around 2.7575 to capture the level of hours worked per capita. The lack of stationarity in hours worked is reflected in a high standard deviation for this parameter, 1.3446. A more refined model would explicitly handle this margin (see Chang, Doh, and Schorfheide, 2006).

Findings about nominal rigidities: We find relatively low levels of nominal rigidities in the economy. For example, we estimate that firms and households reoptimize their prices and wages every quarter and a half (although this estimate is relatively imprecise). Moreover, wages are nearly perfectly indexed to inflation, since they are updated at 94 percent even when labor contracts are not renegotiated (in comparison, the indexation level of goods is only 9 percent). Our findings of low levels of nominal rigidities probably reflect the high levels of inflation that European economies experienced in the 1970s. In a high inflation environment, the costs of not readjusting prices are sufficiently high that agents pay the menu costs implied by reoptimization quite often. This interpretation is supported by the observation that when we reestimate our model with the short sample starting in 1985, we find lower levels of nominal rigidities and we estimate much lower levels of wage indexation (57 percent). A low level of nominal rigidities translates into relatively ineffective monetary policy.

Our estimates of nominal rigidities are lower than the ones reported by Smets and Wouters (2003) but closer to the evidence presented by Bils and Klenow (2004) for the U.S. economy. Bils and Klenow argue that we look at micro data at the item level, there are strong indications of relatively quick price adjustments. Part of the difference between our findings and Smets and Wouters' come from our flat priors: Smets and Wouters have informative priors that induce much higher levels of price rigidity.

Findings about monetary policy: We estimate that the monetary policy in Europe responds to inflation in its Taylor rule with a coefficient of 1.0354. Since this number is slightly above one, our result shows that the monetary policy satisfies the Taylor principle. If this is the case, the economy does not have an indeterminate equilibrium. Interpreting this number is, nevertheless, dangerous. There have been important changes in monetary policy in Europe, the biggest of which was the creation of the ECB. For the shorter sample, our point estimate is the much higher 2.6478, hinting at a move toward a much more active monetary policy. Conversely, the initial part of the sample delivers a value for the coefficient of inflation below one, indicating that monetary policy may have been a source of instability in Europe during the 1970s. Hence, future research should attempt at estimating a model where there are regime changes in monetary policy such as those described by Davig and Leeper (2006) and Farmer, Waggoner, and Zha (2006). The coefficient of the response of monetary policy to the output growth gap is 0.2492, indicating only a mild response of policy to fluctuations in income. Finally, we find that both for the complete and for the short sample, monetary policy has a strong smoothing component of interest rates, since the coefficient on past values of the interest rate is around 80 percent.

Forecasting

We can use the results of our estimation of the DSGE model to perform many quantitative exercises. Among many others, we can compute impulse-response functions of the model to different shocks, we can conduct policy experiments and counterfactuals, we can design optimal policy, and we can forecast.

One advantage of Bayesian methods is that we can perform all of these exercises while taking seriously the uncertainty regarding the values of the model's parameters. Moreover, the procedure is straightforward. We can draw parameter values from the posterior and compute (and store) the desired object of interest (the impulse response function, the forecast, etc.) with the parameter values of the draw. Then, we can draw some new parameter values and repeat the previous computation. If we do this redrawing a sufficiently large number of times, we will end up with the whole posterior distribution of the object of interest. For example, in forecasting, we will have a whole fan chart indicating not

only the point estimate of our forecast but also the whole distribution of the forecast. This distribution offers decision-makers that rely on the DSGE model a more complete assessment of the balances of risks about future events. For example, a skewed forecast distribution of output may indicate that the risks of a recession are substantial even when the point estimate may indicate vigorous growth.

Conclusion

Modern macroeconomics is a quantitative science. We build powerful dynamic models of the economy, soundly based on theory, and with a rich stochastic structure. Moreover, we estimate our models with aggregate data and use them to perform a series of numerical exercises. This formulation and estimation of DSGE models has become the gold standard of applied research in academia, policy-making institutions, and the private sector. In this article, we have shown how such an approach can be successfully applied to Europe to produce both estimates of the model's parameters and forecasts of variables of interest.

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Prospects for the Euro-Area Economy through the lens of a DSGE Model

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Introduction

Economic agents need good forecasting tools because their decisions have clearly a forward-looking component. For instance, consumers make their spending and saving decisions taking into account not only their current income levels, but also those expected for the future. Firms are also forward-looking, since they base their pricing decisions on the expected future path of demand and production costs. Central bankers are also forward-looking. As an example, the European Central Bank (ECB) states that monetary policy needs to be forward-looking, since there are significant lags in the transmission mechanism.

