



## The 2008 Oil Price “Bubble”

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### BACKGROUND

As oil prices began to rise in 2009 from a low point of about \$40 a barrel in January to around \$70 a barrel in July, a key question is whether the world is in for another oil price spike in the near term similar to that witnessed in early 2008. Several hypotheses were advanced when world oil prices started their inexorable climb from 2003–04 onwards, then skyrocketed from \$92 a barrel in January 2008 to cross the \$140 a barrel mark in June, finally hitting a record high of \$147 a barrel on July 11, 2008, before collapsing to less than \$40 a barrel

in December (figure 1).<sup>1</sup> There was the “peak oil” explanation, based on the theories of M. King Hubbert of “Hubbert’s Peak” fame and his supporters, notably Colin Campbell and Matthew Simmons, that the world was running out of oil.<sup>2</sup> There were the market “fundamentalists,” including importantly John Lipsky, the first deputy managing director of the International Monetary Fund (IMF), and Philip Verleger, a well-known oil expert, who argued that the fundamentals of demand and supply were primarily behind the extraordinary rise in oil prices in the first half of 2008 (Lipsky 2009a, 2009b; Verleger 2005, 2008). Interestingly, this fundamentals view was also shared by the US Treasury and was articulated by David McCormick, then undersecretary for international affairs, in a presentation in July 2008 at the Peterson Institute for International Economics.<sup>3</sup> Finally, there were those who maintained that such an increase could only be a “bubble,” unexplained by peak oil theory or market fundamentals. Many financial-market participants were proponents of this third view, notably Michael Masters (2008), as well as the main oil producers, who were as surprised as anyone at the speed and size of the price increase over only a few months. Their argument was that the phenomenal increase in financialization of commodity markets during 2006–08, including in particular the oil market, led to speculation and momentum trading, which pushed oil prices way beyond their long-term equilibrium level as determined by fundamentals.<sup>4</sup>

1. For convenience, oil prices in this policy brief refer to prices for West Texas Intermediate (WTI) crude.

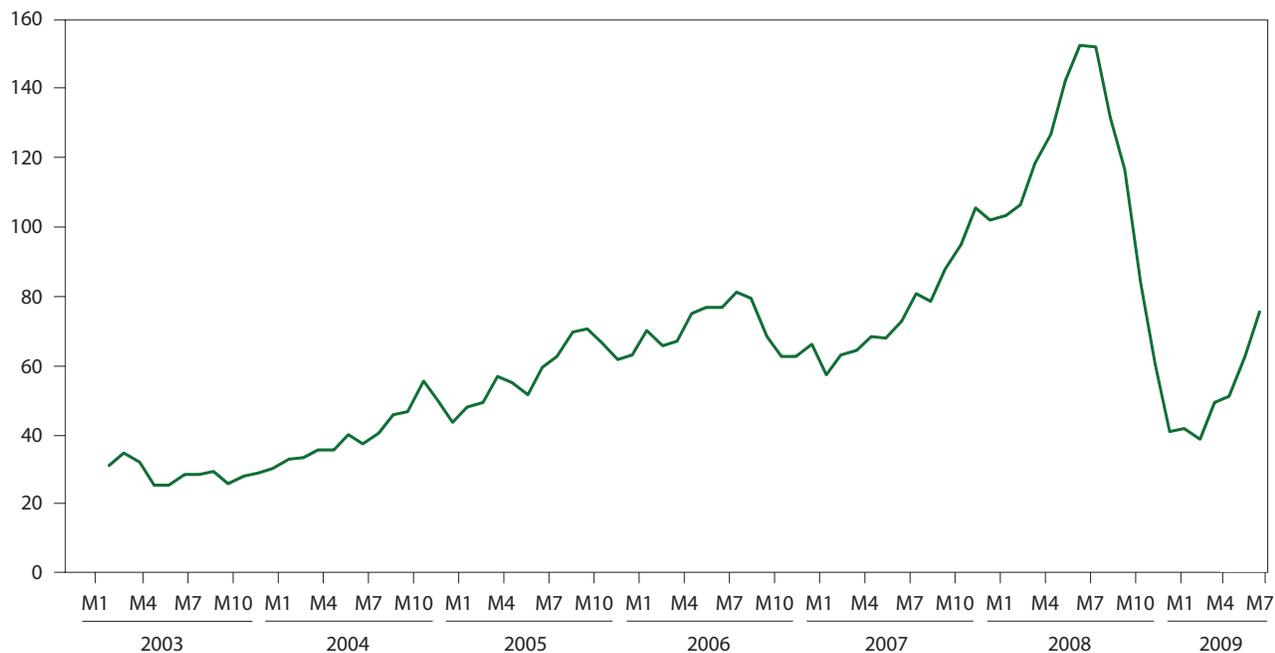
2. A good description, albeit somewhat critical, of the Hubbert’s Peak theory is contained in the recent book by Leonardo Maugeri (2006), who extends and updates the seminal book on the history of oil by Daniel Yergin (1991).

