

OIL'S SHIFTING SUPPLY/DEMAND EQUATION

The world's appetite for oil is uncharacteristically robust today despite high prices, leaving producers struggling to keep up. Our research shows why demand growth is likely to remain strong and how this will slow the process that has corrected price spikes in the past.

AFTER THE PHENOMENAL RUN-UP IN OIL prices—and oil stocks—over the past three years, one question looms large in most people's minds: Where are oil prices headed next?

Are we poised for a replay of the early 1980s, when a collapse in demand sent prices into a severe and lasting decline? Or are structural changes in the oil market likely to keep oil prices permanently aloft? That happened in 1973, after the oil embargo by the Organization of the Petroleum Exporting Countries (OPEC) pushed the price of oil from \$3 a barrel to \$12, and it never came back down.¹

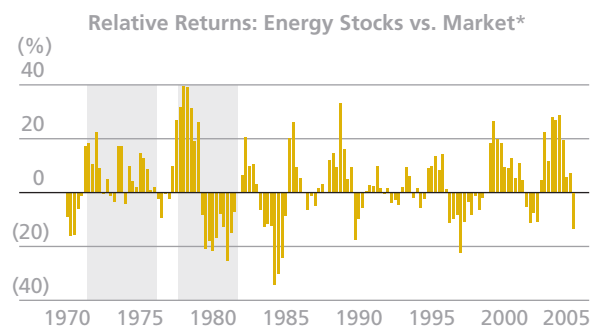
As of year-end 2006, we've already seen a sizable drop in oil prices. But is this a portent of more to come?

The answer, of course, has important implications for energy stocks, which tend to track oil prices in the short term. After the 1973 surge, sparked by OPEC's response to the Israeli/Arab conflict, oil stocks outperformed the stock market for most of the remainder of that decade. But after another price spike in 1978—when the Iranian revolution curtailed that country's output—the pattern was different: Massive but temporary oil stock outperformance was followed by a long and painful rout (*Display 1*) after oil prices began to fall.

We have concluded that the most likely outcome this time is a gradual moderation in oil prices from this past summer's highs—but not a collapse back to historical averages. We see

Display 1

Energy stock performance after past booms has varied widely



*Forward 12-month returns relative to the MSCI World Index; through September 2005
Source: Bloomberg, Morgan Stanley Capital International, and AllianceBernstein

long-term oil in the low-\$40-a-barrel range, well above its historical average of \$27. Here, we present extensive research supporting this conclusion.

Slow-Motion Correction

During the past two oil booms, new supply was slow to come online. From 1973 to 1978, the annual growth of non-OPEC oil production peaked at 2 million barrels per day (mbpd), on a base of 33 mbpd. The post-1978 response was even more lackluster. This is not surprising, though. Exploration and development are extremely capital-intensive and require long lead times.

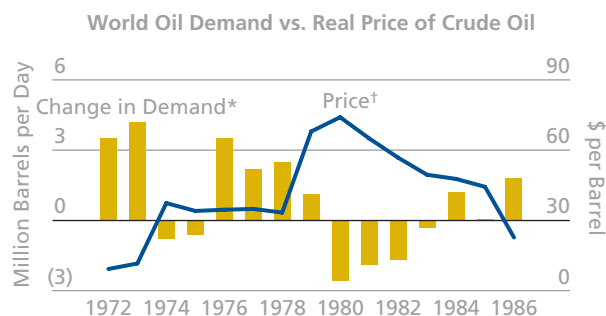
In contrast with supply, demand did react quickly. After oil prices quadrupled from 1974 to 1975, demand fell over the ensuing two

¹ All references to dollars in this article are in US dollars.

years. And within two years of the 1978 spike, demand growth had gone from significantly positive to significantly negative. Eroding demand capped the oil price increase in the first spike, and eventually led to a big decline in the second (*Display 2*).