Modern dynamic stochastic general equilibrium (DSGE) models have emerged as an important tool for macroeconomic analysis and forecasting. This article presents the results from a forecasting exercise applied to key macroeconomic variables of the Euro Area using a state-of-the-art DSGE model.[1] The estimation technique employed allows us to calculate the complete probability distribution of the forecast. In this manner, we are able to provide not only central projections of the variables of interest, but also the uncertainty associated to those forecasts. Moreover, we use the model to compute projections conditioned on various monetary policy paths, and show how the outlook for price stability and the associated risks may be affected by those alternative monetary policy scenarios.

The assessment of risks is certainly an important input in many economic decisions. For instance, the ECB claims that its monetary policy strategy consists of a comprehensive assessment of the risks to price stability and growth. In this article, we compute various inflation risk measures that are helpful to foresee the actions of the ECB. Moreover, we provide a model-consistent indicator of the stance of monetary policy in the Euro Area.

Unconditional forecasts

In this section, we present unconditional forecasts of key macroeconomic variables of the Euro Area obtained from the estimated DSGE model. In order to stress the uncertainty that surrounds these forecasts, we present the information in the form of "fan charts", containing the 5 to 95 percentiles of the forecast distribution.

Chart 5.1 shows that the annual real GDP growth is estimated to be between 3.1% and 3.3% in the first quarter of 2007, continuing in this manner the rise in the last part of 2006. This acceleration is expected to continue over the first half of 2007. The model forecasts values between 2.2% and 2.4% later in 2007. Growth is expected to remain broadly stable at this level during 2008.

Turning to the domestic expenditure components of GDP, Chart 5.2 shows that the annual growth in private consumption is estimated to follow the recent acceleration of 2006. The model yields a central prediction of around 2.9% for both 2007 and 2008. Regarding growth in total fixed investment, the model predicts a continuous deceleration. Chart 5.3 shows that the peak value of 5.3% attained in the second quarter of 2006 is very unlikely to be seen again during the forecast

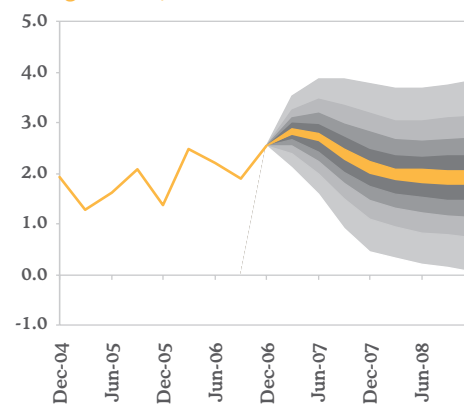**Chart 5.1.**
GDP
(annual growth %)
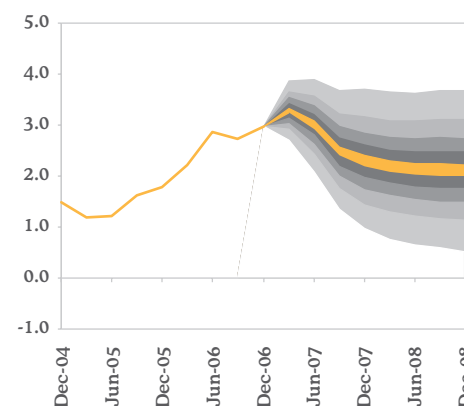
Source: BBVA

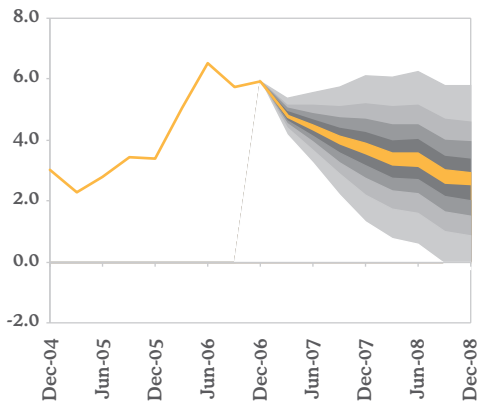**Chart 5.2.**
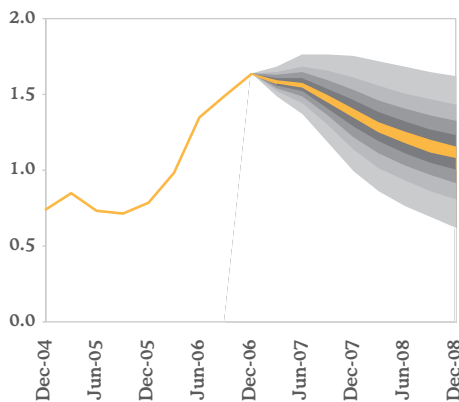**Consumption**
(annual growth %)

