

# Recent commodity price developments : causes and effects

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## Introduction

The movement in commodity prices is of considerable importance for the world economy. The recent price rises, particularly the rise in oil prices, thus triggered fears of substantial adverse effects for the importing countries, owing to the use of these products as factors of production and as consumption goods. Moreover, for many developing countries, commodity exports make a considerable contribution to GDP and to public finances. Finally, the soaring prices of raw materials have exacerbated the problem of global imbalances.

The first section of this article gives a brief historical account of the movement in nominal and real prices of commodities. The second section examines the factors behind the recent rise in the prices of raw materials. The next section examines the economic implications of that price rise. A number of empirical studies have been conducted to measure the influence in various regions of the recent steep increase in oil prices. This article focuses primarily on the effects of the oil shock for the oil-importing countries. Finally, the last two sections present the short- and long-term outlook for commodity prices and the economic policy implications.

## 1. Commodity price developments

Various bodies calculate a commodity price index which they publish at regular intervals (HWWI, IMF, CRB, Goldman Sachs, etc.). These indices differ from one another in the commodities selected and in their

weighting. For the purposes of this article, we use the HWWI commodity price index, which is the most relevant index for the advanced countries<sup>(1)</sup>.

During the first half of the 1990s, commodity prices were relatively stable overall. During the second half of the decade and up to 2002, the global commodity price index recorded a small increase on average, the rising energy prices being offset by falling prices of other commodities. However, this overall picture conceals the widespread decline in commodity prices in 1998, in the context of the Asia crisis, and the sudden increase in oil prices which accompanied the global economic revival in the period 1999-2000, causing a surge in the global index.

From 2003 until 2006, commodity prices increased significantly year by year, with a few exceptions, notably foodstuffs. Thus, over this period, the global commodity index increased by around 24 p.c. per annum. Prices of energy raw materials rose by 26 p.c., driven mainly by the movement in oil prices<sup>(2)</sup>, while industrial raw materials prices increased by 22 p.c. as a result of the higher cost of metals. Food prices rose by only 7.7 p.c. over the period considered. During the first six months

(1) The weight of the various commodities in the global index is based on their relative importance in the total commodity imports of the OECD countries (excluding trade within the EU). It was recently updated to take account of the increased significance of crude oil in imports. Energy raw materials represent roughly 67 p.c. of the global index (63 p.c. for oil alone), whereas the share of industrial raw materials is around 23 p.c. and that of food products 10 p.c. The HWWI institute excludes natural gas from the index because there is no available series of world prices of natural gas.

(2) Natural gas prices have moved broadly in line with the prices of petroleum products on the main markets. Thus, between 2003 and 2006 they increased by an average of 33.7 p.c. per annum in Europe and 24.3 p.c. in the United States. Those movements are due to the opportunities for substitution between natural gas and petroleum products, and the fact that natural gas prices are mostly indexed contractually to petroleum product prices.

**TABLE 1** COMMODITY PRICES

(annual percentage change in US dollar, unless otherwise stated)

	1990-1995	1996-2002	2003-2006	2003	2004	2005	2006	From January to June 2007	<i>p.m. Weight in the global index</i>
<b>Total</b> .....	<b>0.8</b>	<b>1.3</b>	<b>23.5</b>	<b>14.3</b>	<b>30.4</b>	<b>28.4</b>	<b>21.1</b>	<b>3.1</b>	<b>100.0</b>
Food .....	2.6	-4.6	7.7	8.3	11.7	0.0	10.9	17.9	9.9
Industrial raw materials .....	1.4	-5.2	22.3	17.3	24.8	14.5	32.6	23.2	22.6
of which:									
Agricultural raw materials .....	3.5	-6.6	11.2	21.8	9.7	1.3	11.8	22.9	10.1
Non-ferrous metals .....	-0.3	-4.8	31.1	12.0	36.8	16.0	59.8	28.0	9.1
Ferrous metals .....	1.5	-1.4	27.7	18.0	38.6	38.2	16.1	13.2	3.4
Energy raw materials .....	0.5	7.0	26.3	14.4	35.3	36.5	19.1	-3.8	67.4
of which:									
Crude oil (Brent) .....	0.4	9.0	27.1	15.2	30.8	42.3	20.1	-4.5	62.7

Source: HWWI.

of 2007, commodity prices increased by an average of 3.1 p.c. compared to the corresponding period of 2006. The sustained strong rise in the prices of non-fuel commodities was partly offset by a fall in prices of energy raw materials.

Therefore, taking account of the weight of the various commodities in the global index, it is evident that energy raw materials, and particularly oil, made the largest contribution to the rise in that index in recent years. However, in 2006 and in the first six months of 2007, industrial raw material prices shared in the rise in the global index to a greater extent than in previous years, owing to the strong increase in prices of non-ferrous metals.

In the light of these developments and the relative importance of the various commodities in advanced country imports, the analysis which follows concentrates on the causes and effects of the recent rise in oil and metal prices.

Over the period 2003-2006, the price of a barrel of Brent increased by an average of around 27 p.c. each year<sup>(1)</sup>. The price per barrel stood at 66 dollars in 2006, compared to only 25 dollars in 2002. In a historical perspective, the recent oil price rise in nominal terms has not exceeded the scale of the oil shocks of the 1970s. Between 1972 and 1974, i.e. in the space of just two years, the price of a barrel of Brent rose by 258 p.c. By comparison, oil prices climbed by 164 p.c. between 2002 and 2006, a rise

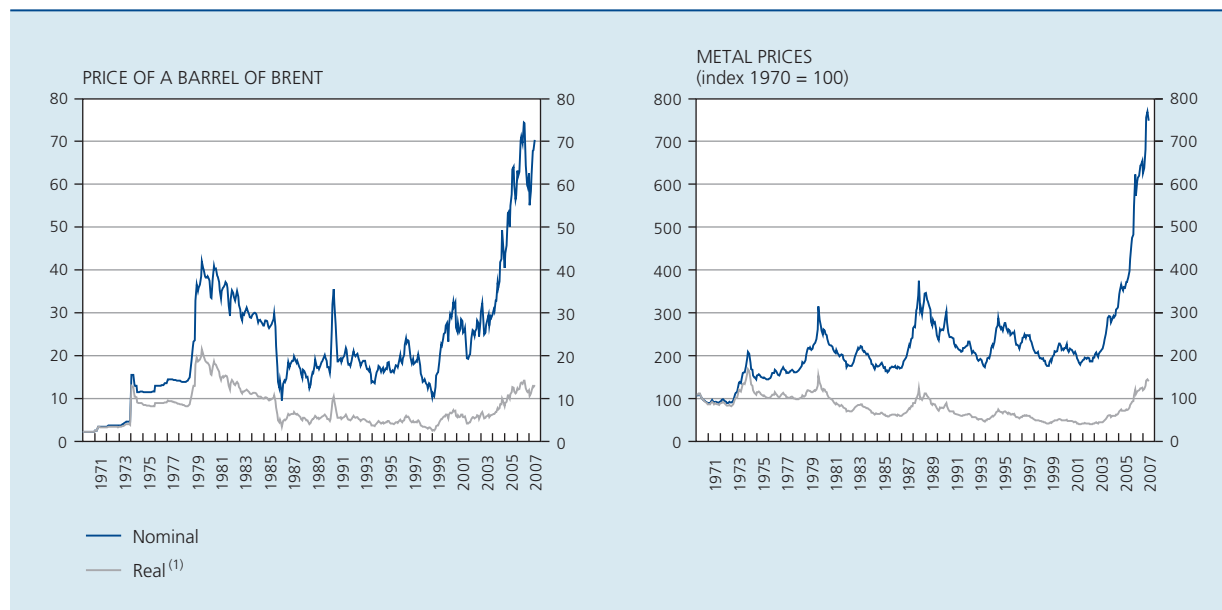
equivalent to that seen between 1978 and 1980 at the time of the second oil shock. However, the price increase recorded over the period 2002-2006 was more gradual. Oil price levels are well above those attained in the 1970s, and at the beginning of August 2006, in a context of Middle East tension, the price of a barrel of Brent reached a record high of almost 80 dollars. Subsequently, the Brent price fell sharply and, as a monthly average, remained below the 60 dollar mark until February 2007, except for a brief surge in December 2006. In June 2007, the price per barrel once again exceeded 70 dollars. The tense situation on the oil market consequently generated great price volatility.