3. See McCormick (2008). It is worth noting that the US Treasury view contrasts with the conclusions of a US Senate Staff Report in 2006 that blamed speculation for contributing to rising energy prices. See US Senate Permanent Subcommittee on Investigations (2006).

4. See Hamilton (2009a, 2009b) for a detailed long-run analysis of the behavior of crude oil prices examining the respective roles of peak oil (or “scarcity rent”), fundamentals of demand and supply, OPEC monopoly pricing, and speculation. While OPEC policies were certainly an important factor in the 1970s and 1980s, there is no evidence to suggest that the cartel was responsible for the more recent price increases as members were producing

**Figure 1 WTI oil prices, 2003–09**

US dollars/barrel



WTI = West Texas Intermediate

Source: US Department of Energy.

## LOOKING AT THE EXPLANATIONS

Developments in the world oil market in 2008 raise two important questions, answers to which have obvious implications for future oil price expectations.

- First, was the oil price increase of over 50 percent in the first six months of 2008 a bubble?
- Second, if it was a bubble and oil prices overshot their long-term equilibrium level in the first half of 2008, did they undershoot when the bubble burst in the second half of the year?

To get a handle on the first question, one needs to consider the two main explanations of the oil price increase in 2008—the *peak oil* theory and the *fundamentals* theory. For a start, developments in the global oil market have not validated the peak oil theory. In the early 1970s, M. King Hubbert projected that world oil production would peak in the mid-1980s and then decline to 35 million barrels a day (mbd) by 2000 (Maugeri 2006, 213–15). This projection was clearly way off the mark as total world oil production in 2000 was around

at close to full capacity from around 2002 and particularly in 2007–08, when prices shot up.

75 mbd. Matthew Simmons (2005) made essentially the same case for Saudi Arabia, the world's largest oil exporter with a quarter of the world's oil reserves, arguing that the country could not maintain its 2003 production rate of 9.5 mbd over the following five to ten years. As it turns out, five years later in 2008 Saudi oil production capacity was 11.5 mbd, and further capacity expansion is planned for 2009–11.<sup>5</sup> Peak oil theory, irrespective of its merits, relates mainly to the long run and certainly cannot explain the run-up in oil prices over a few months. Moreover, oil prices then collapsed from their high of \$147 a barrel in July 2008 to less than \$40 a barrel in December of that year. Peak oil theory would imply that the sharp fall in oil prices in 2008 was due to the sudden discovery of new oil reserves. But, of course, there were no such surprise discoveries.<sup>6</sup>

5. The additional Saudi Arabian oil fields expected to be in production in 2009 are: Khursaniyah (0.5 mbd), Shaybah (0.3 mbd), Khurais (1.2 mbd), and Nuayyim (0.1 mbd). Even factoring in possible delays in bringing these oil fields into production, total production capacity of Saudi Arabia in 2009 will reach 11.5 to 12 mbd, up from 11.2 mbd in 2007. By 2011, the Manifa (0.9 mbd) offshore field is also supposed to come online, which would broadly offset the declines in maturing fields, and total capacity would reach 12 to 12.5 mbd.

6. Hamilton (2009a) also agrees that the dramatic oil price collapse in late 2008 is inconsistent with the scarcity rent hypothesis.

*Fundamentals* are certainly an important part of the story. The basic argument of the proponents of this view is that the price responsiveness of both the demand and supply of oil is very low,<sup>7</sup> so that small changes in demand require large changes in prices for markets to clear. As world GDP growth during 2007 and through the first half of 2008 was very strong by historical standards, and supply was more or less fixed by capacity constraints, oil prices would be expected

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to rise substantially. When the global economy started to slow down and then entered into recession in the second half of 2008, demand fell off rapidly, and since supply declined more slowly as the Organization of Petroleum Exporting Countries (OPEC) began its production cuts in mid-2008,<sup>8</sup> prices dropped like a stone. There is some general plausibility to this explanation, but at the same time there is a problem when it is applied to the 2008 experience. World real GDP growth in the first half of 2008 was about the same as it was in 2007. With a low price elasticity of demand and income elasticity close to unity, as reported by the IMF (2009) and by Hamilton (2009a), one would expect the demand for oil to continue to expand. But in fact, world demand for crude oil actually fell to 86.3 mbd in the first half of 2008 from 86.5 mbd in the second half of 2007. Furthermore, oil production rose to 86.8 mbd from 85.8 mbd over that same period. This would suggest, if anything, that oil prices should have fallen in the first six months of 2008. So market fundamentals alone, while having some validity, cannot fully explain the spectacular rise in oil prices from January to June.