Source: BBVA

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[1] The model is an updated version of the one presented in Smets amd Wouters (2003). This model has become the workhorse of modern DSGE modelling. The Appendix contains a brief description of model's equations.
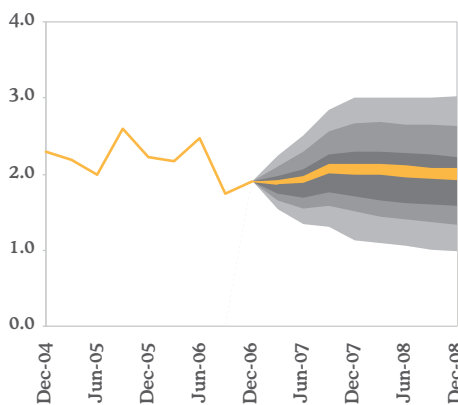
Chart 5.3.
Investment
(annual growth %)

Source: BBVA

Chart 5.4.
Employment
(annual growth %)

Source: BBVA

Chart 5.5.
HICP
(annual growth %)

Source: BBVA

horizon. The annual growth rate is estimated to be between 3.6% and 3.8% in 2007, while it is projected to be between 2.4% and 2.6% in 2008.

Despite the favourable developments in 2006, total employment is projected to decrease slightly over the projection period. The central projection for the annual rate of growth of total employment in the Euro Area, shown in Chart 5.4, is 1.3% in 2007 and about 1% in 2008.

Moving now to price and cost projections, the model predicts that real wage growth will decrease moderately in 2007, remaining fairly constant thereafter at a value of about 0.3%. Regarding inflation, as measured by the annual rate of change in a consumption index, the central projection indicates that prices are likely to remain fairly close to a value of 2% over the forecast horizon. Nevertheless, a moderated fall in the rate of inflation may occur in the early part of 2007, followed by a rise towards values close to 2.1% at the end of the this year. In the medium term, consumer price inflation should gradually settle around 1.9%, consistent with the objectives of the ECB.

In the medium term, inflation is determined by the stance of monetary policy. But over shorter horizons, with slow adjustment in wages and prices, the outlook for inflation is also influenced by imbalances between the demand for private sector output and the resources available to supply it, as well as by the way in which businesses respond to changes in key input costs, including energy and imports. Future developments of the DSGE model used in this paper should take explicit account these factors.

Monetary Policy and the Path for the Nominal Interest Rate

The projection exercises presented so far were performed under the assumption that the European Central Bank follows an interest rate reaction function. Specifically, the central bank responds to deviations of lagged inflation from an inflation objective and the lagged output gap, defined as the difference between actual and potential output. In addition, the policy rule incorporates a smoothing term in the form of lag interest rates. This can be justified from a concern with financial market stability.

Chart 5.6 shows the 5-95 percentile forecasts of the nominal interest rate according to the policy rule described above. According to the model, the ECB will probably act to increase interest rates in 2007. Most likely, the 3-month Euribor rate would attain values between 4.1% and 4.25% in the second quarter of 2007. Rate could reach a value close to 4.45% at the end of 2007. In 2008 rates would remain fairly stable around those values.

The policy rule used in the DSGE model has been shown to be close to an optimal rule in the sense of being a rule that allows the central bank to achieve its objectives of low and stable inflation and growth close to its potential level. Nevertheless, it would be interesting to provide projections using alternative paths for the nominal interest rate. This type of conditional projections provide a natural benchmark for assessing whether interest rates need to be changed given the central bank's goal of maintaining price stability.

Charts 5.7 and 5.8 show projections for GDP and inflation under two alternative scenarios. The first projection is based on the assumption that interest rates will be are kept constant at 3,6%, the value obtained in the last quarter of 2006. One can observe that annual real GDP growth would growth steadily towards a value of 3.7% at the end of 2007 and 3.5% at the end of 2008. Such a loose monetary policy would create significant inflationary pressures, with values of 2.6% in 2007 and 2.8 in 2008.

The results so far have shown that the ECB is likely to increase interest rates in the near future. The exact pace of that increase is difficult to gauge. For instance, we can analyse what would happen if the ECB were to act too aggressively. To be more precise, we have constructed a forecast where nominal interest rate reach 4.75% at the end of 2007 and 5% in 2008. The projection in the alternative scenario is characterised by a sharp decrease in real GDP, with an annual rate of growth of 1.5% in 2007 and 1.3% in 2008. At the same time, inflation would be clearly below 2% during the last part of the forecast horizon. Specifically, it would reach a value of 1.7% in 2007 and 1.5% in 2008.

Assessing the Stance of Monetary Policy

In this section, we present an indicator of the stance of monetary policy in the Euro Area. The indicator is forward-looking in nature and it aims at reproducing the objectives of the ECB: In the medium term, inflation should stay below, but close to, 2% and growth close to potential. Moreover, the ECB states that maintaining price stability is within its top priority. Hence, the indicator is constructed as a weighted sum of the inflation and output stabilisation objectives, with the weight of the latter lower than that of the former.