In real terms, by 2005 oil prices had exceeded the level reached in 1974, though were still below the levels seen in the early 1980s. The price per barrel would have to go beyond the 90 dollar mark to be comparable in real terms to the 1980 level.

During the second half of the 1990s, prices of all metals declined on average (except for the price of iron ore). The trend was reversed from 2003, when the rise in metal prices became widespread. As a result, prices of the majority of metals reached historical peaks. The global index of metal prices rose by around 30 p.c. per annum on average over the period 2003-2006. The movement in

(1) The Brent price is generally used as a benchmark worldwide, though the volume traded is well below the figure for Saudi Arabian, for example. According to the International Petroleum Exchange, the Brent price is used to fix the price of two-thirds of world oil sales.

**CHART 1** NOMINAL AND REAL PRICES OF BRENT AND METALS  
(monthly averages, US dollar)



Sources : BLS, IMF, Thomson Financial Datastream.  
(1) Deflated by the United States' CPI.

the index was influenced mainly by the soaring prices of aluminium and copper, which have the highest weight in the index. In 2006, the aluminium price rose by an annual average of 35 p.c., while the price of copper went up by more than 80 p.c. Nonetheless, certain other metals such as zinc posted record price increases and thus contributed, although to a lesser extent, to the rise in the index. The price rise was maintained over the first six months of 2007, and even gathered pace for a number of metals such as tin, lead and nickel.

Deflated by the United States' consumer price index, metal prices declined by an average of 1.5 p.c. per annum over the period 1971-2002. That downward trend is usually attributed to major productivity gains in the metal-lurgy sector relative to other sectors of the economy, but also to the development of certain synthetic substitutes. Prices started to rise in 2003.

## 2. Factors behind the recent rise in commodity prices

It is essential to comprehend the causes of the recent rise in commodity prices, since the nature of the "shock" may influence both the persistence of the high price level or the rise in prices of raw materials, and its impact on the economy.

### 2.1 The oil shocks in a historical perspective

In recent years, attention has focused mainly on oil price movements, owing to lasting memories of the disastrous effects of the oil shocks of the 1970s.

The recent oil price rise therefore needs to be placed in perspective with the shocks recorded in the past few decades. Up to 1973, oil was a cheap commodity, facilitating the economic expansion of the United States and European countries. The Yom Kippur war in 1973 triggered the first oil shock: the OPEC embargo on western countries which supported Israel caused the price to quadruple in the space of a few months. The Iranian revolution in 1979, and the start of the Iran-Iraq war in September 1980, caused the second oil shock following the substantial reduction in exports from those countries. The escalating oil price had two effects: on the supply side, it opened up the market to oil from sources which had become economically viable, mainly Mexico, Alaska and the North Sea; on the demand side, it caused sharper cuts in consumption via economy measures and diversification.

Following the increase in OPEC output in 1985, oil prices were relatively stable until the late 1990s, with only a few episodes of high volatility: one in 1990 and 1991 as a result of Iraq's invasion of Kuwait, another in 1998 following the

financial crisis in the south-east Asian countries, which led to a steep price fall, and finally a “mini” oil shock in 1999 and 2000, when the price of crude tripled between February 1999 and October 2000, owing to a revival in global demand for oil combined with a decline in output.

While the first two oil shocks were caused by a break in oil production, there is a broad consensus attributing the steady rise in crude prices from 2002 – sometimes called the “third oil shock” – primarily to demand-side factors: not only the purely cyclical upswing in global growth, but also and more particularly the quickening integration of a substantial proportion of the world’s population into the economy and world trade. The explosion in demand for oil in the emerging economies, and especially in China, is not due only to the economic growth seen in those countries but also to an economic structure centred very much on industry – often less efficient in its use of energy than the OECD countries as a whole – and the increase in private use of motor vehicles. The strong growth of world trade may also have contributed to the substantial oil consumption, owing to the accompanying increase in demand for air and sea transport.

These economic factors are supplemented by a combination of geopolitical and technical factors. Centres of tension in the oil-producing countries, mainly in the Middle East, were a major contributor to the rapid rise in crude oil prices. Other producers – Venezuela, Chad, Russia and Nigeria – are also in an “uncomfortable” political situation, and market operators keep an anxious watch on developments in those countries. In that context, having regard to the fears of supply disruption, precautionary demand and speculative demand have most certainly increased. In recent years, supply disruption caused by wars or weather conditions have further exacerbated the tension on the oil market.

## 2.2 Geographical trend in demand for commodities

The emerging economies, and particularly China, occupy an increasingly important position in world oil consumption. Although global demand for oil is still dominated by the advanced countries, headed by the United States, its expansion has been far more rapid in the emerging countries, except for the region of the former Soviet Union which suffered an economic collapse for much of the 1990s.

Global demand for oil expanded at an annual average rate of 1.4 p.c. between 1992 and 2001. Demand was most dynamic in Asia, essentially in China, where it was sustained by exceptional economic growth, averaging

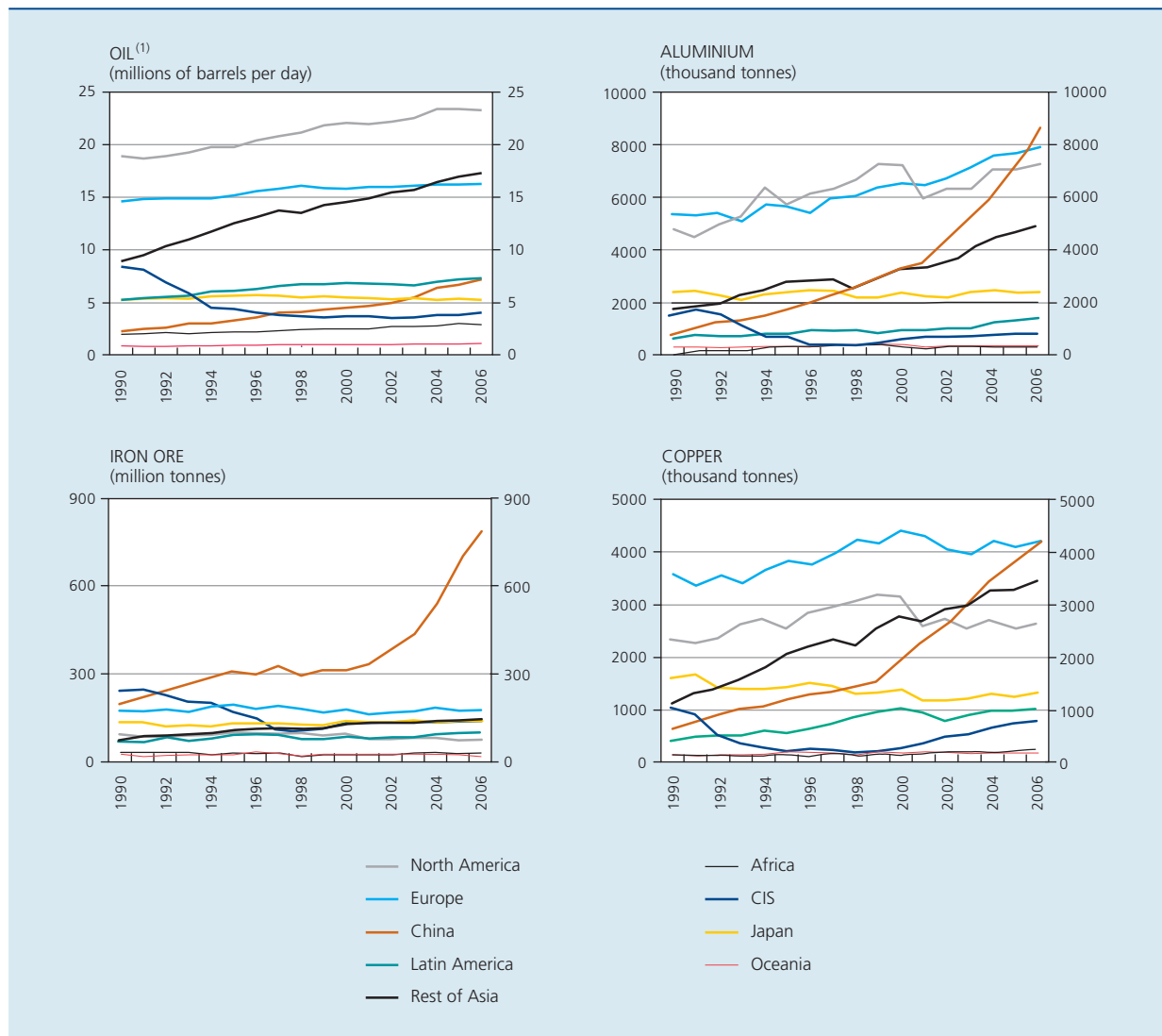
over 10 p.c. per annum. The expansion of global consumption of oil gathered pace in 2003, and especially in 2004 when it reached its highest growth rate since 1977, namely 4 p.c. Except for Japan, all economic regions increased their demand for oil, particularly the United States (+4 p.c. in 2004, or 900,000 barrels per day) and China (+16 p.c., or 900,000 barrels per day). This demand peak was unexpected: in January 2004, the International Energy Agency (IEA) had predicted an increase in demand of only 1.6 p.c. for 2004. In the case of China, there were some temporary factors causing the demand surge, namely electricity supply disruption which encouraged the use of new, more reliable diesel-operated electricity generators, and the expansion of oil stocks in 2004. Together, China and the United States thus accounted for 56 p.c. of the 2004 increase in demand. In 2005 and 2006, demand for oil increased at a more moderate pace of around 1 p.c. In 2006, the OECD countries actually reduced their demand for oil. This contraction was due in particular to the high level of stocks in the advanced economies, the economic slowdown in the United States and the mild winter. However, structural factors could also have played a role, e.g. the substitution of oil by natural gas.

