

# INVESCO Fundamental

INVESCO's education supplement  
March 2005, Issue no. 9

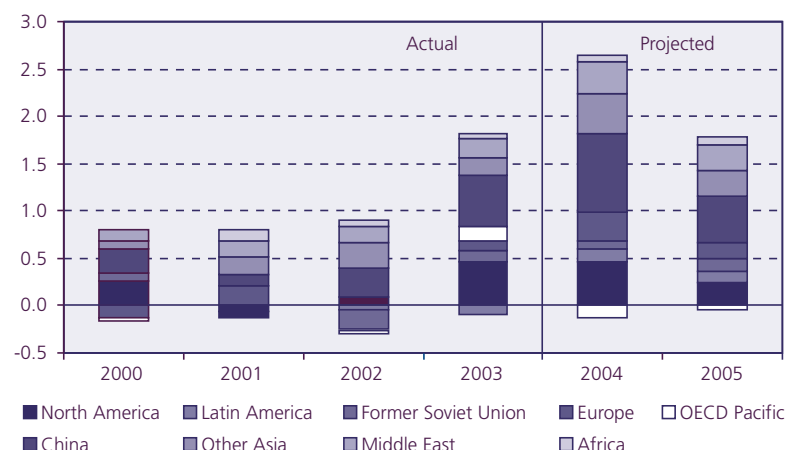
## Is it goodbye to cheap oil

The sharp rise in the oil price to over USD 50 per barrel will go down as one of the defining market and economic events of 2004. Headline focus has centred on short-term developments, and specifically the actual or potential disruptions to supply across parts of the Middle East, Nigeria, Russia and the Gulf of Mexico. On the demand side, this has coincided with a sustained pick-up in global economic growth – led by Asia and parts of the US – following the extended global economic weakness in 2001-2003. The net result has been to significantly reduce the margin of spare production capacity. This not only shifts the influence on oil prices away from the Organisation of Petroleum Exporting Countries (OPEC) and into the hands of speculators, but it also makes oil prices more volatile as market participants react more sensitively to the ebb and flow of oil news. However, this should not obscure the broader question of what will happen to the oil price in the longer-term. The more significant developments have been a gradual

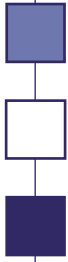
decline in the supply of cheap sources of oil and a gradual increase in the long-term global demand for oil – especially due to demand from China and other rapidly growing Asian economies.

There is little merit in trying to make a point forecast for the price of oil, but we believe that the longer-term sustainable oil price is likely to be a lot higher than it has been in the past. The current high price could prove temporarily self-correcting if it were to precipitate a period of markedly slower world growth or even a recession, thereby dampening global demand for oil. However, the fundamentals of the oil industry and the prospects for global energy demand suggest that even if there were improvements in the short-term inventory position, or even if geopolitical tensions were to disappear for a while, the world is facing a very different outlook for oil than was assumed even one year ago.

**Figure 1 - Average annual rise in oil consumption (millions barrels per day) - China dominates**



Source: International Energy Agency (IEA), October Oil Market Report



## 2004 – the exception or the rule?

*This extract was taken from our view in Q4 2004.*

The NYMEX benchmark crude oil contract reached a peak of just over USD 56 per barrel in late October and, although it has recently fallen quite sharply to around USD 43, it remains 30% higher than its end-2003 level, and 70% above 2003's low of USD 25 per barrel. Reasons for the rise have been well documented and, on the supply side, have included actual or potential problems in Venezuela, Nigeria, Russia, Norway and parts of the Middle East including Iraq and Saudi Arabia. More recently, hurricane-related disruption in the Gulf of Mexico caused a production outage of nearly 500,000 barrels of oil per day in September, which in turn, led to a sharp draw-down of commercial inventory stocks of crude oil and distillates such as heating oil. Production has recently recovered, and stocks have gradually been rebuilt, but our expectation is that US product markets are going to remain fairly tight heading into the winter.