Display 2

Oil demand fell sharply after the 1978 price spike

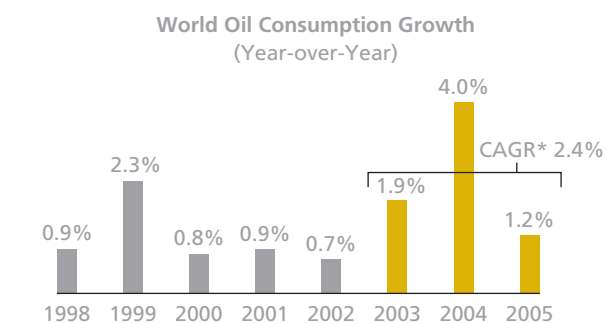


*Year-over-year
†In 2005 dollars
Source: Bloomberg and BP Statistical Review

Oil's supply/demand dynamics today are quite different. Although some production was lost to Gulf hurricanes and supply disruptions in Nigeria and Venezuela, what chiefly caused the recent price spike was stronger than expected demand. The reason: robust global economic activity. On the heels of a 1.9% gain in 2003, world oil consumption leaped 4.0% in 2004 (*Display 3*), a gain far bigger than the 1.5%

Display 3

Oil demand has been surging despite high prices



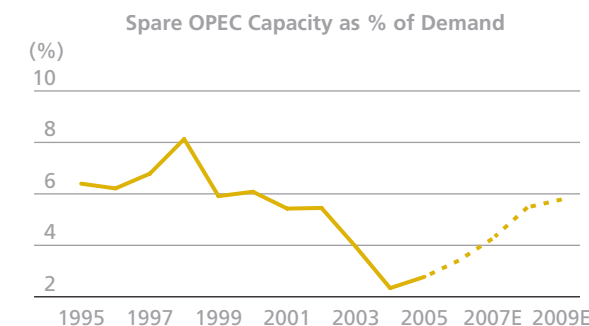
*Compound annual growth rate
Source: International Energy Agency (IEA)

annual average increase over the previous 20 years. The compound annual growth rate has been very strong over the last three years; oil demand has continued to increase even in the face of high oil prices.

The pickup in demand growth caught both OPEC and non-OPEC oil companies unawares. They hadn't added significant production capacity for some time, reducing spare capacity dramatically (*Display 4*). This limits the oil market's ability to react to supply disruptions at a time when heightened tensions in key oil-producing countries have intensified worries about supply shortages.

Display 4

Spare capacity has shrunk dramatically



Source: Deutsche Bank, IEA, Organization of the Petroleum Exporting Countries (OPEC), and AllianceBernstein

The forces that typically correct supply/demand imbalances are already at work today: In response to high prices, producers are once again investing to increase supply, while individuals and businesses are curbing consumption. Together, these forces should eventually bring oil prices lower.

Nonetheless, our research suggests that fundamental structural changes in both oil supply and demand will make the corrective process more protracted than in the past. Let's examine the supply side first.

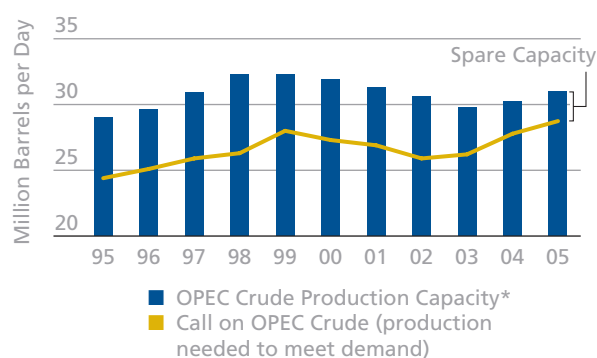
Sluggish Supply

A prolonged slump in oil prices led to a decade of low investment in exploration and development, resulting in today's shortage of spare capacity.

Over the past five years, OPEC production capacity has been flat at best. Although OPEC did encounter some anomalous production difficulties, the basic reason is fairly evident: The world's call on OPEC as a producer—the amount of its oil needed to balance supply and demand—was roughly the same during 2002 and 2003 as it was in the late 1990s (*Display 5*). Why add capacity when demand for your product isn't growing?