Despite China’s vigorous demand in recent years, that country’s oil consumption is still relatively modest. In that regard, it should be pointed out that China is still extremely dependent on coal<sup>(1)</sup> for its energy. It is in fact the world’s biggest producer and consumer of coal.

These tendencies are also evident on other basic product markets. On the metal markets, the main global consumers are Europe (in the broad sense), the United States and emerging Asia, especially China. Over the period 1993-2002, annual growth of world metal consumption averaged between 1.3 and 4.4 p.c., depending on the metal. In the period 2002-2005, the rise in the consumption of the majority of metals accelerated. The steepest increases were recorded for tin, aluminium and steel, with consumption for these three metals rising on average by around 8 p.c. The strong expansion of Chinese consumption, especially since the early years of this century, is evident for all basic metals. Since 2005, the level of Chinese consumption has caught up with the European level for various metals, including aluminium, copper and steel. The scale of the Chinese iron and steel industry requires a corresponding quantity of iron ore. China is already the largest iron ore consumer and producer – as well as being the leading importer of that commodity – and has become the world’s biggest steel producer. Although it has also become the leading consumer of aluminium, China continues to export this commodity; this is part of the reason

(1) In 2004, coal accounted for almost 62 p.c. of China’s total primary energy consumption, while oil represented only 19 p.c.

CHART 2 REGIONAL DEMAND FOR OIL AND METALS



Sources : IEA, World Bank.

(1) The regional breakdown differs from that used for metals.

why the rise in aluminium prices has been more modest compared to the price of copper, which is in very short supply in China. The World Bank (2006b) considers that, in a few years' time, China will far outstrip Europe and will become the biggest consumer of all industrial metals.

Historical trends suggest that metal consumption increases in parallel with incomes, during the period of industrialisation and development of the domestic infrastructure. Beyond a certain income threshold, growth generally tends more towards the service sector, so that metal consumption begins to stagnate. So far, China seems to have followed the tendencies seen in Japan in its initial development phase, except for certain metals where per capita consumption in China is higher for a comparable income

level. One of the reasons is that the Chinese industrial sector represents a much larger proportion of GDP than would generally be expected in a country at that stage of development. According to the IMF (2006b), that situation is due both to historical reasons (the formerly centralised economies had a high level of industrialisation) and to the relocation of manufacturing production from the advanced economies and other emerging Asian economies to China.

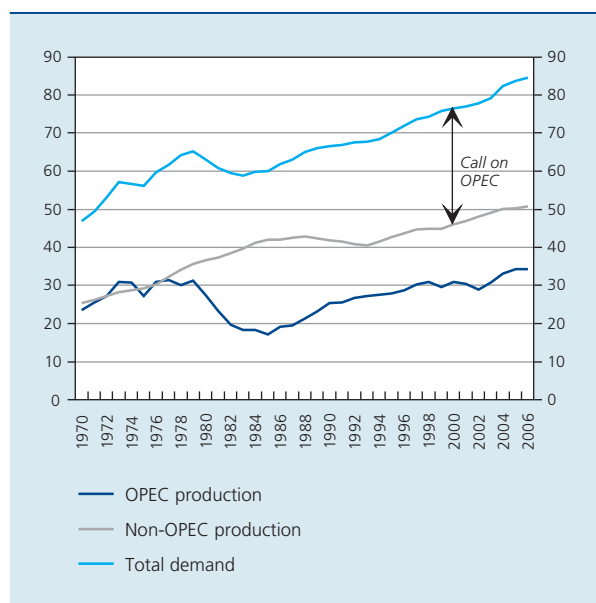
The said structural changes on the demand side could have a more lasting impact on prices, depending on whether Asian growth is sustained by a process of economic catching up, rather than by the international business cycle.

### 2.3 Characteristics of oil and metal supplies

The strong growth of demand does not on its own account for the soaring oil prices: in 2005 and 2006, the expansion of oil consumption was weaker, but prices have never been as high (in nominal terms). On the supply side, the main oil market player is OPEC<sup>(1)</sup> – which currently supplies 41 p.c. of the world's oil and owns 70 p.c. of the proven oil reserves. OPEC's power became apparent primarily in the early 1980s<sup>(2)</sup>. After that, in the face of competition from oil-producing countries that are not members of OPEC and which took immediate advantage of its actions to develop their own production, it became increasingly difficult for the cartel to apply its quota policy effectively. So, production-cutting agreements are occasionally extended beyond OPEC's boundaries to include major non-member producers such as Russia, Mexico, Kazakhstan, Oman and Norway. At the end of 2006, OPEC decided to cut back its production on two occasions, the last cut having been implemented in February 2007<sup>(3)</sup>, exerting upward pressure on oil prices.

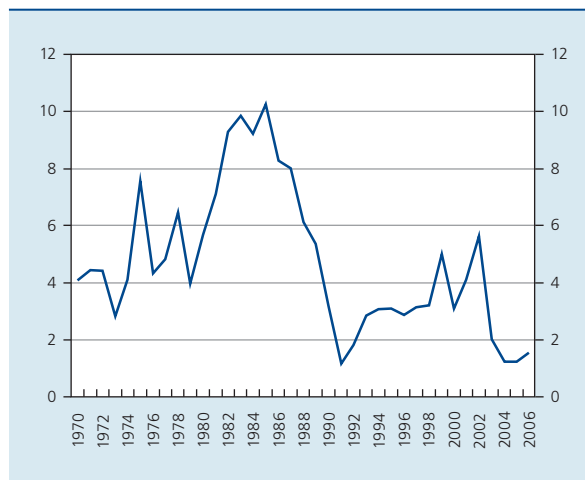
The historically high growth of demand for oil recorded in 2004 highlighted a situation of tension on the oil market. In that year, the expansion of output outside OPEC was curbed by climatic factors (particularly in the United States), but also by a structural decline in output in the United Kingdom and Norway, so that it was insufficient to cope with the consumption boom. Consequently, the

**CHART 3** TOTAL OIL DEMAND AND SUPPLY  
(millions of barrels per day)



Sources: EIA, IEA.