All the while, demand has remained strong thanks to a synchronised recovery in the global economy led by the US and parts of Asia. The International Energy Agency (IEA) recently revised up its projection for average global oil consumption in 2004 to 82.4 million barrels/day (mb/d), 3.4% higher than the average in 2003, and marking the highest annual growth rate since 1978. China has punched above its weight with average daily oil consumption in 2004 expected to be around 800,000 barrels higher than in 2003, accounting for a third of the overall global increase (Figure 1). But the US government has

also been doing its bit by adding to its Strategic Petroleum Reserve (SPR) at an average rate of 4 million barrels per month since mid-2003, although in October, it responded to the hurricane-related bottlenecks by lending 1.5 million barrels back to the commercial sector.

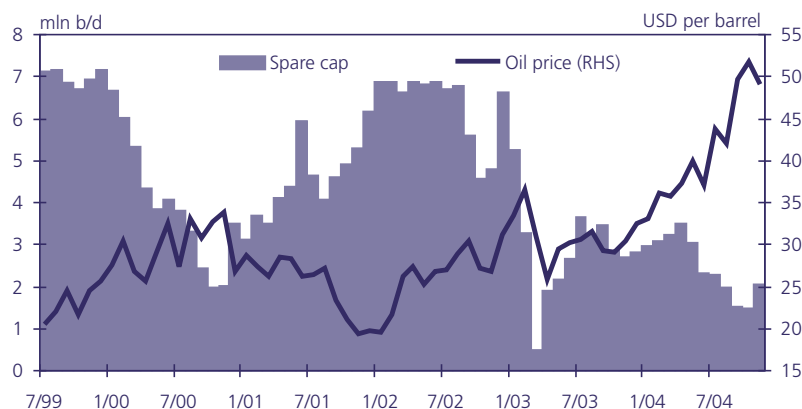
The net result of strong demand and disruptions to supply has been to significantly reduce the OPEC spare production capacity (which accounts for most of the global spare capacity), thereby eroding the buffer against actual or potential supply disruptions and driving the oil price higher (Figure 2). The price has now moved way beyond the USD 22-28 range that OPEC prefers for its own basket of crude oils, and for as long as the amount of spare production capacity remains thin, the cartel has very little control over prices. The key question is whether 2004's high oil prices were an exceptional, short-term phenomenon, or whether they are here to stay.

## Oil market myths and realities

Before discussing the nitty-gritty of longer-term supply problems, it is worth dealing with two oft-repeated myths about oil and energy. The biggest fallacy is that the world is about to run out of oil. Such views tend to be accompanied by forecasts suggesting that the price of oil will soar to over USD 100 per barrel within the next decade.

The first mistake in these kinds of arguments is that they tend to ignore the steady improvement of the relevant technology. Even in the last thirty years the advances in technology have been astonishing, enabling exploration and drilling to take place in places previously considered unreachable. For example, supercomputers now provide previously inconceivable levels of geological analysis, and seismic imaging of reservoirs is now feasible, enabling drill rigs to be designed precisely to the requirements of a new oilfield. The second mistake is to ignore the impact of rising oil prices on consumers' and producers' behaviour. As the first two oil crises of 1973 and 1979 showed, higher oil prices encouraged consumers to make substantial efforts to economise on their fuel use, reducing oil usage per unit GDP in most developed economies and dramatically changing the average size and shape of US autos – at least until the Sports Utility Vehicle came along in the 1990s. Oil producers meanwhile scrambled to find new sources, especially in offshore waters. If the price were to soar again, producers would start

**Figure 2 - OPEC spare production capacity (Bloomberg est) barrels oil price**



Source: Bloomberg

experimenting with non-conventional sources such as the Canadian tar sands. The net result is that proven reserves are greater today than they were 30 years ago, and oil and gas are likely to continue to provide the major sources of energy for most of this century according to Peter Odell, author of "Why Carbon Fuels Will Dominate the 21st Century's Global Energy Economy."

