

# OPEC AND THE HIGH PRICE OF OIL

## A JOINT ECONOMIC COMMITTEE STUDY



**Chairman Jim Saxton (R-NJ)**

**Joint Economic Committee  
United States Congress**

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### **Executive Summary**

- **Crude oil is an abundant resource. Production cost in the Middle East is less than \$5 per barrel and even in higher cost areas is nowhere near today's price. A key reason for high oil prices is the artificial scarcity imposed on the market by the OPEC cartel, which controls 70 percent of the world's known oil reserves and restricts how much oil reaches consumers.**
- **OPEC also aggravates price volatility. It cannot manipulate its rate of output to match changing market conditions precisely and thus causes or magnifies swings in the supply and the price of oil. OPEC conceals important industry information and is not forthright in sharing its output plans and price objectives. Transparency International ranks most OPEC members near the bottom of its worldwide corruption index. Given the capital intensity of oil operations, the cartel's behavior increases risk and uncertainty for non-member investors and slows their market responses.**
- **OPEC today barely produces more crude oil than it did in 1977. It held its output quotas below the level it had set in early 1998 until April of 2005. Yet by year-end 2005, OPEC's net oil import revenue will have more than doubled over a 3-year period, reaching an estimated \$430 billion, up from \$193 billion in 2002. Developing countries are paying an increasing portion of this revenue. Non-OECD countries now account for 40 percent of world crude oil consumption.**
- **Rising oil demand from developing countries has been met with output restriction and underdevelopment of oil reserves by OPEC. The resulting dramatic price increases likely are setting in motion market forces that eventually may bring the price down, as happened subsequent to the oil price peaks of the 1970's. In the meantime, OPEC's role in the price escalation should be exposed and not be obscured by misconceptions about oil resource depletion. There is plenty of oil in the ground.**

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# OPEC AND THE HIGH PRICE OF OIL

## I. INTRODUCTION

This paper explores the reasons for high crude oil prices. It finds that the world is by no means running out of crude oil. On the contrary, crude oil exists in great abundance. It also is not very expensive to produce. The cost of producing crude oil in the Middle East is less than \$5 per barrel and even in higher cost producing areas is nowhere near today's price.

A key reason for the high price of crude oil is an artificial scarcity imposed on the market by the Organization of the Petroleum Exporting Countries (OPEC). The flow of oil to the market is restricted through collusion and the underdevelopment of the vast oil resources controlled by the OPEC cartel. The cartel controls 70 percent of the world's known oil reserves but contributes only 40 percent to world oil production.

Since the oil embargo of 1973, the price of crude oil also has been subject to wide swings. The reason is that OPEC has difficulty manipulating its output to fit changing market conditions and compounds the problem with secretiveness. Independent producers are left guessing what OPEC will do next and what market share it will claim. In the capital intensive oil industry this added uncertainty hinders investment decisions and lengthens the lead time of supply responses to a higher price.

Increases in world oil consumption have been driven principally by developing countries in Asia. Asian crude oil consumption has more than doubled since 1985. U.S. crude oil consumption, by comparison, increased just 12 percent in 25 years while the size of the economy more than doubled. Non-OECD (Organization for Economic Co-operation and Development) countries now account for 40 percent of world crude oil consumption.

Until 1998, OPEC used the increase in oil demand to build up its market share. Since the oil price collapse in 1998 that followed the Asian currency crisis, the cartel has redoubled its efforts to preempt price declines and allowed increases in oil demand to push up the price. OPEC today barely produces more crude oil than it did in 1977. It has been sitting on spare short-run capacity as well while the price has soared. It is expected to collect oil revenue of \$430 billion in 2005—\$92 billion more than in 2004 and \$187 billion more than in 2003.

Part II of this paper cites geological estimates of the oil resource on earth and presents data on the amount of proven oil reserves; the concern over an eventual world oil shortage is addressed; and the cost of producing crude oil in different parts of the world is examined. Part III reviews the size of OPEC's oil reserves, its rate of production, the price volatility it has caused since the oil embargo of 1973, the manner in which it manipulates output, and its secretiveness. Part IV addresses non-OPEC production and the effect that OPEC has on it. Part V examines trends in oil consumption in developed and developing countries over time. Part VI analyzes oil price developments since 1998 in detail and discusses secondary market factors often blamed for oil price shocks. Part VII considers the long-run outlook, and Part VIII presents the conclusions.

## II. SUPPLY OF OIL

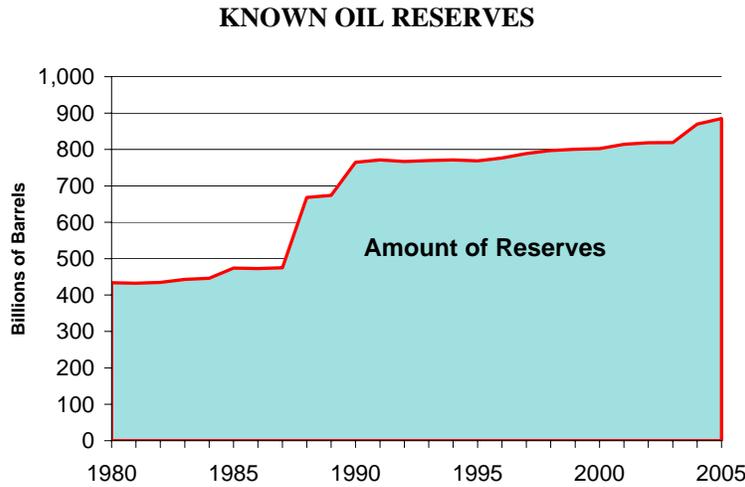
**The oil resource.** Oil exists on earth in different forms and in enormous quantity. The Energy Information Administration (EIA) estimates the world's recoverable conventional oil endowment at 3.3 trillion barrels, i.e., liquid oil in underground reservoirs, of which only 950 billion barrels have been removed in 145 years of production as of 2004. Annual oil consumption in 2004 was 30 billion barrels. At that rate the remaining conventional oil would last another 78 years. In addition, there are more than 4 trillion barrels of oil in the form of so-called oil sands and extra heavy oil, and at least another 2.6 trillion barrels in the form of oil shale.<sup>1</sup>

All this crude oil is not available for immediate consumption. The availability of oil for consumption follows a hierarchy of cost related to the difficulty of finding it, making it accessible and extracting it from the ground. The economic concept of oil supply thus is different from the physical concept of how much oil exists. As an illustration, roughly two-thirds of the conventional oil known to exist in reservoirs traditionally has been abandoned as uneconomic, although that share is shrinking.<sup>2</sup> How much is recovered varies with the price of oil. If the price falls, oil field development will be curtailed. If the price rises, progressively more costly oil will be developed and produced. In addition to price, technology has a major impact on oil supply. Improved survey and recovery methods can increase knowledge about the location and size of oil deposits and reduce the cost of extraction.<sup>3</sup> Geological estimates of the physical oil resource have grown over time as technology advanced. U.S. Geological Survey (USGS) estimates have a history of upward revision.

**Known reserves.** In order to produce oil, detailed knowledge about its location and the structure of deposits must be gathered, wells drilled and pipes laid for collecting the oil lifted from the ground. This activity is referred to as oil field development. The amount of oil that can be produced as a result of a given investment in oil field development is considered a "known" or "proven" oil reserve. The standard for proven reserve estimation is virtual certainty that the oil can be produced economically under existing technical conditions. "Known" reserves can be viewed as a producer's oil inventory in the ground that is drawn down by ongoing production and restocked through incremental oil field development. Known reserves can be bought and sold in-ground.

One approach to measuring whether the supply of oil is keeping up with demand is to track the size of the world's in-ground oil inventory and compare it to the rate of production. In 1980 known oil reserves stood at 645 billion barrels; today they stand at 1.278 trillion barrels. **This means that enough new oil was developed to replace all the oil produced in 25 years and nearly double the reserves.** Figure 1 shows the size of the world's known oil reserves since 1980.