Unfortunately, there is lack of consensus on the exact value for all these magnitudes. As a benchmark case, we have considered the medium term as the time of period of between 7 and 9 quarters ahead. The indicator is, thus, constructed as follows: first, we use the DSGE model to compute a forecast for inflation and real GDP growth. Then, we average the projections corresponding to the 7th, 8th and 9th quarters of the forecast, that is,

$$\text{Inflation Objective} = \frac{1}{3}\left(E_t \pi_{t+7} + E_t \pi_{t+8} + E_t \pi_{t+9}\right),$$

where $E_t \pi_{t+h}$ is the forecasted value (central projection) of the inflation rate h-quarters ahead; similarly, we compute

$$\text{Output Objective} = \frac{1}{3}\left(E_t y_{t+7} + E_t y_{t+8} + E_t y_{t+9}\right),$$

where $E_t y_{t+h}$ is the forecasted value (central projection) of the annual growth rate of real GDP h-quarters ahead. Finally, the stance indicator is given by the weighted sum of the inflation and output stabilisation objectives, that is,

$$\text{Stance Indicator} = w_1 \cdot \text{Inflation Objective} + w_2 \cdot \text{Output Objective},$$

where w_1 and w_2 are the weights assigned to these two objectives of the ECB. The precise magnitude of these weights is difficult to determine.[2] The weight on inflation is usually normalised to one, so that w_2 can be thought of a relative weight on the two main objectives of monetary policy: on the one hand, the case of strict inflation targeting occurs when $w_2 = 0$, and, on the other hand, preferences are geared towards output-gap targeting if w_2 is a large number. In empirical applications, the upper bound on w_2 is usually 3.

Given that price stability is the ECB's top priority, we assign to w_2 a value lower than one. As a benchmark, we set $w_2 = 1/2$. We also consider the case of equal weights.

Next, we can proceed to define the neutral stance of the ECB's monetary policy. To that end, we take into consideration that the inflation objective would be achieved whenever the expected average annual inflation rate in the medium term is between 1.6% and 2%. The output

Chart 5.6.
Nominal interest rate
(Euribor 3m)
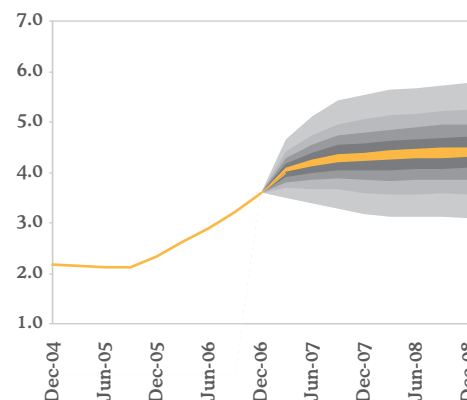
Source: BBVA

Chart 5.7.
GDP
(annual growth %)

■ Constant Rate Policy
■ Standard Policy
■ Aggressive Policy
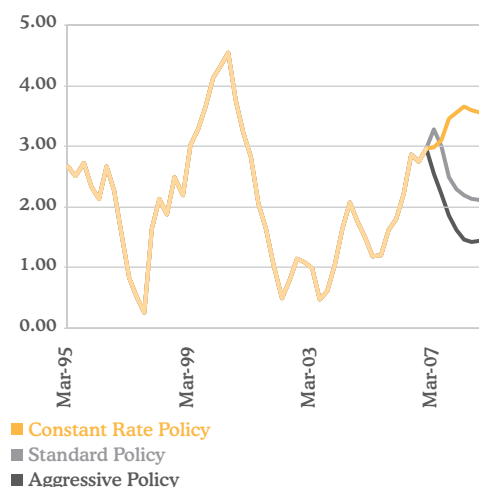
Source: BBVA

Chart 5.8.
HICP
(annual growth %)

■ Constant Rate Policy
■ Standard Policy
■ Aggressive Policy
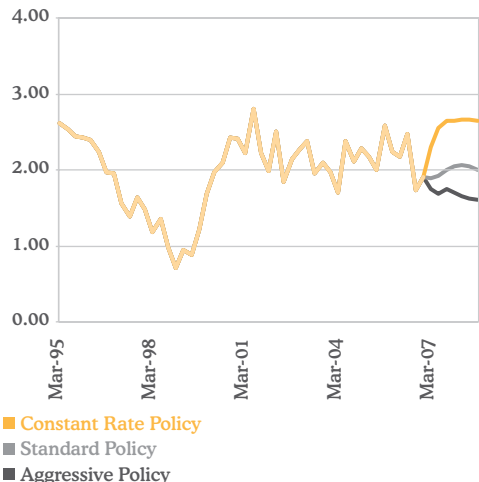
Source: BBVA

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[2] Adalid et al. (2005) consider a similar range of values in a study aimed at quantifying the optimal monetary policy of the ECB.