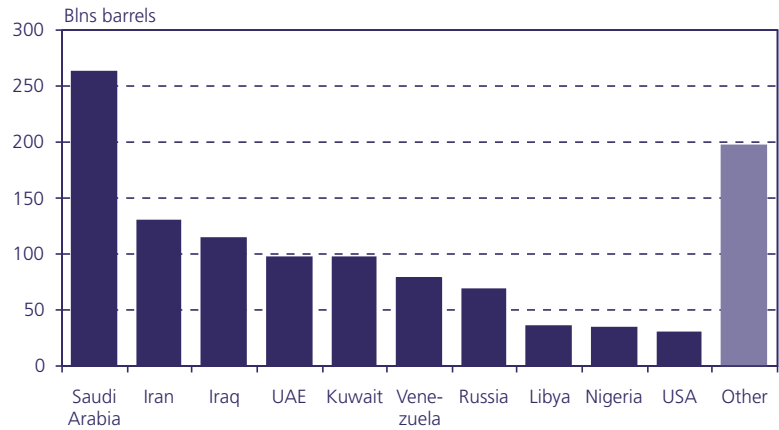
The reality is that two-thirds of the world's proven reserves of conventional oil are concentrated in the hands of five countries (Figure 3) surrounding the Persian Gulf (Saudi Arabia, Iraq, Iran, the UAE and Kuwait), none of which has a stable democratic regime, and several of which are subject to religious or political instability. It therefore seems likely that geopolitical instability in the Middle East will continue to generate periodic supply problems for the foreseeable future.

## Long-term supply problems – reaching for the higher fruit on the trees

High prices and geopolitical instability together constitute a powerful incentive for the major oil companies to search for new sources. The problem is that most of the easily accessible sources outside of the Middle East, West Africa and parts of Russia have all been fully exploited. In North America, extraction and drilling costs have surged from USD 5 in 1999 to USD 11 per barrel, while in Europe equivalent costs have risen from USD 11 to USD 18 over the same period. New reserves are now either in the hands of politically unfriendly regimes, or they must be extracted from expensive sources such as deep undersea beds, or from tar sands that are very costly to refine.

However, with the NYMEX five-year futures price now at over USD35, the incentives are sufficient for some of the oil majors to step up to the plate. According to Forbes magazine, the Big Five (Exxon/Mobil, Royal Dutch Shell, BP, Total, and Chevron/Texaco) spend nearly USD 47 billion per annum on exploration and production (E&P), but until the recent price spike had been earning progressively less per dollar of expenditure. This year's price bonanza, however, will provide the Big Five with estimated net income of nearly USD 140 billion on revenues of USD 975 billion, enabling them to increase E&P spend to USD 60 billion even after distributing USD 80 billion in dividends and paying for share buybacks. Over the past two years 65% of all new reserves found in the world have been discovered in deep

**Figure 3 - Top 10 world proven reserves (billions barrels)**



Source: BP Statistical Review June 04

water (depths of over 1200 feet). Inevitably, with projects this complex, the risks rise and failures become more frequent. For example, in 2003 Chevron/Texaco drilled the deepest well ever attempted in the Alaminos Canyon area of the Gulf of Mexico, reaching down through 10,000 feet of water, and then a further 4 miles down into the earth's crust. The technology for this kind of project in hurricane-plagued waters is awe-inspiring, but the prospect of 200 million barrels of crude made Project Toledo seem worthwhile. In the event the well was dry – a costly failure. But no-one is giving up. The busiest deepwater wells are in West Africa, off the coasts of Nigeria, Equatorial Guinea and Angola, where a typical well is located in 4,800 feet of water.