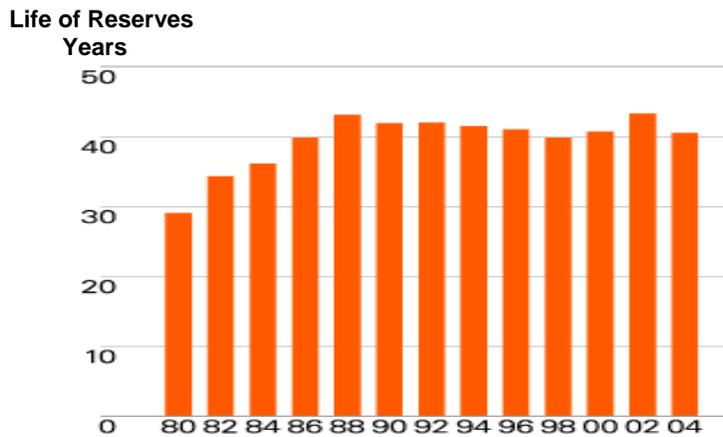
**Figure 1**



Sources: *Oil & Gas Journal*; December 20, 2004; 102, 47 and EIA.

In 1980, the rate of production was 64 million barrels per day (b/d). The known reserves would have lasted for 28 years at that rate, if no new oil had been developed. Much was said at the time about the world running out of oil, because the price was at an all-time high. But, in 2004 the rate of production was 83 million b/d and at that rate today’s reserves would last more than 40 years. Figure 2 shows the history of reserve life expectancy over time, also called the reserves-to-production ratio.

**Figure 2 WORLD OIL RESERVES-TO-PRODUCTION RATIO**



Source: The BP Statistical Review of World Energy, June 2005.

**World oil shortage.** Predictions of a world oil shortage are based on the notion of the oil supply as fixed. They miss the fact that the rate at which the physical oil resource enters the world’s economic oil supply inventory depends on the price and development costs, which in turn depend on the state of technology. Proponents of the so-called peak production theory warn that an increasing rate of production will eventually reach an unsustainable level from which it must decline. They foresee a growing shortage arising after the peak has been

reached.<sup>4</sup> In the first place, this prediction fails to acknowledge that the price system will reallocate consumption among alternative resources long before any one of them run short. The occurrence of a peak in the rate of oil production at some point is to be expected and does not necessarily represent an adverse market event. Production profiles for minerals, commodities, and manufactured products typically increase at first and eventually decline as they are overtaken by substitutes. In the case of crude oil, that may be natural gas. Rather than experiencing a shortage, the world likely will leave a surplus of oil in the ground.

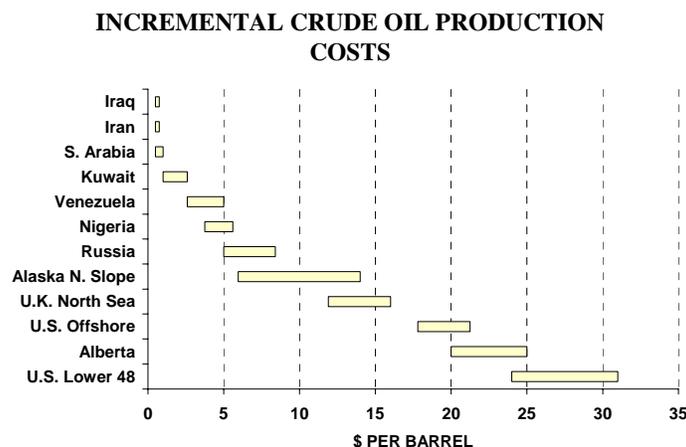
Secondly, the theory denies that there is any elasticity to the supply of oil, that the price mechanism can provide any inducement for increased oil development. Instead, the prediction is premised on a fixed quantity of oil reserves. Yet, while ongoing production obviously reduces the physical quantity of oil in existence, oil reserves have been increasing as shown. **The premise of a fixed oil supply has been proved wrong time and again by experience, as reserve estimates and the timing of production peaks have been surpassed.** Daniel Yergin, chairman of Cambridge Energy Research Associates (CERA), has ventured a guess that the world has “run out” of oil five times already. He also points out that the share of “unconventional oil,” such as oil sands and extra heavy oil, will rise from 10 percent of total capacity in 1990 to 30 percent by 2010.<sup>5</sup> In other words, **oil considered “unconventional” today will become “conventional” in the future.** The EIA shows a history of increasing world oil resource estimates since 1942 when no more than 600 billion barrels of oil were thought to exist on earth.<sup>6</sup> That is less than one-fifth of the current EIA estimate of conventional oil deposits alone. The peak will keep moving to the right for some time to come.

**Costs.** “Lifting” costs refer to costs incurred in operating existing wells to extract oil from developed oil reserves. Persian Gulf wells have the highest flow rates and the lowest lifting cost. Saudi Arabia’s oil minister stated in October 1999, that its cost is less than \$1.50 per barrel.<sup>7</sup> In the North Sea, one of the higher cost producing areas, operating costs have been estimated between \$3 and \$6 per barrel.<sup>8</sup> The EIA shows average direct oil and gas lifting costs (excluding production taxes) worldwide of \$3.87 per barrel in 2003.<sup>9</sup>

The cost measure of greatest significance for the future oil supply is incremental reserve development cost. It represents the cost of creating additional oil reserves and can be thought of as an inventory replacement cost. The “Big Four” Persian Gulf producers Iran, Iraq, Kuwait, and Saudi Arabia, have by far the lowest replacement cost; it has been estimated between \$1 and \$2 per barrel.<sup>10</sup> The U.S., being the most intensely developed oil producing area in the world, faces some of the highest costs among major producers, upwards of \$25 per barrel in the lower 48 states. Figure 3 shows incremental cost ranges for major oil producing countries throughout the world.<sup>11</sup>

The sum of lifting and development costs in much of the Middle East thus falls in a likely range of \$2.50 to \$3.50 per barrel and certainly is below \$5 per barrel. The OECD cites costs in the Middle East of less than \$5 per barrel of oil as does the EIA.<sup>12</sup> The costs cited here do not include taxes, which can be substantial.

Figure 3



Source: Thomas R. Stauffer, "Trends in Oil Production Costs in the Middle East, Elsewhere," *Oil & Gas Journal*, 92, 12 (March 21, 1994): 105-107; selected countries.

Technological advances have made unconventional oil development economical. In 2004, Canada's oil sands production exceeded 1 million barrels per day. Canada's oil sands projects are reported to require a price of oil around \$25 per barrel to be profitable, implying development plus operating costs in that range.<sup>13</sup> **This means that world oil reserves can be replenished and oil produced at a cost of less than \$5 per barrel by the world's low-cost producers, and a cost in the vicinity of \$25 per barrel by high-cost producers in existing oil producing areas.**<sup>14</sup> However, development investments are large in absolute terms and essentially irreversible. This exposes high-cost producers to added risk, especially in a market that is subject to manipulation (see discussion of non-OPEC producers in Part IV.)

### III. THE OPEC CARTEL

**Low cost producers collude openly.** Established in 1960, the Organization of the Petroleum Exporting Countries (OPEC) is an intergovernmental cartel. The member nations own different oil fields and operate production facilities through state-owned oil companies in the Persian Gulf, Africa, South-East Asia and South America. The membership includes Iran, Iraq, Kuwait, Saudi Arabia ("The Big Four"), Qatar, the United Arab Emirates (U.A.E.), Algeria, Libya, Nigeria, Indonesia, and Venezuela. OPEC conducts formal meetings to discuss oil prices and output, share information, and coordinate the market activity of its member countries for the purpose of increasing their oil revenue. In 1982, OPEC started to assign explicit crude oil production quotas to each individual member country (Iraq has not been part of the production agreements since 1998). Previously, the OPEC members had coordinated the offer prices they posted for their crude oil. Professor M.A. Adelman, whose studies of the oil industry span decades, has described the cartel as follows:

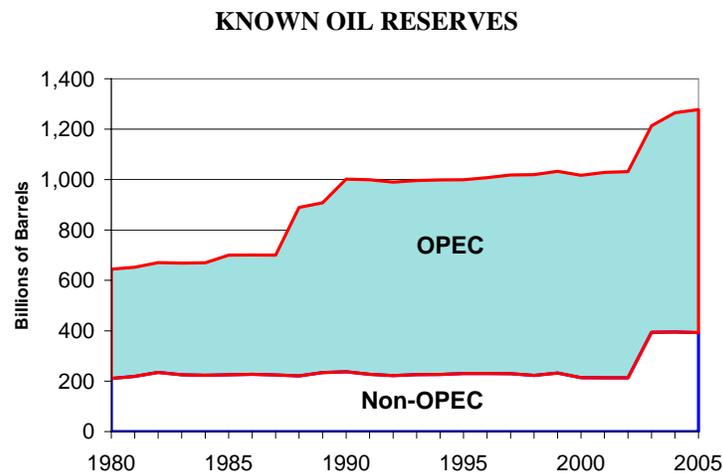
OPEC is a forum whose members meet from time to time to reach decisions on price or on output. Fixing either one determines the other. ... They refrain from expanding output in order to raise prices and profits. ... Because each member's cost is far below the price, output could expand manifold if each producer followed his own

interest to expand output, which would lower prices and revenues. Only group action can restrain each one from expanding output.<sup>15</sup>

Needless to say, if U.S. companies engaged in price fixing and concerted output restriction they would be in *per se* violation of anti-trust laws.