Verleger (2008) has put forward a variant of the fundamentals hypothesis to explain the oil price increase of 2008.

7. Averaging across a number of studies, the short-run price elasticity of demand is estimated to be less than  $-0.1$  and the long-run price elasticity ranges between  $-0.2$  and  $-0.3$ . See Hamilton (2009a). Given capacity constraints and the fact that supply is controlled to a large extent by governments in the major oil-producing countries, the price elasticity of supply is generally assumed to be close to zero.

8. OPEC production cuts were announced in March–May but became effective only after a lag of several months.

Essentially he argues that there was a shortage of light sweet crudes, which represent roughly a quarter of the world's production of crude oil, and that heavier crudes were in plentiful supply, as evidenced by the level of inventories of the latter. It is true that the demand for lighter crudes is higher than for heavier crudes as there is limited refinery capacity in the world to process heavy sour crudes, particularly as Verleger (2008) notes, to process jet fuel and diesel. Because they are easier to process, for a given level of demand, the price of lighter crudes is naturally higher than the price of heavier crudes. But then why did the price of heavy crudes rise in tandem with the price of lighter crudes, even when there was supposedly an excess supply of the former? For example, the discount on heavy crudes (like Arabian Heavy) relative to lighter sweet crudes (like West Texas Intermediate [WTI]) actually declined from 13 percent in 2006 to 8.5 percent in 2007 and increased only marginally to 9 percent in June 2008.<sup>9</sup> If there was excess demand for light crudes and excess supply of heavy crudes in 2007–08, the discount should have increased, yet it actually fell as prices of both light and heavy crudes rose sharply in the first six months of 2008.<sup>10</sup> Verleger (2009), in his testimony at the Commodity Futures Trading Commission (CFTC) hearing in August, blames Saudi Arabian pricing policy, imitated by other OPEC members, for keeping the price of heavy crudes moving in line with prices of light crudes. However, for Saudi Arabia, and OPEC more generally, to maintain a higher price than the fundamentals for heavy crudes warranted, supplies of this type of oil would need to be kept off the market. In fact, total OPEC production rose steadily month by month from January through July 2008, and average daily production during these seven months was about 4 percent above the average daily production in 2007. The falling discount and rising production in the first half of 2008 are difficult to reconcile with Verleger's view that there was excess supply of heavy crudes in the market.<sup>11</sup>

There is more of a consensus that the global recession played an important role in the subsequent collapse of oil prices. Between 1970 and 2007 there have been five global recessions, defined as world economic growth falling to  $2\frac{1}{2}$  percent a year or less. The largest recessions were the first two (1974–75 and

9. The average discount in 2003–05 was about 30 percent. At the end of June 2008, Arabian Heavy was selling at \$124 a barrel, while WTI was at \$137 a barrel.

10. The rising demand for heavy crudes, despite the lack of refineries, is because it is "blended" with the products from lighter crudes.

11. Verleger (2008, 2009) argues that OPEC was storing the excess supply of heavy crudes, citing the example of Iran having to charter extra tankers in 2008 to store the oil it could not move. But if there is a lack of demand, it would be more cost effective for producers to simply leave the oil under the ground, rather than pumping it out and then leasing extra tankers to store it.

1980–82), and oil prices did not immediately fall when the recessions began.<sup>12</sup> In fact, oil prices remained quite firm one year into each of these recessions. By contrast, in the following three milder recessions (1991–93, 1998, and 2001) oil prices declined at the outset. The pattern of the last three recessions was repeated in the 2008 recession as oil prices plummeted as soon as it became evident that global growth was falling

**There will be upward pressure on oil prices in the next year or so as the world emerges from recession, demand for oil picks up again, and inventories fall back to their average or normal levels. Whether this will turn into a 2008-type bubble depends on the degree of speculation in the oil market.**

sharply. There are several possible reasons why the pattern changed between the earlier and more recent recessions. First, the major oil producers switched from contract pricing in the 1970s to largely spot selling in the 1990s, so price responsiveness was naturally slower in the earlier period as buyers were locked into contracts at higher prices, and there was a lag before these contracts expired. Second, OPEC had significantly more market power in the 1970s and 1980s than it did from the 1990s on. So it was easier to prevent falls in prices as demand weakened in the earlier period. Finally, futures markets were relatively underdeveloped so there were limited, if any, opportunities to take speculative positions on future oil prices in the 1970s. This changed in the later period, so that as speculative long positions were unwound, oil prices fell more rapidly than they otherwise would have.