In Russia and its former republics, the risks are not so much technological as either political or concerned with transporting the oil out to western markets (initially by railcar, but more recently through the 900-mile Caspian pipeline to the Black Sea). One problem with the oil from Kazakhstan is that it has a very high sulphur content and has to be partially refined even before it can be piped to the seaports. Nevertheless, several major western oil companies such as BP, Chevron/Texaco and ConocoPhillips have embarked on joint ventures with local companies (Tyumen Oil, TengizChevroil and Lukoil respectively).

Given the multitude of problems connected with conventional oil sources, the industry is increasingly turning to non-conventional sources such as heavy oil from Venezuela, or the tar sands of Canada. Extraction from both these sources has only been made possible by the high price of oil because both involve unusually high costs of production. In the case of Venezuela's heavy oil, the crude (e.g. from the Hamaca project in the Orinoco basin) emerges in the

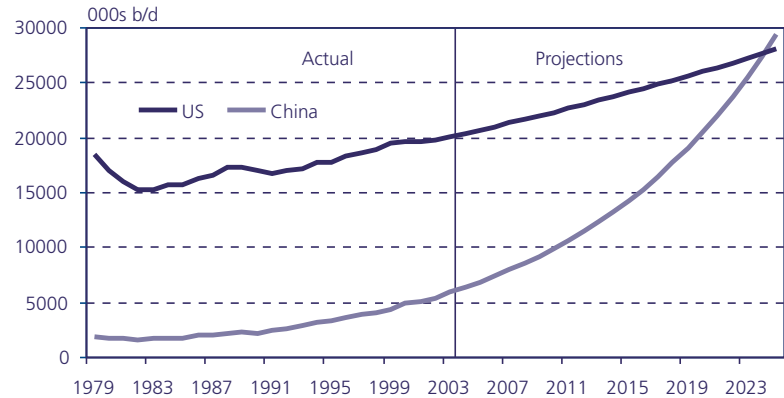
form of a foamy mousse that must be blended before it can be shipped. Processing costs are high, giving an overall cost of close to USD 13 per barrel, but the reserves are large and production should be possible for another 30 years. Producing oil from the Canadian tar sands is almost as costly but poses different processing problems. At the Athabasca strip mine huge quantities of sand and clay are sieved for bitumen, and the hydrocarbon contents are then upgraded into crude oil in an energy-intensive process that uses 650 cubic feet of natural gas for every barrel. The current technology, which costs about USD 10 per barrel, requires natural gas or another energy source to be close at hand. In short, the extraction process does not look as though it is going to become any cheaper.

These problems of oil supply are challenging both politically and technologically. However, provided that the political problems can be overcome, the technologies will gradually become available to exploit previously inaccessible fields, subject of course to costs. Ironically, it is only thanks to higher prices at the pump that the heavy investment costs and the research needed to produce the necessary innovations will come on stream. The days of cheap energy are therefore definitely over, but it would be wrong to say the world is running out of energy. There is plenty of oil, but nowadays there's no cheap new oil – only expensive oil.

## Long-term oil demand – a structural shift to the East

Like GDP growth, oil consumption growth is not uniform from year to year and will typically vary with the economic cycle. Over the long run, the trend rate of growth in global oil demand has been fairly consistent, having averaged 1.7% over the past 30 years and 1.8% over the past ten. Given this, it would not be unreasonable to think that growth can continue at a similar pace going forward, providing us with a benchmark against which we can compare other forecasts. The IEA recently released its World Energy Outlook 2004, predicting annual world consumption of oil of 90 mb/d in 2010 and 121 mb/d in 2030. This equates to an annual average percentage rise of 1.5%, below the trend rate mentioned above. The US Energy Information Administration (EIA) takes a more bullish view. On the basis of their reference (central) case assumptions for global GDP growth, they are forecasting average annual growth in oil consumption of 1.8%, which would

**Figure 4 - Chinese oil consumption catching up with US?**

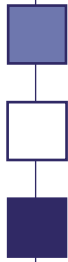


Source: Actual data from BP Statistical Review June 2004 / INVERSCO projections based on average growth last 10 years

take average daily global consumption to 91.4 mb/d in 2010 and 120.9 mb/d in 2025. The EIA's forecasts do not extend out to 2030, but a simple extrapolation of the 1.8% growth rate would put daily oil consumption at 132.4 mb/d by 2030, over 11 mb/d more than the IEA is projecting. The EIA also provides oil market projections on the basis of low and high growth scenarios that would culminate in daily oil consumption of 110 and 161 mb by 2030 respectively. The actual figure is likely to fall somewhere in between these two extremities but it is not difficult to put forward a case where growth overshoots rather than undershoots the central projection.