**Holding back the flow of oil.** OPEC has huge known oil reserves. Its reserves are currently estimated at 885 billion barrels versus 393 billion barrels for non-OPEC producers (Figure 4).<sup>16</sup> Yet OPEC releases its oil to the market at an artificially low rate. **OPEC today barely produces more than it did in 1977** when world oil consumption was 62 million b/d whereas consumption is now approaching 85 million b/d. In 2004 OPEC's daily production was 32.9 million barrels compared to 50 million barrels for non-OPEC countries (Figure 5). Non-OPEC production, which was about the same as OPEC's in 1977, has increased by two-thirds since 1977 and today far exceeds OPEC's rate of production. Professor Adelman has observed that **"for lower-cost output to fall or stagnate, while higher-cost output rises, is like water flowing uphill. Some special explanation is needed..."**<sup>17</sup>

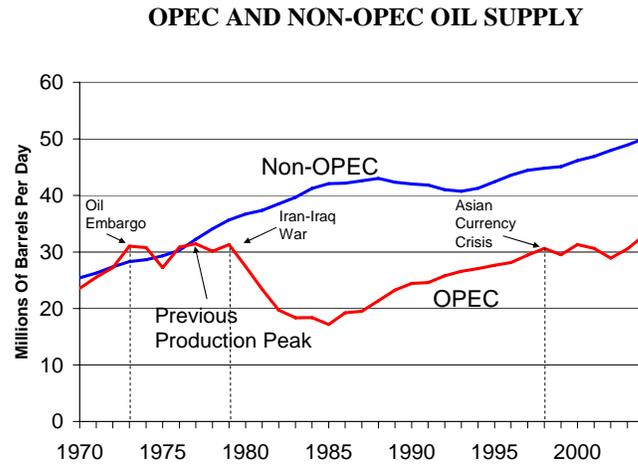
**Figure 4**



Sources: *Oil & Gas Journal*; December 20, 2004; 102, 47 and EIA.

The special explanation is that OPEC holds back output to support the price, whereas producers acting independently sell what they can when the market price exceeds their cost. The OECD concurs, stating that, "OPEC and the reserve-rich producers in the Middle East have incentives to exploit [their] cost advantage by trading off market share for a higher price."<sup>18</sup> Given the large size of its known reserves, OPEC definitely has the ability to increase production substantially. Even OPEC delegates reportedly have indicated that the cartel is capable of raising production by one-third to 44 million b/d by 2009.<sup>19</sup>

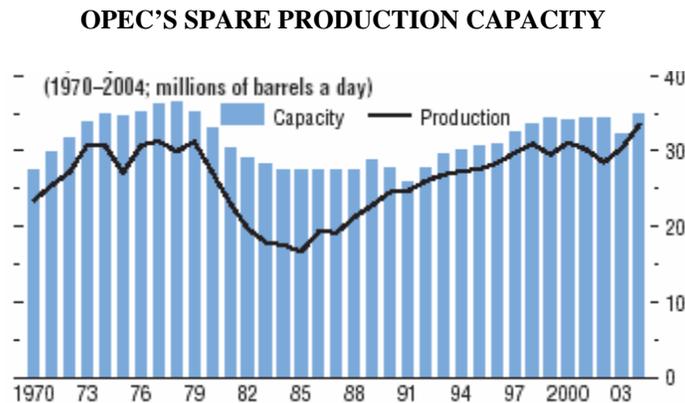
Figure 5



Source: EIA data, Table 4.4, World Oil Supply, 1970-2004.

**Spare capacity.** Moreover, OPEC has had substantial excess short-run production capacity. Figure 6, reproduced from the International Monetary Fund (IMF) April 2005 World Economic Outlook, shows OPEC’s idle production capacity over time.

Figure 6



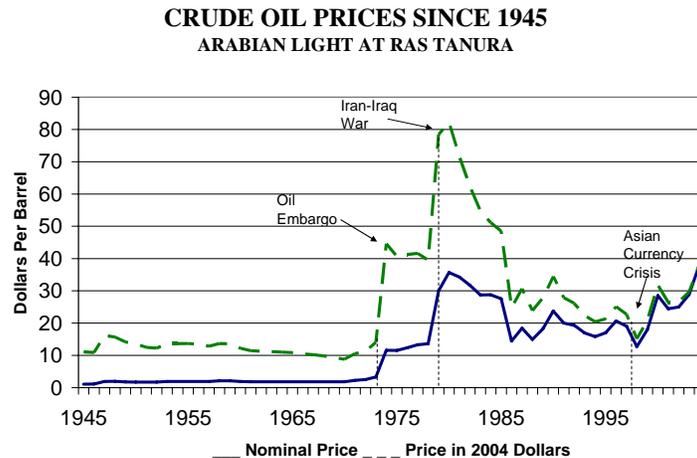
Source: IMF World Economic Outlook, April 2005.

OPEC’s spare short-run production capacity has been viewed as a “safety margin” that can be tapped quickly—within 30 days according to the EIA’s definition—in case of supply disruptions or demand surges and its reported decline as a reason for higher prices. This logic is inverted. **OPEC does not hold excess production capacity for the benefit of oil buyers.** Significant, persistent excess production capacity is an indication of strategic output curtailment. At an average worldwide lifting cost of less than \$4 per barrel, a price of, say, \$20 per barrel would yield more than \$16 in gross margin. Producers who forgo this size margin on any appreciable volume of sales have a strategic motivation. Non-OPEC producers do not hold excess capacity. From the beginning of 2002 to the spring of 2004, the worldwide average crude oil price rose from less than \$20 to \$30 per barrel and also exhibited short-term swings close to ten dollars in magnitude. OPEC was sitting on excess short-run capacity during this period that could have been activated within a month’s time. As the price rose above \$30 per barrel, more of the excess capacity was activated (the gross margin exceeding \$26 per barrel),

but to this day Saudi Arabia is reported to have surplus production capacity of 0.9 to 1.4 million b/d.<sup>20</sup> **This surplus is not being used to lower the price.** In the wake of Hurricane Katrina, OPEC declared its willingness to produce as much oil as needed. As Hurricane Rita gained strength in the Gulf of Mexico, OPEC even announced suspension of its output quotas. But when asked about discounting oil, Saudi Oil Minister Ali Naimi said: “Absolutely not. I don’t want to bring it on the market unless the consumer wants it at the commercial rate.”<sup>21</sup> The commercial rate exceeded \$65 per barrel at the time. Katrina, though more devastating than anticipated, had no adverse effect on the price of crude oil after the fact; the price actually fell because *buyers’* stocks from the Strategic Petroleum Reserve were released to the market. **Thus the price of crude oil will be lower and more stable if spare capacity is held by oil buyers (in the form of oil stocks), not if it is held by oil sellers with monopoly power.**

**Price volatility.** The price of oil used to be low and stable. The price per barrel fluctuated over months, not years and typically by cents or ten cents, not tens of dollars, notwithstanding increasing oil consumption, threatening political events and severe weather conditions. From the end of World War II until the oil embargo of 1973, Arabian Light crude oil sold for less than \$2.50 (about \$10 in 2004 dollars) per barrel in Ras Tanura, the Saudi Arabian Persian Gulf oil terminal. Then came the oil embargo; the price shot up and started to gyrate. Figure 7 shows the history.