Chart 5.9.
Indicator ECB's Monetary policy stance

LOOSE ■ NEUTRAL ■ TIGHT
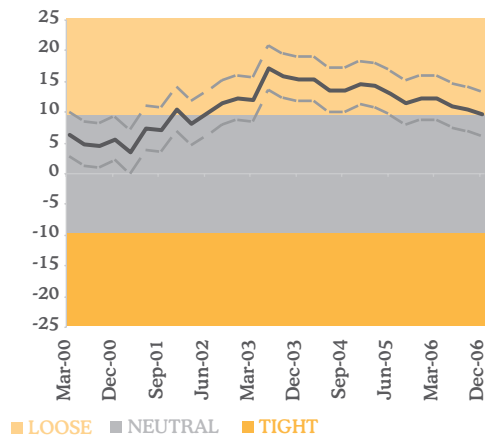
Source: BBVA

Chart 5.10.
Indicator ECB's Monetary policy stance
(Equal Weights)

LOOSE ■ NEUTRAL ■ TIGHT
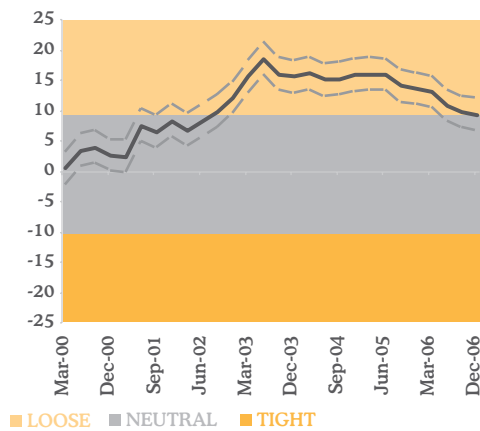
Source: BBVA

Chart 5.11.
Risks to price stability

■ Balance of Risks ■ Deflation Risk
■ Inflation Risk ■ Probability Excess Inflation

Source: BBVA

stabilisation objective would be achieved if annual real GDP growth is close to its potential, which can take any value between 1.8% and 2.1%.[3]

Given the values above, we say that the stance of monetary policy is "correct" or "neutral" if the indicator lies between the following bounds:

Upper bound: 2.0% + (1/2) · 2.1% = 3.0

Lower bound: 1.6% + (1/2) · 1.8% = 2.5

The stance is hence considered to be loose if the criterion is above the upper bound defined above; similarly, monetary policy is said to be tight whenever the indicator is below the corresponding lower bound.

Given the central projections for output growth and inflation discussed above, and considering a weight on the output growth objective of 1/2, we obtain a value of the stance indicator as of 2007:Q1 of 3.04. This figure is slightly below the upper bound of the neutral band, which in this case is equal to 3.05.

These figures suggest that the path for nominal interest rate implied by the model, and consistent with the forecasts for inflation and output growth presented above, can be considered as borderline neutral. Nevertheless, a slightly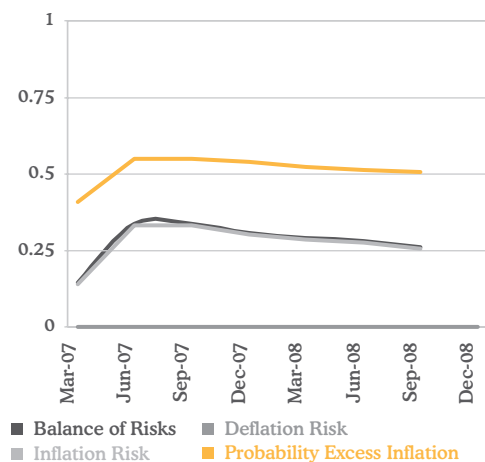 more aggressive policy cannot be disregarded if the ECB aims at consolidating a more neutral position. This is clearly true if one considers equal weights in the output and inflation objectives. In this case, monetary policy is relatively loose due to the good prospects for GDP growth.

In order to put the stance of monetary policy in perspective, we have estimated the indicator starting in the year 2000. Charts 5.9 and 5.10 provide a graphic description of the indicator, together with the confidence bands.[1] To help visualise the information, the indicator has been expressed as a percentage deviation around the mean value of the neutral band.

According to the model, the ECB's monetary policy stance was consistently neutral up until the beginning of the year 2002, suggesting that the policy was "correct". However, since that date the stance of monetary policy was becoming increasingly loose. The highest value of the indicator corresponds to the second half of 2003. This is consistent with the perception amongst most observers and can be justified in an attempt by the ECB to boost the Euro Area Economy after the slowdown of 2001-2002.

A Closer Look at the Prospects for Inflation

In addition to the indicator of monetary policy stance, which is based on central projections derived from the DSGE model, we have calculated an indicator of inflationary pressures.[5] Specifically, we have computed a measure of excess inflation risk, a measure of deflation risk and the corresponding measure of balance of risks. These measures are relevant since the strategy followed by the ECB consists of a comprehensive assessment of the risks to price stability.