In 1990, the industrialised countries' share of global GDP was 79.5%. By 2001, this had dropped to 77.5% and on the basis of the EIA's central projections, will have fallen to 68% by 2025. The notion that developing countries will grow at a quicker pace than the industrialised world is not unusual and is consistent with standard economic theory. But while growth among the developing nations has in the past been spearheaded by smaller countries such as South Korea (in the 1980s), the current wave of economic 'catch-up' is being led by China, closely followed by India. Together they constitute 35% of the global population yet only account for 11% of the world's oil consumption. Given their relative size, it is quite feasible that a shift in the share of global GDP to the non-industrialised countries might occur at an even quicker pace. Furthermore, since growth in the developing world tends to be more energy intensive, this has important implications for future oil consumption.





## Estimates of China oil demand appear too low

The potential growth in Chinese oil demand is immense. According to the Development Research Centre of the State Council, China's oil demand is forecast to rise to 450 million tonnes by 2020. This converts to just over 9 mb/d, which appears to be a gross underestimate. In its reference case scenario, the US EIA forecasts Chinese oil consumption of 11 mb/d by 2020 based on an annual average GDP rate of 6.1%, while on the assumption of higher GDP growth of 7.1%, oil consumption would hit 12.8 mb/d. Just to put this into perspective, China's oil demand increased on average by 600 kb/d between 2002 and 2003, and is projected to have increased by 1.0 mb/d (on EIA estimates) between 2003 and 2004, placing average China oil consumption at 6.6 mb/d in 2004. Even annual increases of a mere 0.5 mb/d would take oil consumption near the 15 mb/d mark in 2020. Put another way, oil consumption in China has grown on average by 7.5% over the past 10 years. If this continues, then Chinese consumption would reach 27.5 mb/d by 2024, putting it on a par with US oil consumption if present trends continue (Figure 4).

In practice, China's growth is unlikely to be smooth. Major bottlenecks are already occurring with industrial output having been curtailed by power shortages. The government has administered measures to curb investment growth and interest rates were recently raised for the first time since 1995. But it is still difficult to question the huge potential for expansion in Chinese oil consumption. For example, the ratio of vehicle numbers per 1000 people currently stands at 20 compared to an average global level of 120.

According to the Ministry of Communications, total vehicle numbers are expected to increase by 6 times to 140 million units by 2020.

Such forecasts are borne out by a comparison of oil consumption per capita. This has been unsurprisingly stable in the US over the past 20 years, but it has grown considerably in South Korea where it has nearly quadrupled in the past 20 years.

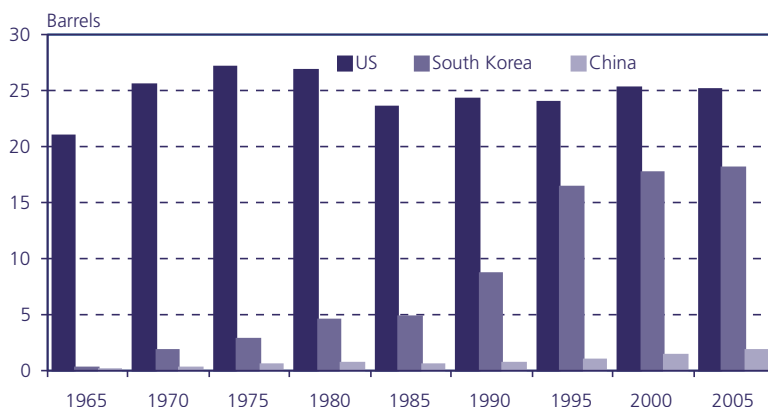
Figure 5 shows that, on projections for 2005, Chinese citizens will on average consume just 2 barrels of oil per year, significantly below their US and South Korean counterparts. However, if the Korean pattern were to be repeated in China over the next twenty years, then average daily oil consumption in China would reach an almost unimaginable 30 mb/d, far beyond what any official organisation is currently estimating.