*Speculation* is a third possible explanation for the jump in oil prices. The argument runs as follows: While fundamentals were responsible for the rise in the equilibrium oil price, speculation on the future price of oil led to both overshooting of spot prices in the first half of 2008 and undershooting in the second half of the year. Unfortunately, it is very difficult to measure speculation in any direct way. One obvious straightforward approach is to look at the data on the volume of oil futures; it turns out that these have grown spectacularly over the last few years (figure 2). In 2002 the average daily trading volume of oil futures (or paper barrels as they are known) was

12. Both these recessions were associated with large prior hikes in oil prices, and even so prices stayed high.

four times the daily world demand for oil (physical barrels). By 2008, daily trading in paper barrels had reached 15 times the daily world production of oil (of around 85 mbd) and remained at about that level through the first half of 2009.<sup>13</sup> These numbers are clear evidence of the enormous financialization of the oil market that has taken place in only five to six years, and some part of this surely reflects speculative activities. A number of analysts also have used the volume of net open positions in futures markets because in principle it can yield information on movements in spot prices. Net open positions in oil futures more than doubled over 2003–07, and net long noncommercial positions at the New York Mercantile Exchange (NYMEX) reached new highs in early 2008.

Two problems, however, exist with using oil futures as an indicator of speculative activity. First, to isolate the speculative component in the net open positions one has to separate out commercial and noncommercial positions, since the former are presumably related to hedging rather than speculation.<sup>14</sup> While separate data on commercial and noncommercial net open positions are reported, in practice the distinction between the two is more or less arbitrary.<sup>15</sup> Second, if financial flows into the futures market caused spot prices to rise, net long noncommercial positions would systematically lead spot prices. But IMF economists argue that many studies have found no evidence of systematic causality between oil financial positions and spot prices in either direction (IMF 2006, 2008a, 2008b). These empirical findings lead the IMF to reject speculation as a factor behind the oil price hike in 2008, but this conclusion could simply be a consequence of the weakness of the indicator of speculative activity being used for the tests.<sup>16</sup>

Furthermore, unlike the adherents to the fundamentals viewpoint, the CFTC now considers that speculation has been an important factor in oil price movements and announced on July 7, 2009, that it would hold hearings in July and August to consider whether to impose speculative limits on futures

13. In fact, the futures data are probably an underestimate since they do not include options or over-the-counter trades. Furthermore, it is important to note that major oil producers, like Saudi Arabia and the other OPEC countries, transact only in the spot market and not in the futures market.

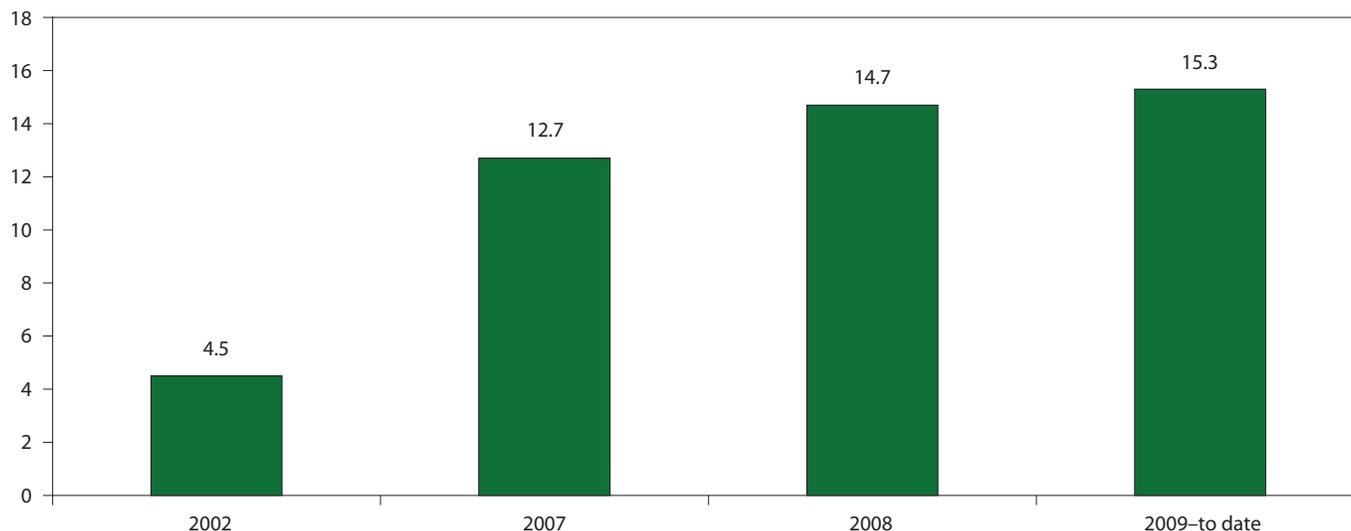
14. The CFTC estimates that about 20 percent of traders in the NYMEX are noncommercial, in the sense that they are financial investors who are not users or producers of oil and are basically betting on the direction of prices. However, this is only an estimate, and the true proportion of noncommercial traders is thought to be considerably higher. See, for example, Masters (2008, 2009).