**CHART 4** OPEC'S UNUSED PRODUCTION CAPACITY  
(millions of barrels per day)



Source: IMF.

OPEC countries adopted an accommodating attitude towards this surge in demand, by producing at more or less full capacity until the end of 2004. The level of output by non-OPEC countries hardly changed in the following year<sup>(4)</sup> and the "call on OPEC" – i.e. the OPEC supply supplementing that of other countries to cope with demand – prolonged the cartel's high rate of output. The unused production capacity thus dropped to an all-time low, increasing the sensitivity of prices to any event affecting or threatening oil supplies.

The shortage of excess production capacity partly reflects the lack of investment during the 1990s, following the low level of real oil prices, on average, over the period 1985-2000. The easing of oil market tension is basically dependent on the supply in an industry featuring very long investment cycles (five to ten years). However, both international and national oil companies seem to be adopting a cautious approach towards new investment. In the case of the international oil companies, there are several factors restraining the expansion of investment<sup>(5)</sup>:

- (1) Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela. In 2007, Angola became the twelfth member of OPEC.
- (2) When the price of oil remained high even when demand was falling or stagnating owing to the global economic recession and supply was rising sharply with the large-scale development of oil reserves outside OPEC. Throughout this period, OPEC delayed the decline in oil prices significantly by introducing production quotas.
- (3) OPEC decided to reduce its production from November 2006 with 1.2 million of barrels per day and from February 2007 to reduce it further with 0.5 million of barrels per day.
- (4) Owing to the decline in production in Russia – particularly in the Yukos oilfields – and in the United States as a result of the damage caused by Hurricane Katrina in August 2005.
- (5) IMF (2005c), IMF (2006b).

- limited access to the reserves of oil-rich countries associated with regulatory changes which cast doubt on the investment return, and a tendency to nationalise resources in some countries. In particular, three Latin American countries – Bolivia, Ecuador and Venezuela – have made fundamental changes to the tax rules on the oil and gas sector, in order to increase their control over the resources. Elsewhere, too, in response to high commodity prices, the oil- and gas-exporting countries have tended to guarantee the State a larger share of the profits made by oil companies operating on their territory. The process has taken different forms, including greater State participation and higher export taxes in Russia and Argentina, bigger royalties in Kazakhstan, and an increase in tax on the oil companies' revenue in the United Kingdom and Denmark;
- in the OECD countries where the international oil companies hold a dominant position, it has become difficult and expensive to extend the productive life of the existing oil fields which are in decline;
- following job cuts in the 1990s, the lack of skilled workers is necessitating relatively high expenditure on training in the short term;
- a great volatility of oil prices hampers investment decisions.

However, some major national oil companies, capable of financing projects themselves and having maintained their level of expertise during the decline of the 1990s, have developed ambitious plans for expanding production capacity at all levels in the supply chain<sup>(1)</sup>. On the other hand, the real investment of the majority of other national oil companies has not really recovered since the decline of the 1990s, especially as investment in many oil-producing countries was limited by restrictions imposed by the government of those countries, notably via their budget plans.

The level of demand for oil combined with the erosion of the excess capacity also revealed structural imbalances in the oil sector, leading to greater price differentials between light and heavy types of crude. Although OPEC adopted an accommodating attitude towards demand, most of the additional production of OPEC is of the heavier type, whereas world demand is increasingly shifting towards the light types (for transport)<sup>(2)</sup>. The shortage of light oil was aggravated by a structural imbalance in the refining sector. Not only is total refining capacity scarcely higher than the level of the 1980s, at 83 million barrels per day in 2005, and utilisation rates, which have gradually increased since 2002, are still over 90 p.c., but furthermore, the bulk of the refining capacity consists of simple distillation processes which cannot be used to process heavy crude (containing a lot of sulphur). Nonetheless, the refineries

can be adapted to deal with this type of crude, though the conversion process is expensive and it may take them several years to reach the operational stage.

The problem of under-investment also concerns the metal sector. For over thirty years, the mining industry has been able to produce increasing quantities of metals at gradually diminishing real cost. Real metal prices have thus experienced a long period of decline, mainly as a result of the technological progress made in the extraction and processing of metals. However, the buoyancy of demand for metals, particularly Chinese demand, took the industry by surprise and led to a reduction in stock levels, especially as the previous price falls had prompted a lack of investment in the metal sector in the late 1990s and the early years of this century, and the closure of uneconomic excess capacity. Since then, the sector's substantial income has supported investment spending, which has already increased significantly. However, the rising cost of inputs – including energy – and the scarcity of equipment and skilled labour have tended to delay some investment projects.

#### 2.4 Financial investors and dynamism of the commodity markets

In recent years, basic products seem to have become an attractive financial investment. The commodity futures markets have become much deeper over the years, and the presence of financial investors on those markets has rapidly increased. Thus, participation in the New York Mercantile Exchange (NYMEX) – measured by the number of contracts recorded by the US Commodity Futures Trading Commission – has quadrupled since 1995. The total number of futures contracts on the oil markets came to almost 2 million in 2006, and the proportion of non-commercial contracts increased from 9 p.c. in 1995 to 16 p.c. in 2006 (IMF, 2006b). As pointed out by Domanski and Heath (2007), the markets in basic products are now increasingly similar to financial markets in terms of participant motivation and strategies. On the basis of an empirical analysis comparing the periods 1998-2001 and 2002-2006, the authors conclude that short-term factors reflecting yield considerations have generally become more important over the years.

(1) SAUDI ARAMCO in Saudi Arabia, ADNOC in the United Arab Emirates, KPC in Kuwait.

(2) Brent and West Texas Intermediate (WTI) are light oils which are easier to refine. Heavy oil is more expensive to refine because it needs additional processing (called deep conversion) to produce ordinary products such as petrol.

The increase in the number of futures contracts for commodities and the heightened price volatility led some analysts to claim that speculators had become more capable of influencing prices. The IMF (2006b) tried to measure the influence of speculation on the pricing of commodities by conducting an econometric analysis of the direction of the causality between spot and forward price fluctuations and changes in speculative positions for a sample of products including not only crude oil but also copper, sugar, coffee and cotton. That analysis shows that the general direction of the causality is from spot and forward prices to speculation, and not the other way round. Domanski and Heath (2007) mention preliminary signs pointing to a positive link between the amount of the risk premium and long-term non-commercial positions on the oil market. The authors stress that it seems difficult to reconcile the increases in futures prices up to mid 2006 with the economic fundamentals. It thus appears that the role of speculation requires more research.

### 3. Economic impact of oil price fluctuations

The movement in commodity prices has a substantial influence on the operation of the economy. Most of the studies which examine the economic effects of the recent price increase concentrate their analysis on oil. In so doing, they are following a tradition established in the wake of the oil crisis of the 1970s. Although the advanced countries have since become less dependent on oil, that approach highlights the crucial role that this commodity still plays in the operation of the economy.

#### 3.1 Theoretical framework

There is a lasting and complex link between oil price movements and the economy. At global level, the influence is reciprocal, since the world economic situation also determines the price of this commodity. The economic importance of oil is due to the fact that the amount spent on this fuel uses up a substantial part of the consumption budget, and oil is generally an essential factor in the production process. The theoretical analysis which follows looks at the consequences of an increase in the oil price for the oil-importing countries.