The inflation risk measure is computed as the square deviation of expected inflation rate from the 2% upper bound, multiplied by the probability that the inflation realisation is above this limit, that is,

$$\text{Inflation Risk Measure} = \text{Prob}\left(\pi_{t+h} > 2\right) E_t \left[\left(\pi_{t+h} - 2\right)^2 \mid \pi_{t+h} > 2\right].$$

[3] These figures are taken from an ECB study by Musso and Westermann (2005), where projections for potential real GDP growth vary from a value of 1.8 % in an scenario were factor inputs grow in line with past patterns, to a more optimistic 2.1 in an scenario that assumes that the employment rate reaches 70% in 2010, as stated in the targets set in the Lisbon agenda for Europe.
[4] These bands correspond to the central percentile of the forecast distribution, that is, the central band of the fan chart.
[5] Definitions of indicators of inflationary pressure such as the natural rate of interest vary, and numerous alternative estimation procedures have been proposed, several of which are discussed in a survey paper by Giammarioli and Valla (2004).

The measure of deflation risk is computed analogously, but with the bound equal to 0%, that is,

$$\text{Deflation Risk Measure} = \text{Prob}\left(\pi_{t+h} < 0\right) E_t\left[\left(\pi_{t+h} - 0\right)^2 \mid \pi_{t+h} < 0\right].$$

The sum of the projected excess inflation and deflation risk measures can be seen as a measure of the projected balance of risks to price stability.

To gain some intuition on these risk measures, we can think of them as weighted probabilities, where the weights are the deviations of inflation from their corresponding upper and lower bounds. Hence, for a given probability of excess inflation, the risk measure is higher the higher is the expected deviation of annual inflation from 2%.

Chart 5.11 illustrates the expected development of those risk measures for the next two years in the Euro Area, together with the probabilities that the inflation rate is out of the corresponding bounds. For a better interpretation, the indicators have been normalised by the unconditional square deviation of inflation from their bounds, so that they lie in the unit interval. In view of that, the risk of inflation exceeding its bounds is higher the closer the indicator is to one.

The chart shows that the balance of risks in clearly on the upside, since the risk of deflation is almost inexistent. The risk of excess inflation is increasing in the first quarters of the forecast, but then it decreases smoothly. This suggests that the ECB is in a relatively good position to achieve its primary goal of price stability in the medium term.

Concluding Remarks

This article has presented the results from a forecasting exercise applied to key macroeconomic variables of the Euro Area. We have used a state-of-the-art DSGE model and have provided fan charts of the variables of interest. Moreover, we have presented several macroeconomic scenarios under different assumptions on the conduct of monetary policy.

Central banks know that achieving low and stable inflation calls for accurate and precise indicators of inflationary pressure, together with a good quantitative description of the monetary transmission mechanism. DSGE models of the kind used in this paper address both of these challenges within a unified framework. In this article, we have used a DSGE model to compute various inflation risk measures that are helpful to foresee the actions of the ECB. Moreover, we provide a model-consistent indicator of the stance of monetary policy in the Euro Area.

The structure of the DSGE model used in this article remains relatively simple. Future developments should include the introduction of more realistic financial and labour markets. The introduction of an open economy dimension is an unavoidable task for the near future.

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Appendix: The Linearized DSGE Model (Smets and Wouters, 2003)

The *consumption* equation:

$$C_t = \frac{h}{h+1}C_{t-1} + \frac{1}{h+1}E_t C_{t+1} - \frac{1-h}{(1-h)\sigma_c}(R_t - E_t \pi_{t+1}) + \frac{1-h}{(1-h)\sigma_c}\varepsilon_t^b$$

Consumption C_t depends on a weighted average of past and expected future consumption, the ex-ante real interest rate, and a preference shock ε^b. The parameter h represents the habit formation coefficient and σ_c is the analogue of the inter-temporal elasticity of substitution.

The *investment* equation:

$$I_t = \frac{1}{1+\beta}I_{t-1} + \frac{\beta}{1+\beta}E_t I_{t+1} + \frac{\varphi}{1+\beta}Q_t + \frac{1}{1+\beta}\varepsilon_t^I$$

Investment I_t depends on past and expected future investment, the value of the existing capital stock Q_t and an investment-specific technology process, ε^I. β is the rate of time preference and φ is the parameter that summarizes the investment adjustment costs.

The value of capital (Q) equation:

$$Q_t = -(R_t - E_t \pi_{t+1}) + \frac{1-\tau}{1-\tau+\overline{r}^{-k}}E_t Q_{t+1} + \frac{\overline{r}^{-k}}{1-\tau+\overline{r}^{-k}}E_t r_{t+1}^k + \eta_t^Q$$

The value of the capital stock depends negatively on the ex-ante real interest rate, and positively on its expected future value, the expected rental rate r^K and an equity premium shock η^Q.