**Figure 7**



Source: BP Statistical Review of World Energy, June 2005

**Output manipulation.** OPEC’s effectiveness as a cartel has been questioned because an unstable price could suggest a lack of control over the market. Furthermore, the price had fallen below \$20 per barrel for several years which seemed low compared to the price levels of the 1970’s. However, under changing market conditions it is far more difficult to maintain price or profit targets with output adjustments that are sized and timed correctly than it is to simply push the price above cost. In a dynamic market OPEC cannot go through an output adjustment process only once to get the margin it wants. It has to keep manipulating output and will know only after the fact if it could have driven the price higher or if it caused the price to rise too much. To maximize its profit over time, OPEC must take into account that a price level achieved in the short-run may not be sustainable in the long-run, because demand is more

price sensitive (elastic) in the long-run as is the output of alternative suppliers. Once customers and competitors have had time to react to a higher price, OPEC may have to cut output, accept a lower price, or a combination of both. **Large price swings reveal errors in forecasting and execution, not a lack of power to move the price.**

In the 1970's OPEC misjudged the industrialized world's ability to conserve and find substitutes for oil and drove the price too high. The rate of consumption fell by 6.4 million b/d from 1979 to 1983. At the same time, OPEC underestimated non-OPEC supply. Oil fields in Alaska's North Slope, Mexico, and the North Sea had been discovered and committed to development before the 1973 oil embargo.<sup>22</sup> OPEC reduced its rate of production up to 14 million b/d from 1977 to 1985—a reduction of 45 percent—and managed to hold the market price in a range between \$15 and \$21 per barrel for the most part from 1986 to 1999.<sup>23</sup> World output continued growing, because the price remained above the incremental cost of non-OPEC producers. Had there been no cartel action to prevent it, the price would have fallen back down to OPEC members' cost.

OPEC's internal management problems further complicate the execution of joint output plans. Holding back output cooperatively is difficult, because each producer's incentive individually is to expand output when the price exceeds cost. Professor James L. Smith of the Southern Methodist University provides a most apt description of the cartel: "OPEC acts as a bureaucratic syndicate; i.e., a cartel weighed down by the cost of forging and enforcing consensus among its members, and therefore partially impaired in pursuit of [its] common good."<sup>24</sup> Professor Adelman is blunter: "Since cooperation is usually difficult, reluctant and slow, members' output overshoots or undershoots the demand. Prices are volatile not because of methods of production or consumption, but because of the clumsy cartel."<sup>25</sup>

A study released in June 2005 by the Federal Trade Commission (FTC) confirms that OPEC has tried to cut or increase production to enforce a price band of \$22 to \$28 per barrel. The FTC concludes that while these efforts were only sporadically effective, OPEC "has been successful in exercising a significant degree of market power and in obtaining prices above competitive levels." *The Economist* reports that OPEC cleverly reduced its quotas to stop prices from softening whenever oil stocks in OECD countries started rising.<sup>26</sup>

**Monopoly profits.** Indeed, OPEC has collected enormous monopoly rents since 1973. In 2003, *The Economist* cited a study that estimated the wealth transfer from American consumers to oil producers at more than \$1 trillion since the 1973 embargo, because the oil price has been held above the competitive level.<sup>27</sup> According to the EIA, OPEC collected \$193 billion in net oil export revenues in 2002, \$243 billion in 2003, \$338 billion in 2004, and will collect an estimated \$430 billion in 2005; that represents a 123 percent increase in just three years on a 17 percent increase in OPEC's average rate of oil production.<sup>28</sup> **Stable or not, high oil prices are hugely profitable for OPEC and they are kept high only by collusion.** Addressing the Houston Forum in October 1999, Ali I. al-Naimi, Saudi Arabia Minister of Petroleum and Mineral Resources, stated that "one thing is for sure: Saudi Arabia cannot accept a low oil price. Yet it cannot defend the world oil price all by itself, it can do so only in cooperation with other producers. We have tried doing it alone in the past and it did not work."<sup>29</sup>

**Secretiveness.** Among the troubling characteristics of OPEC is its lack of transparency. It does not permit outside inspection of its reserves or production facilities, does not release timely, accurate output data and does not reveal its future output plans or price targets. Inadequate information from OPEC renders industry data incomplete and forecasts highly unreliable.<sup>30</sup> This adds unnecessary uncertainty that can misdirect investment decisions and set off or exacerbate speculative forces in the oil market. Born from internal posturing and cheating relative to the cartel's quota allocations, the OPEC member's aversion to transparency serves no positive purpose. **Secretiveness fosters duplicity in the members' dealing with each other and with the outside world.** Transparency International's Corruption Perceptions Index 2005, surveyed 159 countries and rated them on a corruption scale from 0 (most) to 10 (least). It shows nine OPEC countries with a score below 5 and of those seven have a score less than 3.<sup>31</sup>

#### IV. NON-OPEC PRODUCERS

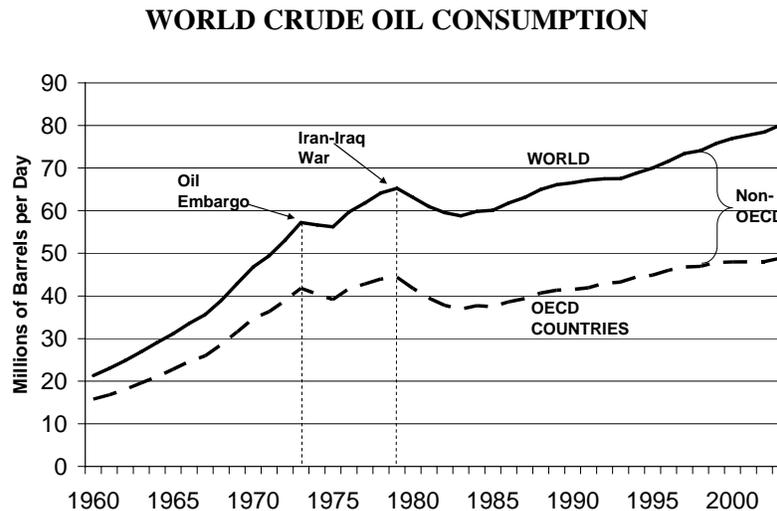
Crude oil is sold in standardized grades on a world market. Individual oil producers typically do not account for enough supply to move the market price to their advantage. They are price takers. Hence they operate close to their short-run pumping capacity. With the upper bound of operating costs estimated at \$6 per barrel, producers who take the market price as given would leave highly valuable output in the ground, if they do not operate their wells at capacity. Each well is subject to a declining flow rate which steadily raises a well's operating cost per barrel of oil produced. When a well's operating or lifting cost exceeds the market price, it is capped. Short-run output flexibility is provided by the rate at which aging wells are shut down, which depends on the market price.

Non-OPEC producers will respond to a rising oil price by keeping older wells operating longer and by drilling new ones. But **upfront investment in new production is essentially irreversible.** Since investors know that OPEC can move the price up as well as down but do not know what its plan is, they are more hesitant to invest than they would be if the market were not subject to manipulation. **The heightened uncertainty can delay an adequate supply response to a rising price.** By the same token, once new supply capacity is in place it takes an exceedingly low price (below operating cost) to shut it down. According to Adelman, "Oil prices fluctuate more because betting on price must include calculations about not just supply and demand, but also about OPEC's quota decisions, plus the members' fidelity to their promises. Hence, the world oil market is less predictable, more volatile, and more herky-jerky."<sup>32</sup> The IMF World Economic Outlook concludes: "The unpredictability and volatility of oil prices also has deleterious effects on investment in the oil sector. ... The impact of price volatility on investment could generate a vicious cycle whereby low or delayed investment activity could in turn add to price volatility."<sup>33</sup> Claude Mandil, Executive Director of the International Energy Agency (IEA), in an article dated June 29, 2005 and posted on the IEA website, has called for OPEC governments to announce clearly their programs and schedules for new capacities.<sup>34</sup> They have not done so.