15. The CFTC plans a major effort to improve the quality and transparency of futures data.

16. Since using net positions can obscure the true relationship between future positions and spot oil prices, an interesting empirical experiment would be to relate spot prices to long and short positions separately.

**Figure 2 Average daily trading volume of oil futures to world oil demand**

ratio of volume of oil futures to world oil demand



Source: Morgan Stanley.

contracts for energy products.<sup>17</sup> This would bring oil in line with the policy of limits the CFTC places on speculative trading in agricultural products like wheat and corn. So far, futures exchanges themselves, principally NYMEX, have been allowed to set their own limits. In an op-ed in the *Wall Street Journal* on July 8, 2009, UK Prime Minister Gordon Brown and President Nicolas Sarkozy of France also expressed concern about “damaging speculation” and called for the International Organization of Securities Regulators to oversee the oil futures market and investigate the role that futures trading plays in oil price fluctuations.

The IMF has rightly argued that if momentum trading—essentially buying commodities that have experienced high returns during some recent period and selling (or shorting) those that have low returns—was driving prices, one would have seen rising inventories of oil,<sup>18</sup> which is a storable commodity. Since oil inventories have not risen, this would reject the possibility of momentum trading. But in the case of oil, one should not draw strong inferences because the data on oil inventories are notoriously poor, with many countries not reporting at all. In particular, most non-OECD countries, which make up a little less than half of world demand for crude oil and include very large consumers such as China, do not report data on oil inventories. Furthermore, oil invento-

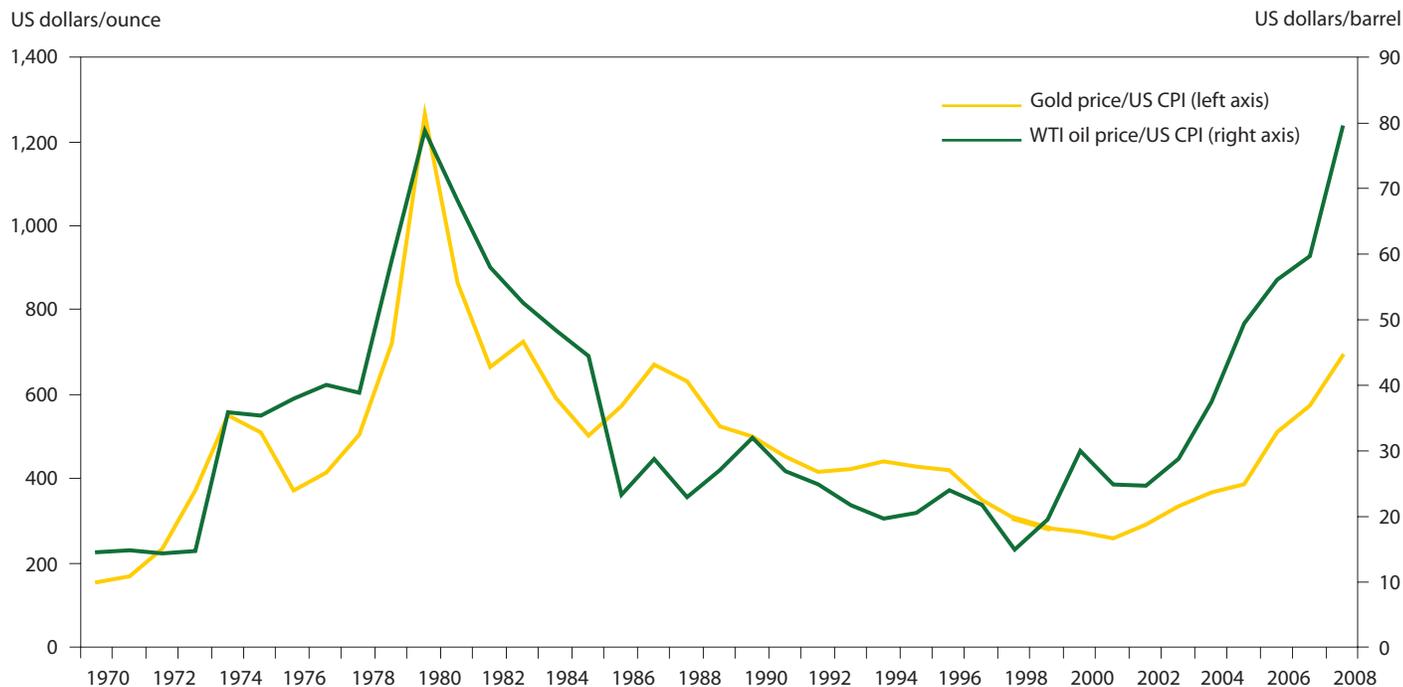
ries do not include oil in tankers, commonly referred to as “oil at sea,” which distorts even the inventories data reported by the United States and other OECD countries. Therefore, even though direct evidence is unavailable, to explain the oil price volatility in 2008 one cannot rule out speculative buying as a cause of the price surge in the first two quarters of the year and the unwinding of positions as a determinant in the subsequent collapse of prices starting in the third quarter.