The *capital accumulation* equation:

$$K_t = \tau K_{t-1} + \tau I_{t-1}$$

This is a standard equation where the capital stock K_t depreciates at a rate τ

The *inflation* equation:

$$\pi_t = \frac{\beta}{1+\beta\gamma_p}E_t \pi_{t+1} + \frac{\gamma_p}{1+\beta\gamma_p}\pi_{t-1} + \frac{1}{1+\beta\gamma_p}\frac{(1-\beta\xi_p)(1-\xi_p)}{\xi_p}\left[\alpha r_t^k + (1-\alpha)w_t - \varepsilon_t^a + \eta_t^p\right]$$

The deviation of inflation from the target depends on past and expected future inflation deviations and on the current marginal cost, which itself is a function of the rental rate on capital, the real wage w_t and the productivity process. The parameter α determines the share of capital and labour in the marginal cost. The term $(1-\varepsilon_p)$ is the probability that prices can be reset in a given period, while γ_p is the degree of indexation of prices on past inflation. The term η_t^p is a price mark-up shock and ε_t^a is a technology shock.

The *real wage* equation:

$$w_t = \frac{\beta}{1+\beta}E_t w_{t+1} + \frac{1}{1+\beta}w_{t-1} + \frac{\beta}{1+\beta}E_t \pi_{t+1} - \frac{1+\beta\gamma_w}{1+\beta}\pi_t + \frac{\gamma_w}{1+\beta}\pi_{t-1}$$
$$- \frac{1}{1+\beta}\frac{(1-\beta\xi_w)(1-\xi_w)}{\theta\xi_w}\left[w_t - \sigma_L L_t - \frac{\sigma_c}{1-h}(C_t - hC_{t-1}) - \varepsilon_t^L - \eta_t^w\right]$$

The real wage w_t is a function of expected and past real wages, the expected, current and past inflation rate and the deviation of the actual real wage from the wage that would prevail in a flexible labour market.

η_t^w is the independent and identically distributed shock in the wage mark-up while ε_t^l is a persistent labour supply shock. The parameter θ measures the degree of market-power in the labour market.

The *labour demand* equation:

$$L_t = -w_t + (1+\psi)r_t^k + K_{t-1}$$

Labour demand L_t depends negatively on the real wage (with a unit elasticity and positively on the rental rate of capital and last period's capital stock. The parameter ψ reflects a capital utilization adjustment cost.

The *goods market equilibrium* condition:

$$Y_t = cyC_t + iyI_t + \varepsilon_t^g,$$

with *cy* the consumption–output ratio and *iy* the share of investment in output. The term ε_t^g reflects an exogenous component of GDP such as public spending.

The *monetary policy reaction* function:

$$R_t = \rho R_{t-1} + (1-\rho)\left\{r_\pi\left(\pi_t - \overline{\pi}_t\right) + r_Y\left(Y_t - \overline{Y}_t\right)\right\}$$
$$+ r_{\Delta\pi}\left(\pi_t - \pi_{t-1}\right) + r_{\Delta Y}\left[\left(Y_t - Y_{t-1}\right) - \left(\overline{Y}_t - \overline{Y}_{t-1}\right)\right] + \eta_t^R$$

The interest rate R_t reacts persistently, via the parameter ρ, on both the level and the first difference of the inflation deviation from the objective and the output gap. The term η_t^R is a monetary policy rule shock.

7. Summary of Forecasts

Germany: GDP growth and inflation forecasts

YoY rate	2004	2005	2006	2007	2008
Private consumption	-0.3	0.3	1.1	1.3	2.0
Public expenditure	-1.3	0.6	1.0	1.0	0.8
Gross fixed capital formation	-1.4	1.0	5.9	3.7	2.9
Equipment	2.4	5.9	7.6	4.6	3.6
Construction	-4.6	-3.5	4.2	2.8	2.0
Inventories (*)	0.3	0.2	0.2	0.0	0.0
Domestic demand (*)	-0.4	0.6	2.1	1.6	1.8
Export	8.8	7.1	12.4	7.7	6.1
Import	6.2	6.7	12.0	7.8	6.6
Net export (*)	1.2	0.4	0.8	0.4	0.1
GDP	0.8	1.1	2.9	2.0	2.0
Inflation	**1.7**	**2.0**	**1.7**	**1.9**	**1.5**

(*) Contribution to growth
Source: BBVA

France: GDP growth and inflation forecasts

YoY rate	2004	2005	2006	2007	2008
Private consumption	2.5	2.1	2.7	2.4	2.2
Public expenditure	2.2	1.1	2.0	2.1	2.1
Gross fixed capital formation	2.6	3.7	3.5	3.2	2.9
Inventories (*)	0.3	0.0	-0.1	0.0	0.0
Domestic demand (*)	2.8	2.1	2.6	2.6	2.3
Export	3.3	3.2	6.1	5.3	4.8
Import	6.0	6.4	7.8	6.1	5.4
Net export (*)	-0.7	-0.9	-0.6	-0.4	-0.3
GDP	2.0	1.2	2.0	2.2	2.1
Inflation	2.1	1.7	1.7	1.6	1.7