## V. DEMAND FOR OIL

**Economic growth.** Oil is needed for industrial production, electric power generation, and transportation. In the developed countries, oil demand from all three was increasing rapidly prior to 1973. But the oil price spikes of the 1970's caused the OECD countries to curtail their demand for oil through input substitution and conservation. Industry and utilities in substantial measure have shifted to other energy sources (e.g., natural gas). The transportation sector was forced to conserve fuel through minimum mileage requirements for cars in the U.S. and high gasoline taxes in other countries. World oil consumption fell as a

Figure 8

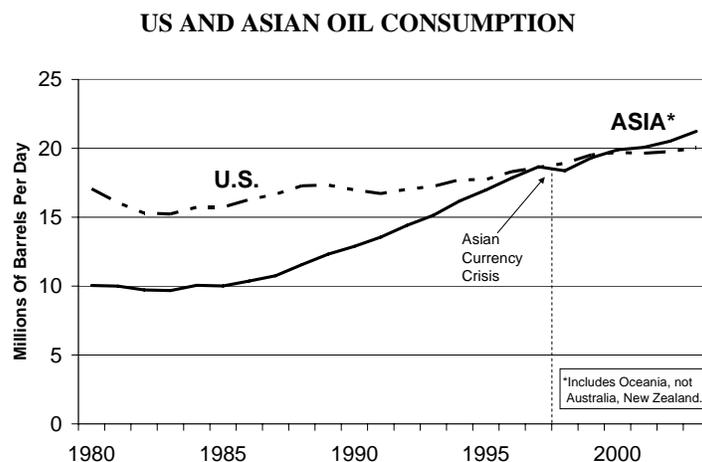


Source: EIA data; Table 11.10, World Petroleum Consumption, 1960-2003.

result and even substantial economic growth in OECD countries thereafter caused it to rise only gradually. **Since 1979, U.S. crude oil consumption increased by 12 percent in which time the nation's real GDP more than doubled.** Figure 8 shows the much lower trajectory of OECD oil consumption since the 1980's compared to the period prior to the embargo. In non-OECD countries meanwhile, economic growth has led to greater increases in oil consumption. **In 1973 non-OECD countries accounted for 27 percent of world oil consumption; in 2003 they accounted for 40 percent.** Developing economies are much less energy and oil efficient than the more developed economies and their growth is more oil dependent. The People's Republic of China (PRC), for example, is less than half as efficient in the use of oil per unit of GDP as the OECD average.<sup>35</sup> Some countries actually subsidize the use of oil domestically to mitigate the adverse impact of high oil prices on their economy.<sup>36</sup>

**Asian demand.** Economic development in Asia is a major new force in the world, and its oil consumption accounts for most of the increase. Figure 9 shows the steep rise in Asian consumption. It overtook U.S. crude oil consumption first in 1997 and, after the Asian currency crisis had set it back temporarily, again in 2000.

Figure 9



Source: EIA data; Table 1.2, World Petroleum Consumption, 1980-2003.

Of the 4.8 million barrel increase in daily world oil consumption from 2001 to 2004, 3.29 million (69 percent) came from non-OECD countries and 2.32 million (48 percent) came from non-OECD countries in Asia. The new demand has been coming primarily from the PRC and India. From 1990 to 2003 the shares of oil consumption by the three largest oil consuming nations in Asia changed dramatically: The PRC's share rose from 18 percent to 26 percent, India's share rose from 8.5 percent to 10.5 percent, and Japan's share of oil consumption fell from 38 percent to 25 percent. The PRC is now the largest oil consuming nation in Asia.<sup>37</sup>

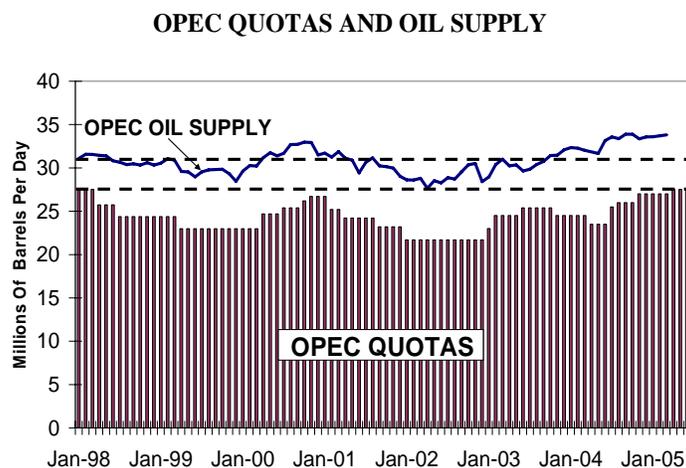
## VI. ANALYSIS OF OIL PRICE DEVELOPMENTS SINCE 1998

**OPEC reclaims market share.** Growing Asian demand helped OPEC to boost its oil production and market share from their 1985 levels without causing the price to decline further. The steep rise in Asian oil demand starting in 1986 (Figure 9) coincides with the recovery of OPEC's rate of production (Figure 5) and market share, which increased from 29 percent in 1985 to 40 percent by 1994. In 1997, OPEC committed a miscalculation, however, and suffered a severe setback. It raised its production ceiling substantially by 2.5 million b/d in anticipation of further demand growth from Asia, but it guessed wrong.<sup>38</sup> The currency crisis of late 1997, instead, caused Asian demand to fall. The result was a market price that dipped below \$10 per barrel for the first time since 1973, and a \$51 billion year-over-year reduction in oil revenue.

**OPEC restrains output, price rises.** OPEC quickly lowered its output quotas and kept them below the level adopted in December 1997 for the next seven years. This despite the fact that world oil consumption recovered and in 1998 was higher than in 1997. The attacks of September 11, 2001 caused oil demand to fall, but world oil consumption was still 4.3 million b/d higher in 2002 (78.4 million b/d) than it had been in 1998 (74.1 million b/d). Yet OPEC cut its quotas for all of 2002 to a level 5.8 million b/d below that of December 1997 (21.7 vs. 27.5 million b/d). Its market share fell to 37.6 percent. World oil consumption subsequently accelerated, increasing by 1.5 million b/d from 2002 to 2003 (to 79.9 million b/d), and by 2.6 million b/d from 2003 to 2004 (to 82.5 million b/d). OPEC finally raised its quotas in 2003

and regained market share, but it subsequently lowered its quotas again. Figure 10 shows OPEC's quota adjustments and oil supply since 1998.

**Figure 10**

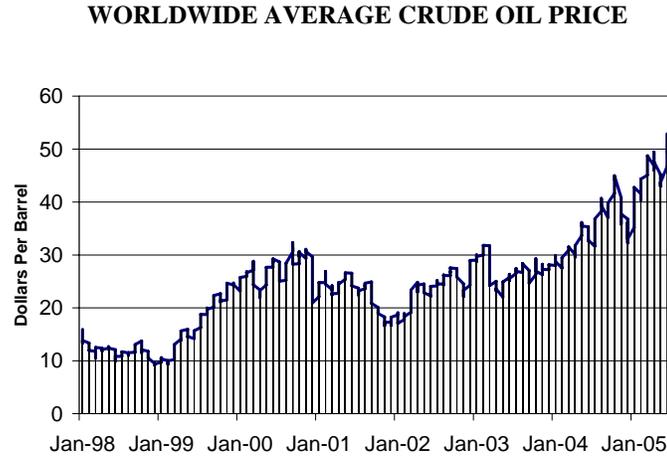


Source: EIA, World Oil Supply, 1997-Present, Table 1.4, and data provided by EIA.

As late as April 2004, OPEC reduced its quotas to 23.5 million b/d, and in December 2004, it resolved to cut back member output that was exceeding its quotas.<sup>39</sup> Prices had been in the mid-\$30s per barrel in December 2004; by the last week of January 2005, they exceeded \$40 per barrel and continued to climb. Only in April of this year did OPEC bring the quotas back up to the level in effect at the beginning of 1998. It finally raised its output ceiling by another 0.5 million b/d effective July 1, 2005. On June 25 of this year OPEC's president was quoted by *The Wall Street Journal* as saying that there was a need to observe price further before raising the production ceiling again. The price for West Texas Intermediate crude oil had just reached \$60 per barrel.<sup>40</sup>

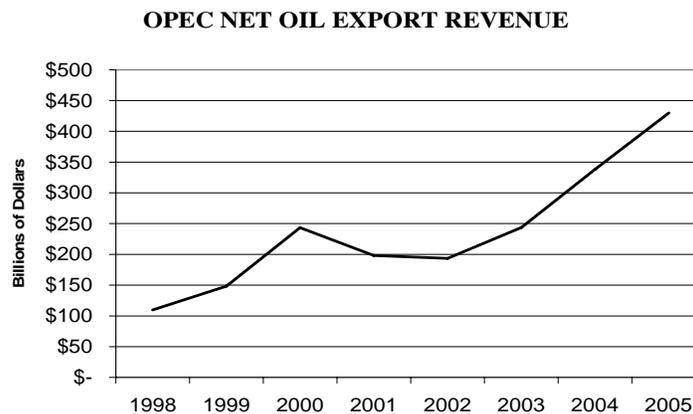
OPEC's quotas are set for crude oil only. Total oil supply consists of lease condensate, natural gas plant liquids, and refinery processing gain in addition to crude oil. Because of these additional components and deliberate overproduction by some members, OPEC's total oil supply exceeds its quotas. As Figure 10 shows, total OPEC supply nevertheless correlates to the crude oil quotas and was held below or close to its 1998 level until 2004 when it moved modestly higher. In 2004, world oil consumption had grown to 82.5 million b/d and the price had been rising almost continuously since early 2003.