##### 3.1.1 Effects on inflation

All other things being equal, an oil price increase causes an almost immediate rise in inflation. This “direct effect” is due to an increase in the energy component of the consumer price index. That increase is then generally

extended (at least partially) to other index components when firms put up the prices which they charge for goods and services to reflect the increase in their production costs which is itself due to the higher oil prices (“indirect effect”).

Finally, there may be a second round effect when workers try to extract wage increases to compensate, at least in part, for the loss of purchasing power which they have suffered. If the firms once again adjust their selling prices accordingly, that may trigger a wage-price spiral which not only augments the upward inflationary pressure of an oil shock but also makes that pressure more persistent, potentially causing households and businesses to adjust their inflation expectations.

##### 3.1.2 Effects on the real economy

All other things being equal, an increase in the oil price generally causes economic growth to slow down. The effects of such a price increase on the real economy are felt only gradually, in contrast to the effects on inflation.

The increase in the oil price results in a transfer of income from the oil-importing to the oil-exporting countries<sup>(1)</sup>, which depresses domestic demand in the importing countries. Confidence and wealth effects may depress domestic demand further. That effect is reinforced by the fact that exports to other oil-importing countries are most likely also to be influenced negatively. True, part of the higher oil bill can be “recouped” if the oil-exporting countries devote part of their additional income to the purchase of goods and services from the oil-importing countries. The financial markets provide another channel for recycling the “petrodollars” to the oil-importing countries, and possibly exerting a moderating effect on interest rates.

#### 3.2 Empirical studies

In recent years, many econometric studies have assessed the dynamics and the scale of the economic effects of oil price shocks. The results of these studies diverge, one reason being the wide variety of models used and underlying assumptions.

(1) Attention should also be drawn to the implications of the rising oil prices for the global imbalances. In recent years, these have been exacerbated by the persistent deterioration in the US current account deficit and the marked increase in the surpluses of the oil-exporting countries. Those surpluses actually exceeded the surpluses of the emerging Asian countries. These developments could mean that the global imbalances persist for a longer period.



A recent assessment by the IMF (2007) states that a doubling of oil prices pushes up global inflation by 1.5 percentage points and depresses global GDP by 1.4 percentage points. A European Commission simulation (2005) of a permanent 50 p.c. increase in oil prices shows that the impact on inflation in the euro area comes to 0.5 percentage point in the first two years. The effect of the higher prices on real GDP growth is most marked during the first year, namely minus 0.6 percentage point, and diminishes to minus 0.3 and minus 0.2 percentage point during the ensuing two years. A National Bank of Belgium estimate (2006) of the effect on the Belgian economy of a doubling of the oil price concluded that the upward pressure on inflation comes to 0.4, 1.1 and 1.2 percentage points respectively during the three years covered by the simulation. The downward pressure on economic growth comes to minus 0.1, minus 0.5 and minus 0.7 percentage points over the same period.

Additional conclusions can be drawn from the results of various studies<sup>(1)</sup>. For instance, the effect of oil shocks is asymmetric. In fact, increases in oil prices have a greater impact on economic growth (and to a lesser extent on inflation) than price reductions. This finding may be due to downward wage and price rigidities. In addition, allocation effects on the labour market and uncertainty on the financial markets following oil price fluctuations also play a role. Another obvious conclusion is that the impact of

the higher oil prices is more pronounced in the emerging countries than in the advanced countries. This is because oil is more important to the emerging countries, particularly in view of the greater role of manufacturing industry and the generally less modern stock of machinery.

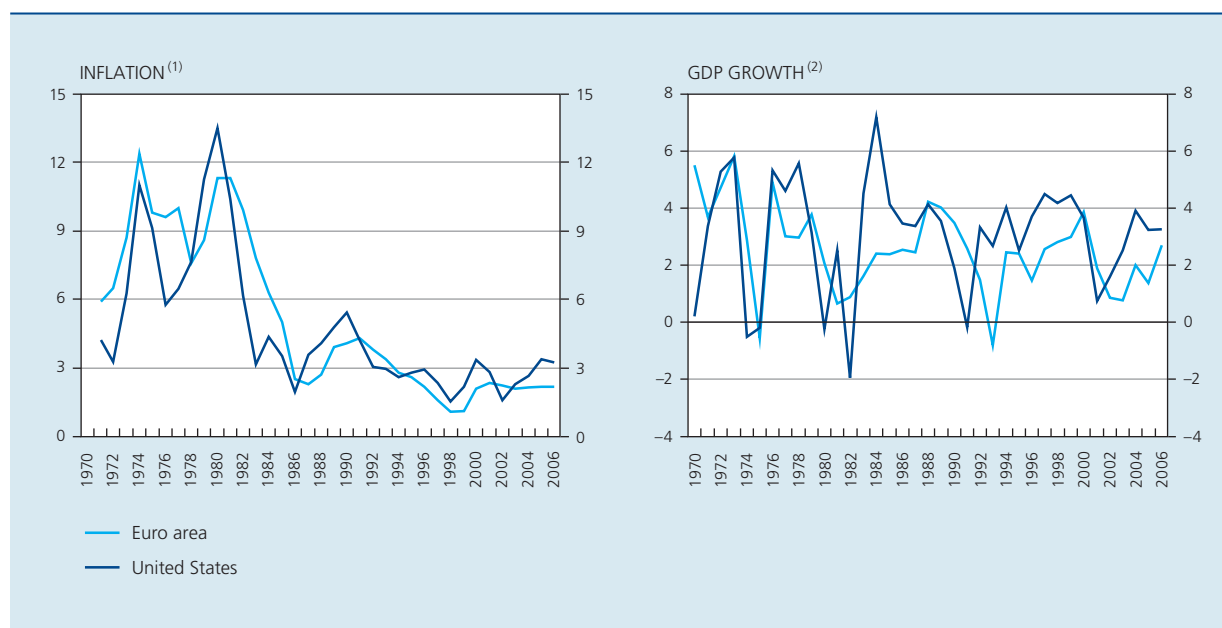
### 3.3 The moderate economic impact of the current oil shock

In recent years, economic growth and inflation in the main oil-importing countries have been relatively resistant to the steep rise in energy prices. In the United States and the euro area, although it has edged slowly upwards since the late 1990s, inflation has remained at a historically low level so that, contrary to what happened at the time of the previous oil shocks, there has been no serious increase. Moreover, unlike what was seen at the time of the two earlier shocks, economic growth has actually strengthened in the two regions over the past few years.

There are various factors which may explain the moderate effect of the commodity price increases on overall inflation in the euro area<sup>(2)</sup>.

(1) ECB (2004), IEA (2004), IMF (2005c), OECD (2004), Rogoff (2006).  
(2) See for example Boeckx (2006).

**CHART 5** INFLATION AND ECONOMIC ACTIVITY IN THE EURO AREA AND IN THE UNITED STATES  
(percentage changes compared to the previous year)



Sources : EC, ECB, Fagan et al (2005), OECD.  
(1) Measured by the consumer price index.  
(2) In volume.

The monetary policy framework has changed since the 1970s, both in the euro area and elsewhere. Since the 1980s, the central banks of the advanced countries have in fact set price stability as their principal objective, and they have built up strong credibility enabling them to anchor inflation expectations more securely.

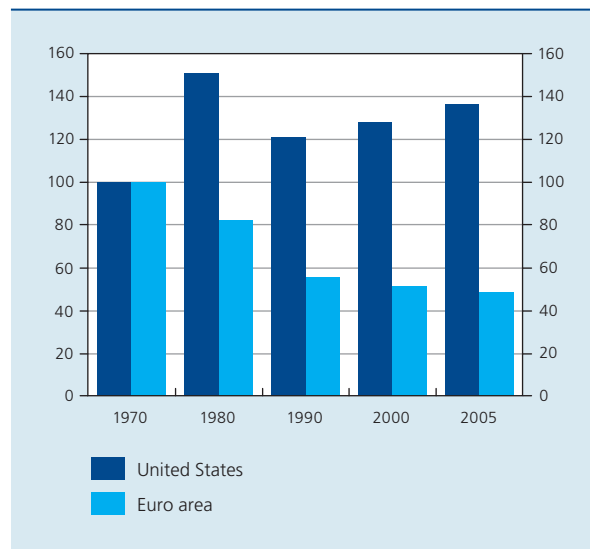
In addition, between 2003 and 2006 most of the euro area countries had a negative output gap. Consequently, demand components added no inflationary pressure at all.

