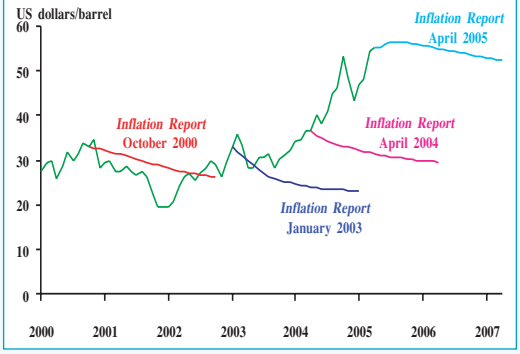
Global oil market developments and implications on oil price forecast

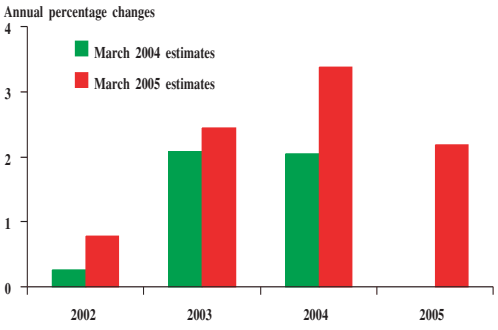
Since the previous *Inflation Report* (January 2005), crude oil prices have risen further. The price of WTI oil in March 2005 averaged at 54.33 US dollars per barrel, increasing from the average of 46.99 US dollars per barrel in January 2005 by 15.62 per cent. The price reached a historical high of 56.93 US dollars per barrel on 4 April 2005. More importantly, Chart 1 indicates that the WTI futures curve has also risen, with futures prices up to 2-year delivery remaining above 50 US dollars per barrel. This is in contrast to previous oil price spikes in 2000 and 2003 where futures prices tended to fall back to the 20-30 US dollars per barrel level, reflecting market participants' view that oil prices will remain high for quite some time.

Chart 1 Spot prices and futures curve of WTI oil



Note: Futures curves are average values of futures prices for contracts with maturities between 1-24 months during the ten working day period of the month in which the *Inflation Report* was issued as indicated on the chart
Source: Bloomberg and Bank of Thailand

Chart 2 World oil demand



Source: International Energy Agency

Chief among the reasons for continued high oil prices is that both futures prices and spot prices are reacting to more persistent shocks. On the **supply side**, the market has become more concerned about future oil shortages due to geopolitical instability in some major oil producing countries. As for possible new supplies, it usually takes up to 5-10 years to develop new oil fields and refineries. Moreover, negative news about possible short-run supply disruptions will have larger impacts on prices, given the historical low level of OPEC's spare capacity. On the **demand side**, demand for oil continued to rise, especially from China. In fact, over the past few years, most analysts have underestimated actual world oil demand. As a result, world oil demand has been successively revised upward (Chart 2).

Methods for crude oil price forecasting

In general, there are four approaches employed by various institutions to form assumptions on crude oil prices:

1) Experts' forecast survey: The approach of using surveys to infer market expectations is convenient and widely employed. However, it also has disadvantages in terms of timing problems as different research houses use different survey frequencies and overlapping information to form forecasts. Moreover, it also suffers from the small sample problem, which could render the forecasts unreliable. These problems are likely to become more acute at times when uncertainties in the global world oil markets escalate. Over the past year, the standard deviation of experts' consensus forecast doubled between March 2004 and March 2005, implying greater uncertainty associated with employing mean forecasts from experts' survey.

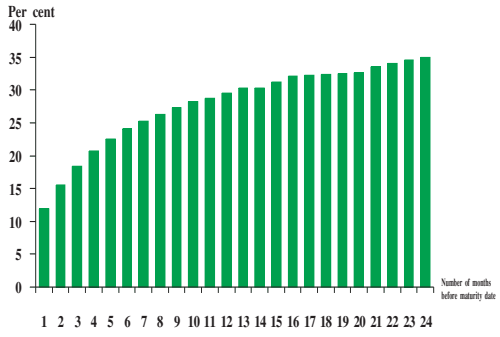
2) Random-walk assumption: This method assumes that expected future prices equal the current price, following the principle that today's price should already reflect all available information with regards to risk factors. Therefore, future prices will change only with new information. As new information is equally likely to have a positive or negative impact on prices, on average today's price should be a good approximation for expected future price. The International Monetary Fund (IMF) employs this approach for its oil price forecast. The advantages of this approach are its convenience and forecast consistency. It does not rely on particular models or data interpretations which are mostly complicated and may not be reliable. Nevertheless, by ignoring other potentially valuable information, it may not produce an optimal forecast.

3) Futures price: The European Central Bank and the Bank of England are among those that use prices of futures contract to form oil price forecasts. In principle, the futures price reflects market participants' views on expected future price of oil. However, one must be aware of two limitations of this market based approach: 1) Besides being an asset, oil is also a consumption good. Thus, holding physical stocks of oil can be more valuable than holding a contract for future delivery of crude oil, especially during the time when there is concern about disruption to future deliveries. 2) Movements in futures price also embody risk premium which is time-varying. Therefore, oil futures price could deviate from the market's expected future spot price to some extent.

4) Judgmental approach: This method considers relevant information from both fundamental and psychological factors in reaching the appropriate oil price assumption without relying on any specific model. However, to adopt this approach, institutions would need experts on the global oil market. In addition, each round of forecasts could potentially be based on different criteria. Recently, the OECD has opted for this approach.

The MPC recognizes the significance of crude oil prices to the conditions and stability of the Thai economy. As a result, in setting assumptions about crude oil prices, which are used as key inputs for the forecasts of output growth and inflation, the MPC does not simply rely on just one particular approach but considers the results from the aforementioned approaches jointly.

Chart 3 Implied volatility curve of options on oil futures



Note: Implied volatility was taken from call options (at the money) on WTI oil futures contracts with maturities between 1-24 months. The values are the averages for options contracts traded in March 2005

Source: Bloomberg and Bank of Thailand

To incorporate market-based information, the MPC not only uses oil futures prices[1/] to form oil price assumptions for the baseline scenario but also utilizes implied volatility of options on oil futures contracts to capture the price distributional risks to form assumptions for the worse case scenario. The latter application is meant to better reflect greater price volatility and prospects of further rises in oil prices. Chart 3 shows the price volatility which is equivalent to one standard deviation of implied volatilities reflected in prices of option contracts traded during March 2005 with maturity up to 2 years. As indicated by the chart, the variability of future oil prices increases with longer forecast horizons.

[1/] Use average values of futures prices for contracts with maturities between 1-24 months during the 10-day period before each BOT economic projection.