(*) Contribution to growth
Source: BBVA

Italy: GDP growth and inflation forecasts

YoY rate	2004	2005	2006	2007	2008
Private consumption	0.5	0.1	2.1	2.0	1.9
Public expenditure	0.6	1.2	0.6	1.5	1.4
Gross fixed capital formation	1.9	-0.4	2.8	3.1	2.5
Inventories (*)	-0.1	0.2	0.0	0.0	0.0
Domestic demand (*)	0.7	0.4	2.0	2.1	1.9
Export	2.5	0.7	4.8	3.6	3.2
Import	1.9	1.8	4.5	4.0	3.8
Net export (*)	0.1	-0.3	0.0	-0.1	-0.2
GDP	0.9	0.1	2.0	2.0	1.8
Inflation	**2.2**	**2.0**	**2.1**	**1.8**	**2.0**

(*) Contribution to growth
Source: BBVA

Spain: GDP growth and inflation forecasts

YoY rate	2004	2005	2006	2007	2008
Private consumption	4.2	4.2	3.7	3.3	2.7
Public expenditure	6.3	4.8	4.2	4.3	4.1
Gross fixed capital formation	5.0	7.0	6.4	5.2	4.4
Equipment	3.7	8.8	9.0	7.3	6.8
Construction	5.5	6.0	5.9	3.9	2.8
Others products	4.4	7.7	3.9	5.4	5.0
Inventories (*)	0.0	0.0	0.1	0.0	0.0
Domestic demand (*)	4.9	5.2	4.9	4.3	3.7
Export	4.1	1.5	5.3	4.8	4.0
Import	9.6	7.0	8.1	5.9	4.7
Net export (*)	-1.7	-1.7	-1.1	-0.8	-0.7
GDP	3.2	3.5	3.7	3.5	3.0
Inflation	**3.0**	**3.4**	**3.5**	**2.2**	**2.4**

(*) Contribution to growth
Source: BBVA

Summary of forecasts

Euro area (YoY)

	2002	2003	2004	2005	2006	2007	2008
GDP at constant prices	**0.9**	**0.8**	**1.7**	**1.5**	**2.8**	**2.5**	**2.3**
Private consumption	0.9	1.2	1.3	1.4	1.9	2.0	2.2
Public consumption	2.4	1.8	1.1	1.3	2.1	2.0	1.9
Gross Fixed Capital Formation	-1.5	1.1	1.8	2.7	4.8	4.0	3.7
Inventories (*)	-0.3	0.2	0.2	0.1	0.1	0.0	0.0
Domestic Demand (*)	**0.4**	**1.5**	**1.6**	**1.7**	**2.6**	**2.5**	**2.4**
Exports (goods and services)	1.6	1.1	6.3	4.5	8.5	5.9	5.1
Imports (goods and services)	0.3	3.1	6.2	5.5	8.3	6.0	5.7
External Demand (*)	**0.5**	**-0.7**	**0.2**	**-0.3**	**0.2**	**0.0**	**-0.2**
Prices and costs							
CPI	2.1	2.1	2.1	2.2	2.2	1.8	1.8
CPI core	2.5	2.0	2.1	1.5	1.5	2.0	1.8
Industrial Prices	-0.1	1.4	2.3	4.1	5.2	1.6	1.5
Labour Market							
Employment	0.7	0.4	0.6	0.7	1.3	1.5	1.2
Unemployment rate (% of labour force)	8.3	8.7	8.9	8.6	7.8	7.5	7.6
Public Sector							
Surplus (+) / Deficit (-) (% GDP)	-2.5	-3.0	-2.8	-2.4	-2.0	-1.8	-1.7
External Sector							
Current Account Balance (% GDP)	0.7	0.4	0.6	-0.3	-0.4	-0.4	-0.2

* Contribution to growth

International environment (YoY)

	Real GDP growth (%)					Inflation (%)			
	2005	2006	2007	2008		2005	2006	2007	2008
US	3.2	3.4	2.8	2.5		3.4	3.2	2.1	2.0
UK	1.9	2.6	2.6	2.5		2.1	2.3	2.2	2.0
Japan	1.9	2.2	2.0	2.3		-0.3	0.2	0.5	1.0
Latam*	4.4	5.2	4.5	4.1		6.0	5.1	5.4	5.2

* Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay and Venezuela. Inflation forecast: end of period

Financial variables (end of period)

	Official rate (%)					10 year interest rate (%)			
	02/13/07	Jun-07	Dec-07	Jun-08		02/13/07	Jun-07	Dec-07	Jun-08
Euro zone*	3.50	4.0	4.25	4.25		4.1	4.25	4.3	4.25
US	5.25	5.25	5.25	4.5		4.8	4.9	4.9	4.6

	Exchange rate (vs euro)					Brent		
	02/13/07	Jun-07	Dec-07	Jun-08		02/13/07	Dec-07	Dec-08
US	1.30	1.32	1.31	1.30	$/b	57	51	47

* 10 year interest rate refers to German bonds

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