Attention should also be drawn to a number of structural changes in the euro area. For instance, dependence on oil, expressed as the percentage of GDP represented by net oil imports, has halved in the past decade. That measure is influenced by energy-intensity – the efficiency of energy use – and the proportion of energy needs met by imported oil. There are considerable differences between countries regarding the level and the evolution of oil dependence. In the United States, net oil imports are now actually higher in relation to GDP than they were in 1970. Since the energy intensity of the US economy has declined significantly during that period, the main reason lies in lower national oil production: in 1970, the US imported just over 20 p.c. of its oil requirements, but in 2005 that figure was about 70 p.c. Other structural changes which account for the limited effect of the higher prices of commodities on overall inflation in the euro area include greater budgetary discipline and positive productivity shocks, whether or not due to globalisation.

The advent of the global economy has in fact also had a moderating influence on inflation. First, the transmission of the rise in commodity prices to the later phases in the production process was restrained by the stronger competition accompanying globalisation, so that firms find it more difficult to increase their selling prices when commodities become more expensive. Also, the threat of the relocation of production to low-wage countries tended to moderate the workers' wage claims. Finally, with the increasing trade with low-wage countries, imports of finished and intermediate products became cheaper. On the basis of this last effect and the rise in commodity prices, the OECD (2006) calculated the net impact of globalisation on the change in consumer prices. In the majority of the advanced countries, globalisation has caused inflation to fall – albeit slightly – in the past five years.

In regard to economic growth, a number of factors have similarly helped to limit the adverse repercussions of the rising commodity prices. First, the global economy has prospered in recent years, and that has been reflected in particularly high growth rates. Moreover, the scale

**CHART 6** SHARE OF NET IMPORTS OF OIL IN GDP  
(metric tonnes in relation to real GDP, on the basis of purchasing power parities, index 1970 = 100)



Sources: IEA, OECD.

of the oil shock was less in real terms than that of the previous oil shocks. The decline in energy intensity and oil dependence has also played a role, as has the pursuit of an accommodating monetary policy and the accompanying low level of interest rates. Finally, the recycling of the "petrodollars" via imports has sustained economic growth in the euro area and elsewhere: imports from the blocs of oil-exporting countries, such as OPEC or the CIS, have shown a marked rise in recent years, as those countries have spent (part of) their additional oil revenues. According to the EC (2006), the recycling of oil revenues via imports has been more beneficial to the euro area than in the 1970s.

## 4. Outlook for commodity prices

In view of the significant impact of commodity prices on the economy, forecasts for those prices constitute vital information for the preparation of economic projections and for planning and formulating macroeconomic policy.

### 4.1 In the short and medium term

Projections over this time span are generally based on commodity prices quoted on futures markets. However, the use of these prices to predict price movements is open to criticism, both for methodological reasons and because

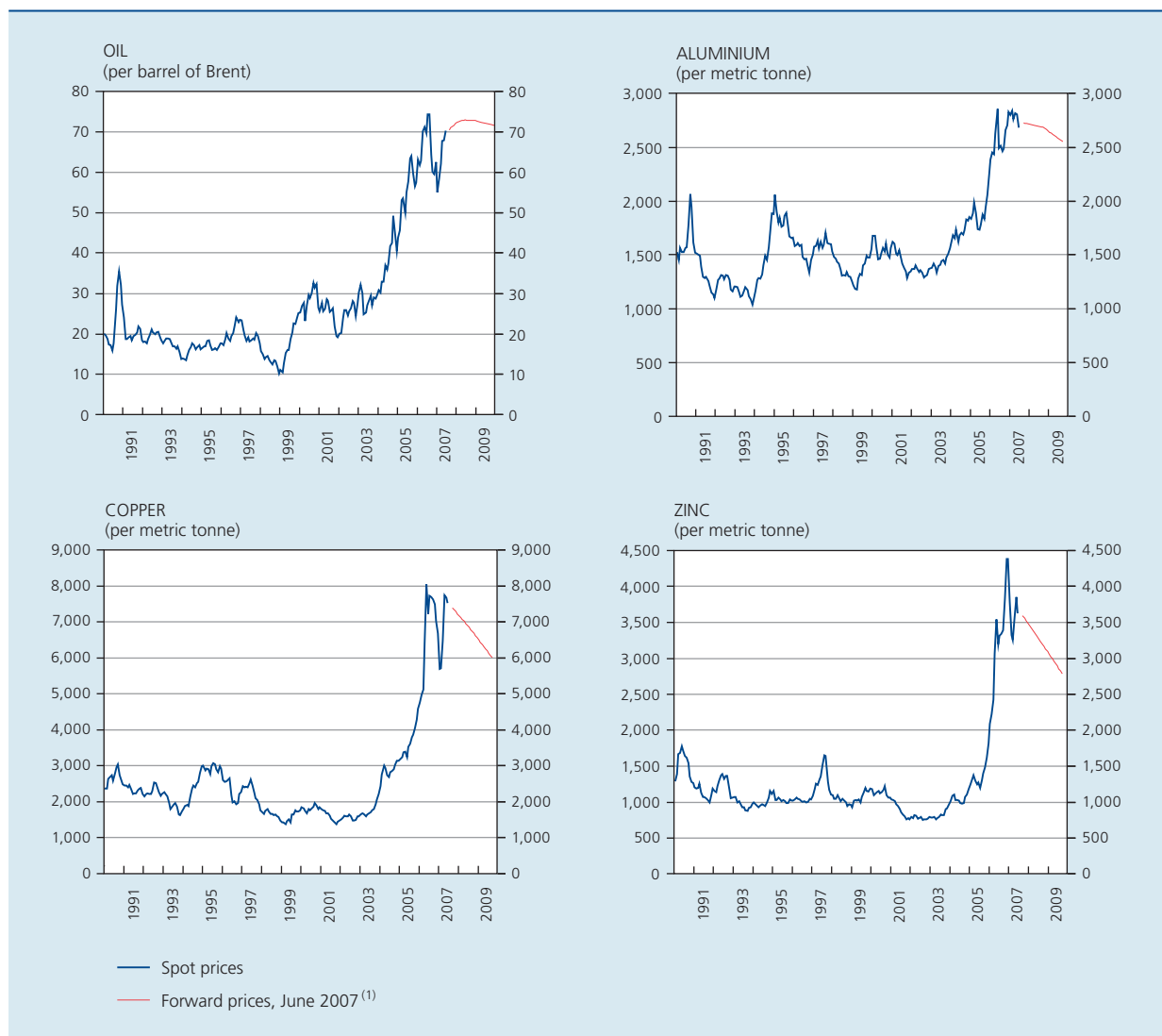
of their limited predictive capability<sup>(1)</sup>. The prices quoted recently on the futures markets seem to indicate that market operators consider the current, historically high, oil price level to be a permanent fixture. In June 2007, the financial markets expected the oil price to continue rising slowly until mid 2008 and then to subside somewhat.

The recent projections produced by international organisations also expect the high oil prices to persist in the years ahead. Thus, the IMF (2007) predicts that, on an annual basis, the average price of oil will fall by 5.5 p.c. in 2007 and increase by 6.6 p.c. in 2008. Moreover, in the opinion of that organisation, the risk factors applicable to oil prices are still on the upside. The latest detailed

projections by the IEA (*World Energy Outlook, 2006*) indicate a slight fall in oil prices during the period 2007-2009 owing to the combined effects of expanding supply and a slackening growth rate of the demand. However, at the same time the IEA draws attention to the persistence of geopolitical risks and the supply disruptions which could push prices up. The IEA warns in a later publication (IEA, 2007) for an increasing scarcity on the oil market after 2010. According to that organisation, oil prices will remain subject to upward pressure in the coming years.