## Oil and the economy

The recent oil price spike shares some of the same characteristics as the three previous oil spikes or crises of 1973, 1979 and 1990. However, the economic impact of the current crisis is likely to be significantly different. The three previous crises were triggered either by fears about supply disruptions (1973 and 1990), or by deliberate, oligopolistic price hikes by OPEC taking advantage of rising aggregate demand and inflation, and/or a weakening US dollar (1973 and 1979).

The economic impact of the current oil price shock is therefore likely to differ from its predecessors not so much because of the narrow impact of the oil price itself (a relative price change), but because of what is happening to aggregate demand (or spending) and inflation (the change in overall prices). Whereas in 1973 and 1979 aggregate demand was growing very rapidly in nominal and real terms and overall prices were rising strongly, this time, global demand, although it has been strengthening in real terms at the beginning of a new business cycle upturn, is much more restrained in nominal terms. Accordingly, the required response to strong aggregate demand and rising oil prices in 1973 and 1979 was an across-the-board tightening of monetary policy, primarily to curb nominal demand and inflation and – as a by-product – creating recessions that also reduced the real spending on oil and oil-related products. In sum, it was not the increase in oil prices that produced the subsequent recessions, but the

**Figure 5 - Annual oil consumption per capita**



Source: INVERSCO estimates based on actual and projected data from BP / UN pro. div

tightening of monetary policies. By contrast, on this occasion, although there has been an increase in aggregate real demand due to the upswing in the global business cycle, there has been no big surge in nominal demand or spending on a global basis (with the possible exception of China) such as would generate inflation on any significant scale. Consequently, the increase in oil prices on this occasion is more likely to crowd out some spending on other goods and services than to cause any rise in overall prices or to cause a recession.

## Conclusion – days of cheap energy are over

Much of the focus in the oil markets this year has been on the short-term fundamentals and specifically the geopolitical risks associated with the supply of oil. There is no doubt that the confluence of these supply dynamics and a recovery in global demand has put pressure on oil prices by reducing the amount of spare production capacity, thereby removing the so-called buffer that has afforded OPEC control over the oil markets for so long. With the erosion of spare production capacity and a relatively low level of commercial stocks, oil prices are likely to remain volatile and probably above the USD 40 mark (New York benchmark crude) at least throughout the Northern hemisphere winter.

The world is not about to run out of oil: the total amount of proven reserves has never been higher, but the problem lies with the fact that it's either concentrated in the politically volatile Middle East or is costly to reach. New reserves are either in the hands of politically unfriendly regimes, or must be extracted from expensive sources such as deep undersea beds or from unconventional sources such as the Canadian tar sands.

The longer-term demand for oil is hard to predict but appears to have been underestimated by many organisations. The growing importance in global GDP of the developing nations has recently been occurring at an accelerated pace, partly because of the sheer size of China and India as a proportion of the world's population. Not only are these countries growing at a quicker pace than their developed counterparts, but their output is typically more energy-intensive at this stage of development. Potential oil demand in China in particular is immense: in another 20 years, its share of global oil consumption could be on a par with the US were current growth trends persist.

Relief from higher oil prices might come if the global economy were to slow, or even to fall into recession, as a result of higher oil prices. However, with no such scenario looking likely, any prolonged respite from high oil prices seems remote. In the longer-term, the sustainable oil price is likely to be a lot higher than it has been in the past.

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