Display 5

OPEC production capacity had declined



*Not including production of natural gas liquids and heavy oil
Source: Deutsche Bank, IEA, OPEC, and AllianceBernstein

The call on OPEC production had not risen during this period because non-OPEC suppliers were able to satisfy the fairly slow growth in world oil demand. In the late 1990s, production growth was broad-based. Most non-OPEC countries, with the exception of Russia, benefited from productivity-enhancing imaging and drilling technologies. Then, just as the other non-OPEC producers had largely exhausted the boost to production from these

innovations, Russia was beginning to exploit them. As a result, Russia accounted for three-fourths of the 4.1 mbpd increase in non-OPEC production from 2001 to 2005.

But the oil supply tide should turn. Although we expect Russia's production growth to moderate significantly over the next five years, that of the remainder of the non-OPEC producers should rebound sharply. Along with increases in OPEC output, this added supply should allow for a recovery in spare capacity over time.

However, there are risks to this scenario. All of the spare capacity that exists today is under the control of OPEC, and most of the new supply is to come from OPEC and from other politically sensitive countries in the Middle East, Latin America, the former Soviet Union, and Africa. Although oil production is also expanding in more stable regions such as Canada and Brazil, as well as the deepwater fields of the Gulf of Mexico, this growth will be largely counterbalanced by the declines in mature US and North Sea oil fields. Thus, even as spare capacity is slowly rebuilt, the "security premium" embedded in oil prices is likely to remain higher than it has been in the past, a situation that will continue until there's enough spare capacity to ensure that the market is no longer concerned about scarcity.

In addition, exploration projects do not look promising by historical standards. Both the number and the size of recent discoveries have been surprisingly low, suggesting that the industry is struggling to find new drilling opportunities. Other constraints exist: Project start-ups are hindered by persistent shortages throughout the supply chain, particularly for offshore drilling rigs and skilled personnel. This is driving up the costs of finding and developing new reserves, further limiting the supply push.

Robust Demand

Just the opposite is occurring on the other side of the supply/demand equation. A common expectation is that sustained high prices will eventually rein in demand for commodities in general. However, our research suggests that global oil demand will remain fundamentally stronger and less sensitive to price spikes than in past cycles as a result of two shifts in consumption patterns over the past 30 years:

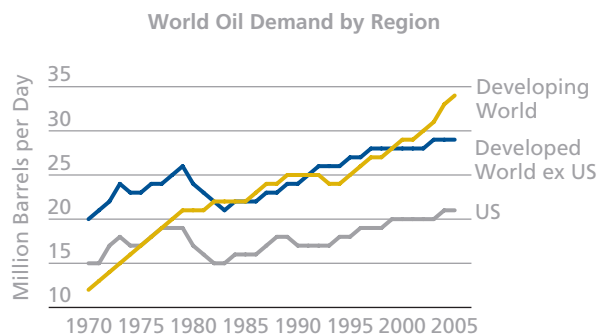
- > A greater proportion of oil demand comes from emerging economies that are growing faster than the rest of the world and consume more oil relative to their economic output.
- > A larger share of the world's oil goes to uses that are comparatively insensitive to price and for which there are few substitute fuels, notably commercial transportation.

Asia's Big Appetite for Oil

Developing countries—chiefly those in Asia—are consuming a growing share of the world's oil (*Display 6*). Roughly 70% of the increase in global oil consumption between 1998 and 2005 can be traced to the developing world. The US, meanwhile, accounted for roughly 17% of demand growth and the rest of the developed world the remaining 13%.

Display 6

Developing nations are using a bigger share of world oil



Source: BP Statistical Review and IEA

We expect oil consumption in the developing world to grow at a compound annual rate of 3.5% over the next five years—nearly three times the pace in the developed world.

A large chunk of this growth will be driven by China's and India's rapid industrialization and urbanization. China alone accounted for more than one-fourth of the increase in world oil consumption between 1998 and 2005. Hence, understanding the world's future oil demand requires a realistic forecast of China's oil needs.

Given China's economic growth outlook, its appetite for oil is likely to remain huge. The question is: Will China's oil consumption continue to outpace its GDP growth, in the manner of industrializing countries in the 1990s? Or will its consumption track economic output, in the fashion more typical of developing economies?