(1) Domanski and Heath (2007), IMF (2006b), OECD (2007).

**CHART 7** SPOT AND FORWARD PRICES OF CRUDE OIL AND SOME MAJOR METALS  
(monthly averages, US dollar)



Sources : ICE, IMF, LME, Thomson Financial Datastream.  
(1) Futures contracts traded on the ICE (oil) and the LME (metals).

Prices quoted on the futures markets in some important metals (aluminium, copper and zinc) indicate that the outlook for these metal prices over the next two years differs somewhat from that for oil. Prices of these metals are expected to fall fairly sharply in the years ahead. That pattern is in line with past movements in metal prices. In the medium term, metal prices in fact move in parallel with the production costs of marginal producers, namely those who are the least efficient. However, in periods of booming economic activity, and hence an acute market shortage, market prices may be well in excess of those costs, but later subside fairly rapidly to their equilibrium level, since additional production capacity can be mobilised quite quickly. In view of the current gap between the market price and the equilibrium price, prices can therefore be expected to fall. Various international organisations (including the IMF and the World Bank) agree with that point of view. According to those organisations, the contraction of demand caused by the price rises seen in recent years and the expansion of supply resulting from increased investment are likely to play a key role in the expected reduction in prices.

#### 4.2 In the long term

According to the IEA's reference scenario in the *World Energy Outlook 2006*, demand for oil will increase by 1.3 p.c. per annum during the period 2005-2030,

compared to 1.1 p.c. per annum during the period 1981-2004. The rise is expected to be most marked in the non-OECD countries, with annual growth predicted at 2.3 p.c. The substantial wealth creation and the accompanying sharp rise in car ownership expected in those countries are the main factors. In the advanced countries, the expansion of demand is expected to be only 0.6 p.c. per annum during the period 2005-2030. The continuing decline in energy intensity and the measures taken to combat the greenhouse effect should curb the growth of consumption in those countries. As a result, the consumption of non-OECD countries is expected to exceed that of the OECD countries by the end of the projection period.

The oil supply is determined by the level of remaining oil resources and the degree to which those are extracted and marketed.

The estimates of oil resources still available are surrounded by uncertainty owing to differences in methods of calculation, political interests and the fact that a number of regions have not yet been examined for the presence of oil.

These remaining oil resources are an important factor influencing future production potential and prices. However, it is difficult to estimate precisely the level of future production since, apart from the uncertainty over remaining oil resources, it is also necessary to take account

### Oil resources

The IEA definitions distinguish between conventional and non-conventional oil<sup>(1)</sup>. Conventional oil is defined as the oil which can be produced from underground reservoirs by means of traditional wells. It comprises several categories<sup>(2)</sup>. The first consists of the proven reserves. These comprise the oil which has been discovered and is expected to be economically viable to extract. At the end of 2004, the IEA has estimated those reserves at 1,106 billion barrels, which would last for about another 40 years at the current rate of production. Second, there is the expected increase in reserves resulting from technological progress, which boosts the recovery rate in existing oil fields, or from new information on these fields. These reserves are estimated at 308 billion barrels. The third category comprises resources which have not yet been discovered. These are estimated at 883 billion barrels. The conventional oil resources thus total 2,297 billion barrels.

Non-conventional oil is technically far more difficult to produce, so that the production costs are much higher than for conventional oil, and the economic viability of its extraction is more dubious. In addition, the adverse environmental impact of producing non-conventional oil is greater. These resources are estimated at around 7,000 billion barrels. Non-conventional oil comprises: extra-heavy oil, oil shale, natural bitumen and tar sands.

(1) The conventional oil resources also include natural gas liquids.

(2) The IEA's World Energy Outlook for 2004 and that for 2005 were used as the source for the figures on conventional oil resources.

of factors influencing investment and development conditions in the countries where the deposits are located. Thus, a recent American study<sup>(1)</sup> estimates that around 85 p.c. of the world's proven oil reserves are located in countries where the investment risks are considerable or where foreign investment is prohibited.

Estimates of future oil supplies vary widely depending on the organisations which produce them. A number of observers, including the IEA, predict further increases in production in line with demand up to the end of the projection period in 2030. Conversely, other analysts expect production to peak before that date and decline subsequently. That view conforms to the "production peak" theory introduced in the 1950s by the American geologist M.K. Hubbert and applied to United States oil production. Since then, that theory has also been applied to other countries or regions, and in recent years it has also been used to predict the global production peak.

Estimates of the timing of that peak vary widely, and fall roughly between 2005 and 2040. In the IEA's projection, the market shares of the OPEC countries increase from 41 p.c. in 2005 to 48 p.c. in 2030<sup>(2)</sup>.

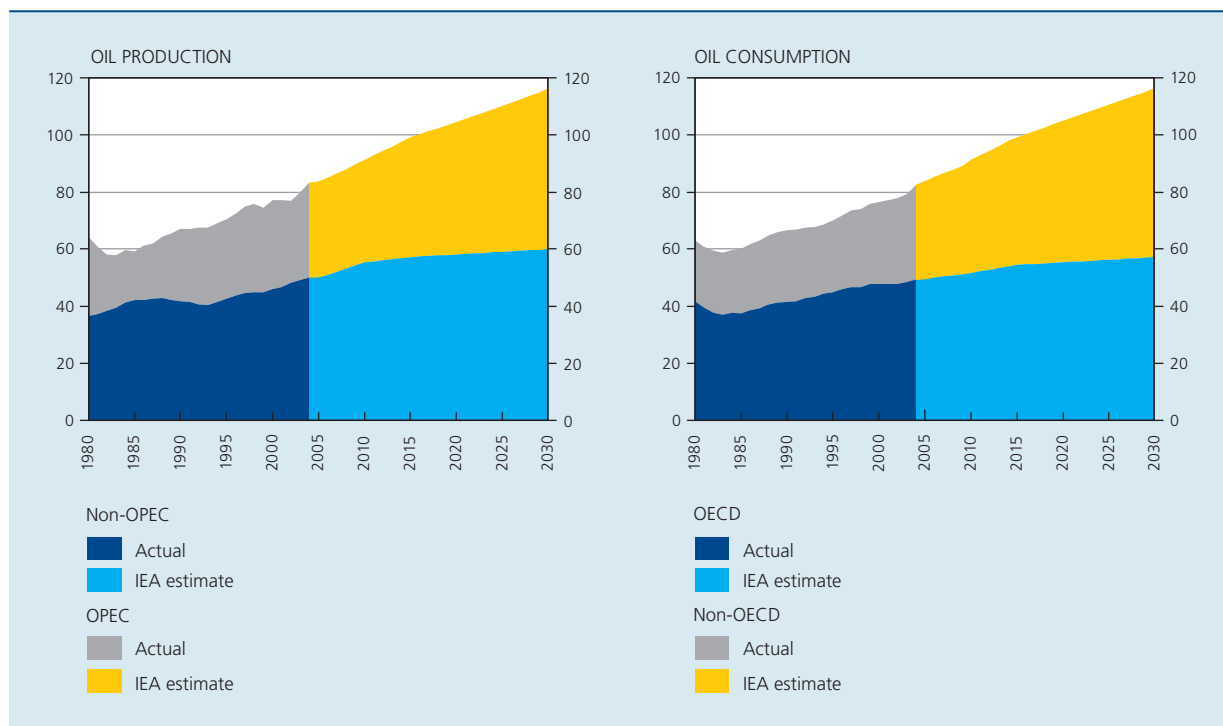
According to the IEA's reference scenario oil prices in real terms should decline gradually up to 2012, and then increase, owing to the combined effect of rising marginal production costs in non-OPEC countries and the expanding market share of the OPEC countries in total output<sup>(3)</sup>. Nevertheless, oil prices are expected to remain below the level reached in 2006. However, the OPEC countries have nothing to gain from excessively high prices, since in that case, global demand would contract, it would become more attractive to use alternative energy sources and it would become profitable to exploit hitherto undeveloped oil deposits, situated mainly outside the cartel. It must be stressed that this prediction is based on a continuous increase in oil production over the projection period. If the rise in oil output is slower, or if production peaks during that period, that will exert additional upward pressure on prices. On the basis of these findings and other projections, it can be said that there is a fairly broad consensus that oil prices will remain high over the next few decades in comparison with the pre-2002 period.