Another way to get a sense of speculative activity in the oil market is to compare movements in the real price of oil with the real price of gold. This relationship has been surprisingly close for a long time (figure 3). Gold is well known to be a highly speculative commodity, driven by factors other than derived demand (industrial or consumer). One could reasonably argue that the relationship between real gold prices and real oil prices, which continued in 2008, is also evidence of speculative behavior in the oil market. In fact, oil prices rose at a much faster rate than gold prices from about 2002 onwards, with the gap between them in 2008 becoming the largest observed over the period 1970–2008.<sup>19</sup> In the first half of 2008, while real oil prices rose by over 50 percent, real gold prices increased by only about 13 percent. All in all, since 2002, oil seems to have been an asset that was a better bet than even gold for investors. Starting in July 2008, the decline in gold prices was correspondingly less (falling by 19 percent)

17. This follows the call of the US Senate Permanent Subcommittee on Investigations in 2006 for greater regulation of the oil futures market.

18. Or production cuts, with producers keeping the oil under the ground.

19. Since figure 3 uses yearly average data, the 2008 average prices of both oil and gold show up as significantly higher than their respective 2007 average values.

**Figure 3 Real oil and gold prices, 1970–2008**

WTI = West Texas Intermediate  
CPI = consumer price index

Source: International Monetary Fund.

than in oil prices (which fell by about 70 percent), perhaps partly because they had risen far less to start with and partly because gold became a safe haven for investors in an environment of extreme banking and financial system uncertainty.

### LONG-TERM EQUILIBRIUM OIL PRICE

Ideally, if one knew what the long-term equilibrium price of oil was, one could have a baseline against which to compare the actual level of spot prices. If spot prices were significantly above the equilibrium price, which is determined by fundamentals, this would suggest a “bubble.” This then leads to the second question: Did prices overshoot in the first half of 2008 and undershoot thereafter?

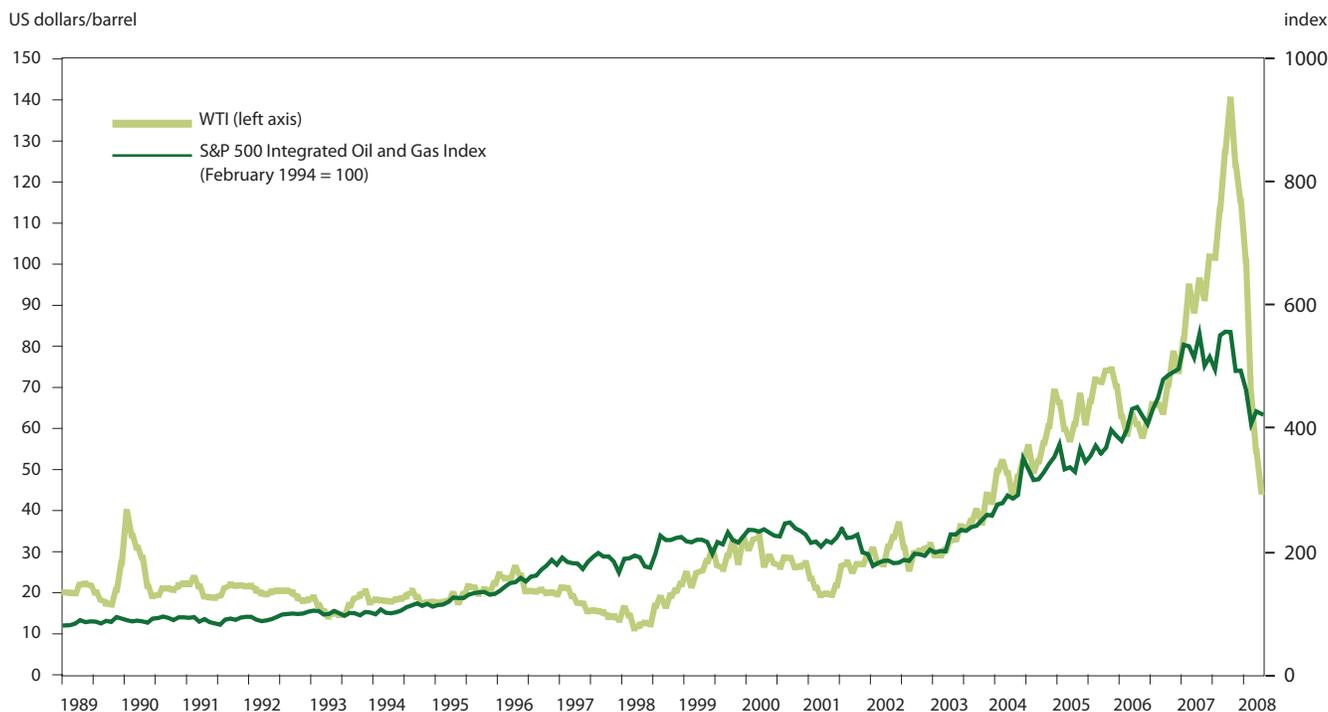
Absent a formal model to determine the equilibrium price of oil, one has to rely basically on the judgment of those who watch the market closely or are active in it. For example, Sheikh Khalifa bin Zayed Al Nahyan, president of the United Arab Emirates, and Saudi Arabian Minister of Petroleum Ali Al-Naimi, both said recently that \$70 to \$75 a barrel represents a “fair” price for both oil consumers and producers. Other OPEC members share this view, and \$70 to \$75 seems to have now been accepted in the market as a kind of benchmark price of a barrel of oil. It is generally believed that a price