When demand increases and sufficient additional oil is not offered to fully accommodate the increment, buyers will allocate among themselves what quantity is available by bidding the price up. Since 1998, OPEC has managed its rate of oil production so that when demand increased it would not be fully accommodated and the price was bid up. Figure 11 shows the upward trend in the average crude oil price.

**Figure 11**

Source: Data supplied by EIA.

There were brief phases when the demand for crude oil declined, which may have prompted concern by OPEC that Asian demand would recede again. It is possible that OPEC's members also have been slow to invest in capacity expansion for this reason. But this is speculation. OPEC shrouds its oil industry in secrecy. It is not known to what extent the cartel's conduct has been shaped by an overly cautious strategy to prevent another price collapse or by a deliberate plan to bring about a higher price.

**Figure 12**

Source: OPEC Revenue Fact Sheet, EIA, and data supplied by EIA.

**The fact is that the price of oil did not have to rise.** OPEC members hold more than enough oil reserves to satisfy increases in demand, and in the Middle East it costs less than \$5 per barrel to produce more oil. Despite yearly increases in world oil consumption, OPEC kept its rate of output in a narrow range for seven years. As a result, the price went up and OPEC reaped huge revenue increases. **OPEC's net oil export revenue increased by \$50 billion in 2003, \$95 billion in 2004, and \$91 billion in 2005.** Figure 12 shows OPEC's revenue since 1998.

**Other explanations for high oil prices.** An inadequate supply side response to increasing demand magnifies the price impact of any disturbance that lessens, even minimally, the amount of oil available for purchase. In the short-run, input substitution typically is a very limited option, which makes oil buyers willing to bid the crude oil price up disproportionately to try to meet their requirements (demand is highly inelastic). This raises concerns over events that normally would not move the price of oil on the world market, such as accidents or labor strikes somewhere in the oil supply chain. Supply disruptions of larger magnitude also are usually compensated for in short order in an unfettered market. Natural disasters, terrorist attacks or production problems in a major oil producing country certainly can have an effect on the price of oil but it does not last very long. **Supply shocks occurred prior to the oil embargo of 1973 as well, but they were absorbed so quickly that annualized price data shows virtually no variation** (see the nominal price line in Figure 7). It is useful to recall the complaint by Mr. Ali I. al-Naimi that Saudi Arabia—the largest oil producer in the world—cannot hold up the market price of oil by itself, which strongly suggests that no other country can either, whatever the particular circumstances. The reason for high oil prices is the ongoing, collective restriction of the oil supply by the cartel members, not isolated events.

**Refinery “bottlenecks.”** OPEC has claimed that insufficient refinery capacity is linked to high crude oil prices.<sup>41</sup> This is not logical. Refineries process crude oil. If they are operating at full capacity, then the rate at which they can use unprocessed crude oil has reached a limit and they will not bid the price up to buy more. On the other hand, if OPEC were to bring more crude oil on the market, that would lower the price.

Different grades of crude oil require different types of refining capacity. In the short-run, imbalances can arise that may cause price differentials among different crude oil grades to widen temporarily. This has occurred with respect to lower sulfur (sweet) and higher sulfur (sour) crude oil grades. But refiners in time adapt their facilities to changes in the relative price of different quality grades. The dramatic upward price trend in all crude oil grades cannot be explained by limitations in all or some types of refining capacity.

**OPEC’s output restriction expected to continue.** When an increase in oil scarcity is perceived to be temporary, the spot price of crude will rise but oil futures prices for long term delivery will not. Crude oil delivery prices exceeding \$50 per barrel extend to 2011. This timeframe is longer than it takes to drill more wells and increase production capacity. Saudi Arabia earlier this year embarked on a \$50 billion program to expand its petroleum industry over the next five years to 2010.<sup>42</sup> OPEC has indicated that it could increase production by 11 million b/d by 2009. Daniel Yergin of Cambridge Energy Research Associates (CERA) recently stated that “between 2004 and 2010, capacity to produce oil (not actual production) could grow by 16 million barrels per day—from 85 million barrels per day to 101 million barrels a day—a 20 percent increase. Such growth over the next few years would relieve the current pressure on supply and demand.”<sup>43</sup> The CERA forecast is based largely on projects already under development that had been approved in the 2001-2003 timeframe with lower price expectations than current prices. The forecast implies a 3 percent average annual compound growth rate of capacity. Since 2001, world oil consumption has been increasing at an average annual compound growth rate of 2 percent. How can oil futures prices remain so high then? Yergin goes on to say that the capacity growth is “pretty evenly divided between

OPEC and non-OPEC.” Therein lays the answer. If OPEC does not fully utilize its capacity, then incremental production could be as much as halved and prices would stay high. The International Energy Agency (IEA) warns that oil-rich Middle East governments may constrain energy-production investment in a quest for higher prices.<sup>44</sup> OPEC has a history of holding back production to support the market price and it could continue to do so, compensating for non-OPEC supply increases. As Phil Verleger of the Institute for International Economics and *The Economist* put it: **“Investors [in oil futures] believe the OPEC cartel will cut output to stop prices falling.”**<sup>45</sup> If demand continues to grow sufficiently, OPEC may even have room to raise its production at a controlled pace while prices remain high or are pushed higher. The OECD puts it this way: “The less elastic global oil demand and non-OPEC supply are in the long-run, the greater are OPEC’s incentives to restrict output and thus raise prices in the face of rising world demand.”<sup>46</sup>

## VII. THE LONG-RUN

Oil futures prices of more than \$50 per barrel for delivery as late as six years hence point to a scenario in which strong demand growth from developing economies continues to strengthen OPEC’s pricing power. However, the longer the timeframe considered, the greater the price elasticity of global oil demand and of non-OPEC supply is likely to be. **Seven years was the timeframe from the oil embargo (1973) to the oil price peak (1980). Thereafter the price plummeted.** Oil sands production today is at a beginning stage, just as Alaskan and North Sea production had been in the 1970’s. The use of oil in developing nations is relatively inefficient and also may experience improvements similar to those in more mature economies. Moreover, new technologies in the oil intensive transportation sector, for example hybrid electric vehicles, are gaining acceptance and could be deployed throughout the globe, not only in developed countries.<sup>47</sup>

Since the Asian currency crisis, OPEC has reduced output at any sign of softening demand. It has increased output only gradually when demand has risen. This strategy indicates preoccupation with price in the near term, not with long-run forces mobilized by large margins over incremental development cost. The market price has moved far beyond the \$22 to \$28 per barrel price band OPEC once sought to maintain. It appears that OPEC’s members have been adjusting upward their view of what the long-run sustainable crude oil price is along with the upward movement of the spot market price. In June of this year, OPEC’s ministers reportedly indicated that they would “like to see” a price below \$50 per barrel, but there was no consensus on how much lower, though not below \$30.<sup>48</sup> More recently some OPEC officials are said to believe that the market may support a price well above \$50 per barrel.<sup>49</sup> The enormous revenue increases for OPEC brought on by the price surge—from \$338 billion in 2004 to an estimated \$430 billion in 2005 alone—provide a powerful inducement for members to regard a high price as the “right” price. It will be difficult for OPEC’s members to change their bias toward underproduction when it has resulted in growing riches. **This could portend continuation of high prices for the next several years and a subsequent recurrence of the price decline seen after 1979.**

## VIII. CONCLUSION

The world is not running out of oil. Crude oil is an abundant resource. The rate at which it enters the world's economic oil supply inventory depends on the price, development costs, and technology. The supply of oil therefore is not fixed, and known oil reserves, in fact, have been increasing.

Unfortunately, the price of oil bears no relation to the scarcity of oil in the ground or to the cost of getting it out of the ground. The OPEC cartel controls 70 percent of the world's known oil reserves and manipulates how much oil reaches consumers. It imposes an artificial scarcity on the market that elevates the price manyfold above Middle East production cost of less than \$5 per barrel and far above the cost of other producing areas as well.