(1) United States Government Accountability Office (2007).

(2) This increase in the "call on OPEC" is due largely to the assumptions underlying the projection and is subject to criticism (cf. in particular Boussema, Pauwels, Locatelli and Swartenbroekx, 2006).

(3) The latest EIA projection relating to the international energy market, dated May 2007, indicates a relatively similar movement in oil prices for the reference scenario.

**CHART 8** GLOBAL OIL PRODUCTION AND CONSUMPTION  
(millions of barrels per day)



Sources : EIA, IEA.

It is important to point out that this price scenario may prompt a number of structural adjustments on the oil market and on the energy markets. On the supply side, high prices may encourage investment in exploration, production, transport and refining of oil, and enhance the attractions of alternative energy sources. On the demand side, high prices may lead to greater energy efficiency. Such developments are likely to exert downward pressure on prices.

In the case of metal prices, the long-term projections should take account of a number of characteristics typical of this market, different from those of oil. First, the supply of these commodities is virtually inexhaustible, and a number of metals can be recycled. Next, the market structure is competitive. Also, investments are quicker to result in increased production. These factors limit the risk of structurally high metal prices, even in cases where a substantial increase in demand is expected. However, it is currently hard to predict whether the above-mentioned historical downward trend in metal prices, namely the decline of 1.5 p.c. per annum in real terms over the period 1971-2002, will continue in the future. According to the World Bank (2006b), it is possible that the structural increase in certain production costs in the metal sector, particularly the energy costs, may halt this downward trend and cause prices to remain above the low levels reached in the later 1990s.

## 5. Economic policy implications

High and volatile oil prices have an adverse effect on the economy. Moreover, the use of oil as the main source of energy is contributing to global warming. Governments therefore clearly have a role to play in the energy debate.

The experiences of the 1970s, however, have shown that an excessively accommodating monetary policy, which tries to attenuate the consequences of higher energy costs, does not produce the expected result: quite the contrary. Even in the case of an oil shock, it is essential for the monetary authorities to adhere to their objective of medium-term price stability, otherwise the unavoidable temporary increase in inflation will become fixed in the inflation expectations of the economic agents, leading to higher wage demands which will in turn drive up inflation. The economy would thus become trapped in a price-wage spiral.

Price regulation, aimed at compensating for the higher oil prices by fiscal measures, e.g. by reducing the taxes on petroleum products, is not advisable either, since it has the disadvantage of disrupting the pricing mechanism and thus delaying the adjustment of demand, for example via energy saving measures. In addition, if their budgetary cost is high, fiscal measures to compensate for prices may also increase the vulnerability of the budget position and augment the effect of high oil prices at macroeconomic level, when these measures ultimately prove to be unsustainable and have to be cancelled.

On the other hand, governments may consider a number of structural measures designed to limit the risks associated with serious production disruption and to guarantee a stable energy supply.

First, action may be taken to expand and improve the information available on the oil markets. It has repeatedly been found that the information currently available is often incomplete, inaccurate and supplied too late. In recent years, progress has been made in this direction, as a result of the JODI project, initiated jointly by seven international organisations<sup>(1)</sup>.

Next, strategic reserves should be maintained at an adequate level. In that regard, the IEA recommends a level of reserves corresponding to 90 days' net imports. Governments can also eliminate any barriers to investment, and try to conclude long-term contracts with oil suppliers.

Finally, the oil-consuming countries can continue looking for ways of making energy consumption more efficient, and diversifying their sources of supply in order to reduce their dependence on oil and gas. In this connection, the problem of the lack of alternatives to oil-based fuels for motor vehicles is of vital importance. There are also ways of continuing to reduce energy intensity in industry and in households. A period of high oil prices may be a good time to take such measures.

A number of initiatives have recently been taken in Europe to define a coordinated energy policy. Thus, the March 2007 European Council presented a draft Energy Policy for Europe (EPE), integrated with a climate policy<sup>(2)</sup>. It was based on recommendations by the European Commission (2007) published at the beginning of this year in the *Strategic Energy Review*. The main points of the energy policy are: security of energy supplies; maintenance of the competitiveness of the European economy, notably by investing in energy efficiency (the aim is to achieve a 20 p.c. improvement by 2020), renewable energy (the aim is to increase the share of such energy to 20 p.c. by 2020)

(1) APEC, Eurostat, IEA, IEFIS, OLADE, OPEC, UNSD.

(2) Council of the European Union (2007).

and new technologies; encouraging respect for the environment and combating global warming (reducing CO<sub>2</sub> emissions to 20 p.c. below their 1990 levels by 2020).

As a first concrete step in the creation of the EPE and in anticipation of further action, the European Council adopted a global energy plan for the period 2007-2009. The progress and results of the energy action plan will undergo annual assessment by the European Council. The Commission was asked to update the *Strategic Energy Review* by the beginning of 2009. That update will be used as the basis for a new energy action plan to take effect in 2010.

## Conclusion

The commodity markets have become the focus of close attention on account of the steep rise in prices, particularly since 2003. In nominal terms, the prices of oil and most metals have reached historically high levels, and in real terms they have reached their highest levels since the early eighties.

The recent increase is due mainly to a substantial expansion in demand for commodities. That reflects the vigour of global economic growth in recent years, and particularly the increasing integration of a substantial proportion of the world's population in the global economy and international trade.

The rising price of oil is due partly to a series of developments on the supply side. The historically strong growth of demand for oil recorded in 2004 in combination with a deceleration in the growth of non-OPEC countries production thus put a strain on the oil market. In response, the OPEC countries adopted an accommodating attitude by producing at almost maximum capacity until the end of 2004. The following years, OPEC production remained at a high level. The excess production capacity dropped to a very low level, so that oil prices were influenced by every change which had a negative impact on the oil supply, such as the regular recurrence of geopolitical tensions.

The figures for economic growth and inflation show that the oil-importing countries have stood up well to the increasing oil price in recent years. The change in the monetary policy system compared to the 1970s, a number of structural changes taking place in the advanced economies, the beneficial effects of globalisation and the favourable economic climate are the main contributory factors.

Looking to the immediate future, on the basis of the forward prices quoted, market operators consider that the high oil prices currently prevailing are structural. In the long term, according to the latest IEA forecasts, demand for oil is expected to increase between 2005 and 2030 by an average of 1.3 p.c. per annum, with a similar increase in production, stepping up the "call on OPEC". The IEA is thus in the optimists' camp, as many analysts actually expect production to peak before 2030. The IEA – in common with the majority of other observers – expects oil prices to remain at a high level over the next few decades. There are some factors which may temper the trend in prices. Thus, high prices could depress demand for oil (efforts to improve energy efficiency, search for alternative sources of energy) and make it profitable to exploit oil fields hitherto undeveloped. Metal price forecasts predict moderation of the current high level, mainly because of the flexibility of supply, as the production capacity can be increased quite rapidly.

Owing to the major economic impact of high and volatile oil prices and growing concern over the environmental consequences of energy consumption, governments have a key role to play in the energy debate. In recent years, there have been a number of European initiatives aimed at creating a common European energy and climate policy. For instance, in March 2007, the European Council adopted an Energy Policy for Europe (EPE), which was put into practice in the form of an energy action plan for the period 2007-2009.

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