much higher than this could have adverse effects on the world economy, and a price much lower would be a disincentive for economizing on oil consumption and developing alternative energy sources.

One possible indicator of an equilibrium price of oil is the market valuation of major oil companies.<sup>20</sup> The market’s valuation of oil companies should respond mainly to changes in long-term oil price expectations. Since proven oil reserves constitute a large part of the assets of these oil companies, an increase in long-term oil prices would lead to higher investments and higher future profits, which would, therefore, be reflected in their equity price. Since valuations are based on long-term price expectations, they will be less volatile than spot prices. Short-term deviations between valuations and spot prices would be temporary, and a bubble would be related to the duration and amplitude of the deviation. Over the long run, however, there should be a close relationship between spot oil prices and market valuations.

The data support this hypothesis to a considerable extent. As shown in figure 4, over the past two decades the spot price

20. Aasim Husain and I first used this indicator in 2008 as a proxy for the long-term price of oil in order to disentangle the temporary and permanent components in oil prices. This is basically the same approach taken by Verleger (2005) in using share values of BP Prudhoe Bay Royalty Trust to back out long-term price expectations.

**Figure 4 Oil and oil-company stock prices, 1989–2008**

WTI = West Texas Intermediate

Source: International Monetary Fund.

of WTI crude has tended to move in tandem with the price of the S&P 500 Integrated Oil and Gas Index.<sup>21</sup> Indeed, oil companies' valuations have exhibited significantly lower short-term cyclical volatility than crude oil prices, and the latter have tended to return to levels consistent with corporate valuations over the medium term.

Past deviations between oil prices and oil company valuations have been associated with temporary shocks to oil demand or supply. During the First Gulf War in 1991, for example, crude oil prices surged while oil equity prices were stable. Similarly, oil prices fell substantially in the aftermath of the emerging-market financial crisis and again following 9/11, while oil company valuations remained broadly stable during both episodes. Again in the second half of 2008, oil prices fell by nearly 70 percent while corporate valuations declined by much less (about 20 percent), generally in line with the decline in stock markets. This pattern is consistent with the idea that corporate valuations in the oil sector do not react to short-term oil price developments and are instead determined mainly by long-term oil price expectations.

21. The index comprises stocks of the following companies (and weights): ExxonMobil (0.47), Chevron (0.21), ConocoPhillips (0.15), Occidental (0.08), Marathon (0.04), Hess (0.04), and Murphy (0.03). The correlation with WTI also holds with equity prices of individual companies such as ExxonMobil and Chevron.

By implication, the steady rise in oil prices during 2003–07, because it was accompanied by a similar increase in oil-company valuations, appears to be “permanent.” On the other hand, the steep hike in oil prices in the first half of 2008, which resulted in a large deviation between crude prices and oil-company equities, appears “temporary,” or a bubble. The long-term, or permanent, component of crude oil prices based on corporate valuations was at that time \$80 to \$90 a barrel, but spot prices were around \$50 higher.