The market price of oil is also highly unstable, because the cartel is not able to accurately anticipate market changes and administer compensating output adjustments. In the short-run, OPEC commits errors in timing and sizing its output changes that set off price gyrations. In the long-run, it has underestimated the elasticity of oil demand and of non-OPEC oil supply. In the 1970's it drove the price up over several years but then had to accept years of price declines. As a result, price trends do not even convey *changes* in the true scarcity of oil.

The effect of the price distortion is worsened by OPEC's secretiveness. The lack of transparency has no benefit to the cartel as a whole and is associated with cheating and corruption. Other market participants lack crucial market information including what price OPEC intends to support and what market share will be left for them. Especially in a capital intensive industry this delays appropriate investment responses from independent suppliers and aggravates price volatility.

Most of the increases in oil demand since the late 1980's have come from developing countries in Asia. Currently 40 percent of world oil production is consumed and paid for by non-OECD countries, up from 27 percent in 1973. One aspect of this shift in demand is that developing countries increasingly are paying for OPEC's enormous profits. The EIA estimates that in 2005 alone OPEC's net oil revenue will be \$430 billion.

Rising demand, on the whole, allowed OPEC to sell more crude oil without lowering the price prior to 1998 and, after the Asian currency crisis, to maintain its sales volume at progressively higher prices. OPEC's output quotas were the same in March 2005 as they were in early 1998. Going forward, if demand continues to grow, OPEC may be able to keep the price high. Oil futures prices are above \$50 per barrel for delivery dates to 2011, which is beyond the timeframe it would take to bring substantial production increases online. OPEC is hinting that it may support prices far above the \$22 to \$28 per barrel range it tried to maintain in years past.

However, significant developments on the demand and the supply side of the oil market are taking hold and could gain momentum (among them hybrid electric vehicles and unconventional oil production). The inflation adjusted historical crude oil price peak occurred seven years after the oil embargo of 1973 when OPEC first imposed dramatic price increases.

After the peak, the price commenced a long, steep decline as input substitution, conservation measures, and increased non-OPEC production lessened OPEC's pricing power. The world may be in the first phase of another such cycle.

Of course, the world could pressure OPEC to produce more oil and provide more information about its oil fields and production plans, if not to dismantle the cartel. The first step is to dispense with misleading representations of oil resource depletion and to place in proper perspective short-run disturbances to the oil supply outside the cartel. Secondly, as a cause for high prices, less emphasis should be placed on increases in oil demand, which, after all, emanate from long awaited economic development in poor countries. Instead, OPEC's restrictive output policy, large reserves, low costs, and surging revenues should make the most headlines: "OPEC's output barely higher than in 1977;" "Mid-East production cost less than \$5 per barrel;" "OPEC to collect \$430 billion in 2005—up \$187 billion in two years." The Third World will need more oil for economic growth. It would benefit greatly from more responsible policies on the part of the world's reserve-rich, low-cost oil producers.

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#### Notes:

<sup>1</sup> The 3.3 trillion barrel estimate was generated by the Energy Information Administration (EIA) from the U.S. Geological Survey (USGS) 2000 Petroleum Assessment and other federal government sources; see Guy Caruso, "When Will World Oil Production Peak?" 10<sup>th</sup> Annual Asia Oil and Gas Conference, June 13, 2005, p.8, <http://www.eia.doe.gov/neic/speeches/main2005.html#June>; Pete McCabe, senior USGS geologist cites cumulative oil production of 952 billion barrels as of 2004, "USGS Official Upbeat About Oil Reserves Outlook," *Oil & Gas Journal*, 103, 16 (4/25/2005): 32; the oil shale estimate is taken from Sam Fletcher, "Industry, U.S. Government Take New Look at Oil Shale," *Oil & Gas Journal*, 103, 15 (4/18/2005): 26.

<sup>2</sup> The amount of oil abandoned is not included in the 3.3 trillion barrel estimate. For a schematic on recoverable oil estimation with a hypothetical conventional 6 trillion barrel oil-in-place resource base, see John H. Wood, Gary R. Long, and David F. Morehouse, "Long Term World Oil Supply Scenarios," posted August 18, 2004, p.3; [http://www.eia.doe.gov/pub/oil\\_gas/petroleum/feature\\_articles/2004/worldoilsupply/oilsupply04.html](http://www.eia.doe.gov/pub/oil_gas/petroleum/feature_articles/2004/worldoilsupply/oilsupply04.html); see also Edward D. Porter, "Are We Running Out of Oil?" American Petroleum Institute (API), Discussion Paper #081, December 1995, which refers to an original conventional oil-in-place resource base between 6 and 8 trillion barrels and provides information on increasing recovery percentages.

<sup>3</sup> To those who waive off blind faith in technology, a recent graphic in the *Wall Street Journal* may be instructive. It shows a survey ship atop the ocean sending seismic signals below to explore for oil beneath the ocean floor. The ocean is about 2 1/3 miles deep; the signals reach to a depth another five miles below the ocean floor. In October 2003, Unocal announced finding oil after drilling a well in the Gulf of Mexico through water and rock to a depth of 35,966 feet. That distance is the cruising altitude of jet aircraft. "Deep Drilling in the Gulf," *Wall Street Journal*, June 23, 2005.

<sup>4</sup> This view draws on the bell-shaped production profile made famous by M. King Hubbert, a geologist who predicted the production peak for the continental U.S. The profile derives from the declining flow rate of producing oil fields due to diminishing natural underground pressure. Hubbert's model greatly underestimated U.S. production in total, mainly because it fails to account for secondary and tertiary recovery methods (see Porter, *Are We Running Out of Oil?*). The peak production theory as such is a truism. Given the assumption of a fixed quantity of recoverable oil, an increasing rate of production must lead to a peak and a subsequent decline, more or less abrupt depending on the steepness of the upswing.

<sup>5</sup> Daniel Yergin, "It's Not the End of the Oil Age," editorial, *Washington Post*, July 31, 2005.

<sup>6</sup> Guy Caruso, *When Will World Oil Production Peak?*, 5.

<sup>7</sup> “Saudi Oil Policy Combines Stability with Strength, Looks for Diversity,” *Oil & Gas Journal* 98, 3 (January 17, 2000): 17. The statement refers to “full” cost, but the context indicates operating cost.

<sup>8</sup> Thomas R. Stauffer, “Trends in Oil Production Costs in the Middle East, Elsewhere,” *Oil & Gas Journal*, 92, 12 (March 21, 1994): 107

<sup>9</sup> Performance Profiles of Major Energy Producers 2003; <http://www.eia.doe.gov/emeu/perfpro/ch1sec5.html>.

<sup>10</sup> Thomas R. Stauffer, “The Economic Cost of Oil and Gas Production: A Generalized Methodology,” *The OPEC Review* 28, 2 (June 1999): 192.

<sup>11</sup> Worldwide cost studies of more recent vintage have not been found, but the EIA’s data on foreign finding costs per barrel of oil equivalent (boe) show that costs have remained stable since 1994. Finding costs are the exploration, development, and property acquisition costs of replacing oil and gas reserves removed through production. The three-year average foreign cost computed by the EIA, in real terms, has moved between \$5 and \$6 per barrel from 1994 to 2003, except in 1996 when it was \$4.73. Prior to 1994, finding costs had been higher. In the U.S. costs have risen since 1999. “Behind the Bottom Line, Finding Costs,” EIA, <http://www.eia.doe.gov/emeu/perfpro/fig16.gif>. However, as an absolute measure finding costs per boe are problematic, because the data comes only from U.S. companies subject to the EIA’s Financial Reporting System (FRS) and for the reasons given in note 14 following.

<sup>12</sup> OECD Economic Outlook, Vol. No. 76, December, 2004/2, p.123; “Oil Production Expansion Costs For The Persian Gulf, 1994-2010,” EIA, January 1996, Table 6 and author’s calculations.

<sup>13</sup> Canadian Association of Petroleum Producers, “Canadian Crude Oil Production and Supply Forecast, 2004-2015,” p.5; Sam Fletcher, “N. American Unconventional Oil a Potential Energy Bridge,” *Oil & Gas Journal*, April 11, 2005; 103, 14, p.25; Tamsin Carlisle, “A Black-Gold Rush in Alberta,” *Wall Street Journal*, September 15, 2005; Bernard Simon, “Safe Deposits? Canada’s Oilsands Can Give Much of the World a Fresh Energy Source,” *Financial Times*, November 8, 2005; Justin Blum, “Where Oil Is Mined, Not Pumped,” *Washington Post*, June 15, 2005.