Recent history is a poor guide. China's oil consumption has been erratic, climbing 11% in 2003 and 16% in 2004 but just 3% in 2005. Some of the 2004 growth resulted from transportation bottlenecks that impeded the delivery of coal to power plants, which forced businesses to use oil-fired backup generators. But the snags eased, and more coal-fired generating plants have come online—reducing oil demand growth in 2005.

To gain insight into China's situation, we examined the oil consumption patterns of two Asian "Tigers"—South Korea and Thailand—during their hyper-growth industrialization from 1987 to 1997 (*Display 7, following page*).

In that decade of spectacular growth, South Korea's oil use grew 1.8 times faster than its GDP, Thailand's 1.4 times. (South Korea's heavy oil use stemmed in part from its development of a petrochemicals industry.)

Display 7

We expect China's oil use to roughly track GDP growth

	Decade of Fast Growth 1987–1997		China Forecast 2005–2010E
	South Korea	Thailand	China
Ratio of Oil Consumption Growth to GDP Growth			
Motor Gasoline	2.7x	1.3x	1.5x
Road Diesel	1.3	1.4	1.3
Petrochemical Feedstocks	2.3	NA	1.5
Power Generation	3.8	2.9	0.0*
Total	1.8x	1.4x	0.9x

*Forecast for 2006 to 2010

Source: Consensus Economics, IEA, International Monetary Fund, United Nations (UN), and AllianceBernstein

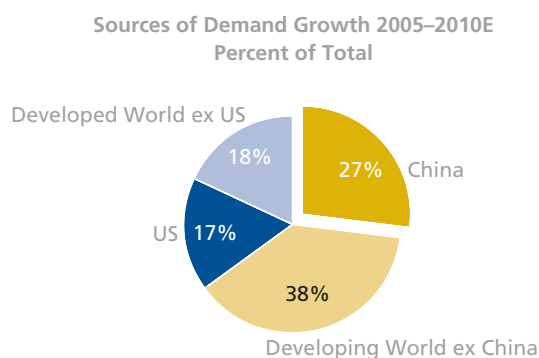
In both countries, a significant share of the growth can be attributed to the power sector. Virtually all of South Korea's and Thailand's growing demand for electricity was met with oil, as they had few other means for generating power. Eventually, Thailand developed its natural gas deposits, enabling it to shift to natural gas-based power generation.

China, like South Korea, uses lots of oil for its fast-growing chemicals industry. But unlike the two Tigers, China has abundant coal reserves to power its generating plants and is also investing in gas-fired, hydro, and nuclear power capabilities. The high price of oil makes these alternative fuels even more attractive.

So, assuming five-year annualized GDP growth for China of 8%, we estimate that the country's oil consumption will grow nearly 7% per year on average through 2010. Nonetheless, at these levels China would still account for 27% of the increase in world oil consumption in five years, while other developing countries would collectively make up a further 38% (*Display 8*).

Display 8

China will remain the biggest driver of demand growth



Source: Consensus Economics, IEA, UN, and AllianceBernstein estimates

Shift to Oil Substitutes Largely Complete

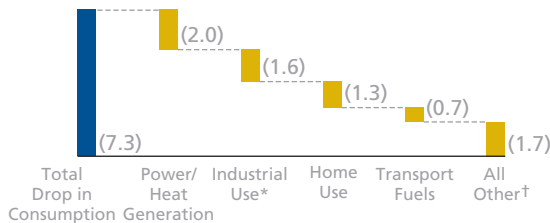
Global oil demand may be more inflexible today than it was in the past. The price spikes of the 1970s triggered worldwide efforts to reduce consumption. From 1978 to 1983, global oil demand plunged 8.5%, despite cumulative world GDP growth of 11.6%.

The biggest declines were in power generation, residential heating, and industrial use, for which cheaper substitutes for oil, such as coal, natural gas, and nuclear energy, were available (*Display 9, top*). By contrast, when substitutes were few, usage proved to be far more stable. Transportation fell only 4% cumulatively from 1978 to 1983. And within transportation, gasoline fell 5%, while diesel use actually grew 16%.