Although the absolute magnitude of the estimated temporary component of oil prices in early 2008 became very large, it was still substantially smaller than some of the peak deviations of the past when scaled by the prevailing long-term oil price. In 1990, for example, oil prices shot up to about twice their long-term level, while in 1998 they fell to about half the long-term trend. In December 2008 the estimated temporary component (actual spot price) was about \$20 a barrel below the permanent component (corporate valuations price).

It should be noted that temporary oil price swings, or bubbles, can vary in persistence. The swing following the emerging-market crisis took two years to reach its peak and another year to unwind, but the spike associated with the First Gulf War was very short lived.<sup>22</sup> The 2008 oil price surge was also reversed

22. As Maugeri (2006) notes, when the United States attacked Iraq on Janu-

quite quickly as the price fell sharply during the last few months of the year to well below the equilibrium price, indicating that it did undershoot substantially and would start to rise toward the equilibrium price. Furthermore, unlike previous episodes, the deviation in 2008 between the spot and equilibrium prices was preceded by a large upward revision in long-term oil price expectations over the previous five years.

## GOING FORWARD

While market fundamentals obviously played a role in the general run-up in the oil prices from 2003 on, it is fair to conclude by looking at a variety of indicators that speculation drove an oil price bubble in the first half of 2008. Absent speculative activities, the oil price would probably have been in the \$80 to \$90 a barrel range.<sup>23</sup> What, then, does the 2008 phenomenon imply for the future? If the market valuations indicator returns to trend, then a price of \$80 to \$90 a barrel is clearly in the cards. In fact, spot prices are already around \$70 a barrel and appear to be climbing back to their 2008 equilibrium level of \$80 to \$90 a barrel, so that day may be fast approaching. Indeed, some forecasters, such as Goldman Sachs, are already revising their projections significantly upward for 2010–11, generally in the \$90 to \$100 a barrel range, which would be somewhat above the equilibrium price as defined here.

The key question is whether another oil price bubble is likely in the future. Naturally, one cannot predict bubbles, as by definition we don't know what causes them in the first place. But it is clear that there will be upward pressure on oil prices in the next year or so as the world emerges from recession, demand for oil picks up again, and inventories fall back to their average or normal levels. Whether this will turn into a 2008-type bubble depends on the degree of speculation in

ary 17, 1991, as part of Operation Desert Storm, crude oil prices fell from \$30 a barrel to \$20 a barrel the very same day. This was largely due to the US announcement that day that it would release 35 million barrels from its Strategic Petroleum Reserves. Furthermore, other OPEC countries committed to making up for the loss of oil production from Iraq and Kuwait and did so during the rest of 1991.

23. This is the price most major oil producers had expected for 2008.

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the oil market. If, as argued in this policy brief, speculation played a significant role in the 2008 bubble, then something will need to be done to control it to prevent the emergence of another bubble in the future. The policies being considered by the CFTC (2009) to put aggregate position limits on futures contracts and to increase the transparency of futures markets are moves in the right direction.

A longer-run danger for the world economy, independent of the speculation argument, is that oil capacity expansion has slowed in 2009,<sup>24</sup> and both national and multinational oil companies are postponing plans to develop new fields and expand existing ones. Even though there is currently a serious push for greater fuel economy and development of alternative sources of energy, it is unlikely that these new technologies will make a significant dent in the demand for oil over the next few years. The International Energy Agency, for example, based on IMF projections of world growth, forecasts world demand for oil to rise by about 0.6 percent a year from 2010 on, reaching 89 mbd by 2014. If supply does not keep up and provide the additional 3 mbd needed by 2014, a serious imbalance between future demand and supply in the world oil market would emerge. A major joint effort on the part of both producers and consumers to correct this potential imbalance, possibly along the lines proposed by Prime Minister Brown and President Sarkozy, involving both capacity expansion and conservation, will be needed over the next few years. Absent such an agreement, and if there is no brake to speculation, a repeat of 2008 could easily occur with spot oil prices soaring above their long-term equilibrium level. Whether this is a high-probability scenario or only a “tail” risk is a matter of judgment, but the signs are there. Unless appropriate policy actions are taken to bring the oil market into long-term balance, and to limit speculation, it may well be that the \$147 a barrel hit in 2008 was not just a once-in-a-lifetime event but rather a harbinger of things to come.

24. For example, OPEC has recently reported that upstream investments planned by member countries over the period 2009–13 have fallen from \$165 billion to \$110 billion–\$120 billion, as these countries revised their oil demand forecasts downwards for the medium and long run. See OPEC (2009).

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