<sup>14</sup> The cost of exploration per barrel of oil in new areas is difficult to isolate and assign properly because (a) most “new” areas are extensions of existing oil fields, (b) time lags in oil discovery and development complicate exploration cost assignment to production volume, and (c) oil and gas tend to occur together but in variable proportion. Oil sands development requires essentially no exploration. Combining exploration costs for oil and gas to arrive at a definitive cost measure per barrel of oil equivalent (boe) is problematic. See M.A. Adelman, *The Genie out of the Bottle, World Oil since 1970*, (MIT Press, 1995), 20 and 37, for a critique of this measure. In any event, according to its oil minister, Saudi Arabia’s cost of finding new reserves is less than 10 cents per barrel (*Saudi Oil Policy*).

<sup>15</sup> M.A. Adelman, “The Real Oil Problem,” *Regulation* (Spring 2004): 20. M.A. Adelman is professor of economics emeritus at the Massachusetts Institute of Technology.

<sup>16</sup> “Annual Special World Wide Report,” *Oil & Gas Journal*, 102, 47 (December 20, 2004); EIA presents but does not certify foreign reserve estimates.

<sup>17</sup> M.A. Adelman, “World Oil Production and Prices 1947-2000,” *The Quarterly Review of Economics and Finance* 42 (2002): 169. Professor Adelman provides a thorough discussion of the OPEC cartel, its output manipulation and its effect on price in this article.

<sup>18</sup> OECD Economic Outlook, Vol. No. 76, December, 2004/2, p.123.

<sup>19</sup> Carola Hoyos, “West Told Oil Demand is Too Much for OPEC,” *Financial Times*, July 7, 2005.

<sup>20</sup> EIA, Table 3a, OPEC Oil Production; Reuters quotes OPEC’s president stating that OPEC has spare capacity of 2 million b/d; “Oil Prices Near ‘Acceptable’ Levels: OPEC,” October 29, 2005.

<sup>21</sup> Bhushan Bahree, “OPEC Suspends its Output Quotas,” *Wall Street Journal*, September 21, 2005, p. A5.

<sup>22</sup> M.A. Adelman, *The Genie out of the Bottle, World Oil since 1970*, (MIT Press, 1995), pp. 150-153.

<sup>23</sup> In over 30 years, the world-wide weighted average crude oil price computed by the EIA fell to a low between \$9 and \$10 for just eight weeks. Data supplied by EIA.

<sup>24</sup> James L. Smith, “Inscrutable OPEC? Behavioral Tests of the Cartel Hypothesis,” *The Energy Journal*, 2005; 26, 1, p.74. Professor Smith presents quantitative evidence of the cartel’s output manipulation. He also discusses reasons why several other studies had failed to do so. Professor Smith is Cary M. Maguire Chair in Oil and Gas Management at SMU.

<sup>25</sup> M.A. Adelman, “World Oil Production and Prices 1947-2000,” *The Quarterly Review of Economics and Finance* 42 (2002): 171.

<sup>26</sup>“Gasoline Price Changes: The Dynamic of Supply, Demand, and Competition,” Federal Trade Commission, June 2005, p.23; “Oil in Troubled Waters--A Survey of Oil,” *Economist*, (April 30, 2005), p.4.

<sup>27</sup> “The End of the Oil Age,” *Economist*, October 25, 2003, p.11; David L. Greene and Nataliya I. Tishchishyna, “Costs of Oil Dependence: A 2000 Update,” Oak Ridge National Laboratory, Oak Ridge, Tennessee, May 2000, p.21; <http://www.ornl.gov/~webworks/cpr/v823/rpt/107319.pdf>.

<sup>28</sup> “OPEC Revenue Fact Sheet,” EIA, June 2005; <http://www.eia.doe.gov/emeu/cabs/opecrev.html> and data provided by EIA. Average OPEC oil production was 28.9 million b/d in 2002 and 33.7 million b/d in the first quarter 2005, the latest EIA data available.

<sup>29</sup> “Saudi Oil Policy Combines Stability with Strength, Looks for Diversity,” *Oil & Gas Journal* (January 17, 2000): 98, 3, p.18.

<sup>30</sup> Bhushan Bahree, “Oil Forecasts Are a Roll of the Dice,” *Wall Street Journal*, August 2, 2005.

<sup>31</sup> The U.A.E. and Qatar have scores of 6.2 and 5.9, respectively. “Transparency International Corruption Perceptions Index 2005,” Transparency International, The Coalition Against Corruption; <http://www.transparency.org/surveys/index.html#cpi>.

<sup>32</sup> M.A. Adelman, “The Real Oil Problem,” *Regulation*, Spring 2004, 20.

<sup>33</sup> IMF World Economic Outlook, April 2005, Chapter IV, p.160.

<sup>34</sup> Claude Mandil, “Statement on High Oil Prices,” International Energy Agency, June 29, 2005; [http://www.iea.org/Textbase/publications/free\\_all\\_papers.asp](http://www.iea.org/Textbase/publications/free_all_papers.asp).

<sup>35</sup> James Hookway, “Thailand Tries to Prop Up Economy,” *Wall Street Journal*, August 30, 2005.

<sup>36</sup> Paul Blustein and Craig Timberg, “High Oil Prices Met With Anger Worldwide,” *Washington Post*, October 3, 2005.

<sup>37</sup> EIA, Table 2.4, World Oil demand, 2001-2005; Table 1.2 World Petroleum Consumption, 1980-2003.

<sup>38</sup> For a more extensive discussion of this event and OPEC’s subsequent actions, see Wilfrid L. Kohl, OPEC behavior, 1998-2001, *The Quarterly Review of Economics and Finance* 42 (2002), 210-213.

<sup>39</sup> OPEC’s 133<sup>rd</sup> meeting on December 10, 2004; EIA, Country Analysis Briefs, “OPEC,” September 7, 2005.

<sup>40</sup> Dow Jones News Wires, “OPEC President Will Wait Before Making Output Hike,” *The Wall Street Journal*, June 25, 2005.

<sup>41</sup> See Claude Mandil, *Statement on High Oil Prices*; also see Dr. Adnan Shihab-Eldin, acting for the OPEC Secretary General, in a speech on September 28, 2005, “OPEC-IEA Cooperation and the International Oil Market Outlook;” <http://www.opec.org/opecna/Speeches/2005/OPECIEA.htm>.

<sup>42</sup> Bhushan Bahree and Russel Gold, “Pursuit of New Oil Supplies Runs Into a Bottleneck,” *Wall Street Journal*, June 28, 2005.

<sup>43</sup> Daniel Yergin, “It’s Not the End of the Oil Age,” editorial, *Washington Post*, July 31, 2005. Also see, Sam Fletcher, “CERA: Global Oil, NGL Production to Rise by 2010,” *Oil & Gas Journal*, (July 4, 2005): 103, 25, p.38.

<sup>44</sup> World Energy Outlook 2005, International Energy Agency; Selina Williams and Bhushan Bahree, “Energy Agency Sets Grim Oil Forecast,” *Wall Street Journal*, November 8, 2005.

<sup>45</sup> “Oil in Troubled Waters, A Survey of Oil,” *Economist*, April 30, 2005, p. 4. At the time the price was \$40 per barrel. Both spot and futures prices are now above \$50 per barrel.

<sup>46</sup> OECD Economic Outlook, Vol. No. 76, December, 2004/2, p.123.

<sup>47</sup> See, for example, Jathon Sapsford, “General Motors Joins Rush to Make Hybrids in China,” *Wall Street Journal*, October 31, 2005.

<sup>48</sup> Bhushan Bahree, “OPEC Lifts Quota But Urges Increase In Refining Capacity,” *Wall Street Journal*, June 16, 2005.

<sup>49</sup> Michael Williams, “Why OPEC’s Over a Barrel,” *Wall Street Journal*, September 17-18, 2005; Reuters reported OPEC’s president stating that “... Oil prices were approaching a level acceptable to both consumers and producers after recent decreases,” “Oil Prices Near ‘Acceptable’ Levels: OPEC,” October 29, 2005.