As a result, the composition of oil demand has changed dramatically since the last oil shock (*Display 9, bottom*). Oil consumed for power generation and industrial purposes fell by nearly half between 1978 and 2003, and the transportation market, which has had few viable substitutes, now consumes slightly more than half of the world's oil, up from 40% in 1978.

Oil demand fell most for uses with cheap substitutes...

Sources of Decline in Developed World Oil Demand
1978–1983
(Million Barrels per Day)



Total Decline 1978–83	(16)%	(43)%	(28)%	(33)%	(4)%	(14)%
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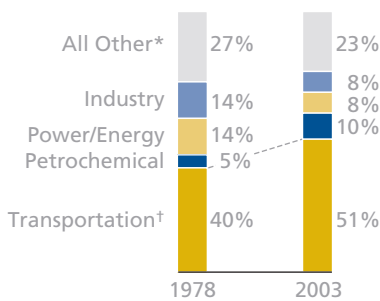
*Excludes chemicals

†Includes commercial and public services, nonenergy uses, and distribution losses

Source: IEA and AllianceBernstein

...leaving transportation to consume more than half of all oil

Composition of World Oil Consumption



*Includes residential and miscellaneous uses

†Includes road, rail, air, ocean, and other unspecified transportation fuels

Source: IEA and AllianceBernstein

Within transportation, oil usage has grown fastest among commercial drivers, mostly truckers using diesel fuel. Consumption of commercial transportation fuel increased by 5.4 million barrels per day between 1978 and 2003,² exceeding the rise in gasoline use. This translated into 4.7% average annual growth for the commercial fuel versus 1.5% for gasoline.

These shifts have major implications for oil’s price elasticity. Although commercial demand for transportation fuel is highly attuned to GDP growth and global trade, it is relatively insensitive to fluctuations in oil prices. After all, if there’s demand, producers will ship their goods, no matter how expensive transportation fuel becomes. Therefore, the gathering forces of globalization imply more—not less—demand for commercial transportation fuel.

Gasoline consumption, on the other hand, has grown more slowly than GDP in most countries and tends to be stable. In mature markets, gasoline use tends to grow along with the number of car owners; changes in price have only a small effect on demand.

All told, over half of the world’s oil consumption has few short-term substitutes and thus is not particularly sensitive to price. Barring a macroeconomic shock, we expect world oil demand to grow at a 2% average annual rate for the next five years—above the 1.5% historical rate—despite high oil prices.

What could disrupt this trend? Certainly, a major technological breakthrough in engine design or the emergence of a viable oil substitute for the transportation market would have a big impact. Two serious contenders we analyzed are hybrid vehicles and ethanol (*see page 9 and page 15, respectively*). Both are attracting huge investment for large-scale development and, by our analysis, should have a dramatic impact on world oil consumption over the longer term. However, it will take time for either technology to become cost-competitive and achieve meaningful market penetration. Therefore, we don’t envision their having a meaningful impact until at least 2010.

² For a fair comparison, our calculations exclude Europe, as diesel-powered car ownership in the region is significant, driven partly by government tax policy; data breaking out consumer diesel use are not available.

Conclusion: Expect Higher Oil Prices for Longer

We expect growth in supply—rather than reduction in demand—to lead to a correction in oil prices, in sharp contrast with past oil-price cycles. Capital projects now under way should rebuild spare capacity, albeit gradually. We’re starting to see an improved supply/demand equation already, and prices will continue to drift down slowly.

Nonetheless, we do not see oil prices collapsing back to or below their historical averages, as has been the case before. Prices are down from their summer peak, but they’re still quite

high—double what they were three years ago. With producers pumping at almost full capacity, meeting the world’s thirst for oil will require operators of marginal fields to ramp up capacity. And these projects are always the last to come online because they entail such steep costs. To allow these producers an adequate return on their investment, oil prices will have to settle at levels that we calculate to be in the low-\$40-per-barrel range. Although that is well below this past summer’s level, it is much higher than the 20-year average of \$27 per barrel. ■