The Factors Encouraging High Oil Prices

Putting the influence of Institutional Investors into the Context of the Physical Oil Market

Testimony before
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By

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OPENING COMMENTS

Good morning Mr. Chairman and distinguished committee members. I am honored to testify before you today. I have been asked to provide a physical market context for the increase in oil prices to over $100 and the role of institutional investors in the oil markets.

Introduction

We are witnessing striking developments in the global markets. The price of crude oil has doubled since the beginning of 2007 and is at or above $100 per barrel. The dollar has fallen precipitously and is now worth only about 2/3 of a Euro. Oil exporting countries are pumping "petrodollars" into the global economy. Some estimates put that amount at $4 trillion dollars as of the end of 2007.[2]

This is the status quo, and as shocking as it seems, it appears to be relatively stable. The weak dollar cushions the impact of the high oil price on consumers outside of the U.S., the petrodollars provide liquidity in investment which helps grow the global economy, especially outside of the U.S. And one could argue the Fed's monetary policy, designed to stimulate our slowing economy by lowering interest rates, keeps the dollar weak, which in turn encourages investors to buy commodities, especially oil, as a hedge against inflation

But, as we witness these developments in the financial markets, it is important to keep in mind that oil prices could only display this kind of strength because of what has taken place in the physical market for oil.

Over the 20 year period prior to 2003, the global oil market was characterized by over-supply. The capacity to produce oil significantly exceeded demand. Nominal prices were flat and real prices fell.

Years of relatively low oil prices supported oil demand not only in the transportation sectors of the industrialized countries, but also in the power generation, industrial and now chemical and transportation sectors of the developing world. As a result, global oil demand caught up with the capacity to produce oil. The spare capacity held by OPEC has been reduced to a bare minimum. Specifically, in the 1980s, there was as much as 15 percent spare

[2] "Oil Producers See the World and Buy it Up," NYT, Wednesday, November 28, 2007, page A1

crude oil production capacity in the global market. By the 1990s, that number had fallen to 7 percent. Now, we are down to 2-3 percent.

In the meantime, with low consumer prices for much of the last two decades, refining has been a fairly low-margin business, discouraging investment except in countries where refiners are at least partially protected by government policies such as price subsidies or import controls. In sum, both global crude production and global refining have very limited spare capacity relative to the previous two decades.

In addition to these structural factors, there have also been more transient factors that have contributed to crude oil's march from $30 to $100. Some have been geopolitical events such as interruptions to oil flows in Iraq and Nigeria or threats to the flow of oil in Venezuela or Iran. There have also been supply chain mishaps like pipeline explosions or hurricanes hitting refining facilities. In the past, these surprise events might have a limited or short lived price impact.

What is most striking about these events today is that, regardless of the severity or the duration of the threat they pose to the supply of crude or products, their impact on prices is tremendous because of the absence of spare capacity (or alternative supplies). We are still living in a world with little margin for error.

This brings us to 2007/2008 and the current run up in oil prices. At the end of 2006, oil prices were sliding and OPEC decided to cut production by as much as 1.7 million b/d. This decision had a significant impact on the global balance for oil in 2007. In a **typical** year, on a **global** basis, oil demand exceeds oil supply in the first and fourth quarters and inventories decline. In the second and third quarters, oil supply exceeds oil demand and inventories typically rise. In 2007, oil demand exceeded oil supply in the first, third and fourth quarters and was essentially balanced in the second quarter. In short, the global market did not build supplies last summer to use this winter. The global market dug a big hole. On average, in 2007 global oil demand exceeded global oil supply by somewhere between 500,000 b/d and 1.0 million b/d. A rally in oil prices in late 2007 was a foregone conclusion.

There were other factors that affected the oil price in 2007, but this basic story of a tight global market has been the physical market backdrop for the run-up in prices. Can it account for the entire move to $110? No I do not think so. But, the physical market has not

discouraged or disciplined the community of investors who want to buy and hold oil as a portfolio investment.

Relief is on its way in the physical market. OPEC increased production significantly in the latter half of 2007 and oil demand is slowing because of the economic slowdown here in the U.S. But the fundamentals have not turned enough....yet…to discourage investors who want to invest in and hold oil. In the meantime, we see nothing in the financial markets that indicates a desire to sell crude oil.

The Factors Encouraging High Oil Prices

Background paper

By Sarah A. Emerson

Sarah A. Emerson is the Managing Director of Energy Security Analysis, Inc (ESAI), an independent energy research and forecasting firm located just outside of Boston, Massachusetts. Ms. Emerson adapted this paper from one she wrote for the Electric Power Research Institute.

During the 1950s, 1960s, and the early 1970s, oil prices were "posted" or set by the major integrated oil companies. Indeed, the volume of trade in crude oil spot markets accounted for only about 15 percent of international crude oil transactions. Moreover, spot transactions were possible only because the major oil companies needed to balance their own supply and demand, unloading small surpluses and covering minor deficits in the spot markets. The oil crises of 1973-74 and 1979-80 led to a threefold increase in prices, the adoption of fixed prices by OPEC, and the abandonment of fixed volume contracts between OPEC member countries and their customers. Higher world prices for oil stimulated non-OPEC production and cut global oil demand. As a result, in the market for the marginal barrel of crude (the spot market) prices fell below OPEC's elevated and fixed price. Not surprisingly, independent refiners, traders and even the integrated majors bought more and more crude in the spot market. By the early 1980s, crude oil transactions at spot prices or prices tied to the spot market accounted for more than 50 percent of total international crude oil transactions.

Within OPEC, the role of swing producer in defense of higher prices became increasingly untenable for Saudi Arabia. Ultimately, Saudi Arabia abandoned this role, a market share war ensued and prices collapsed in 1986. Since 1986, almost all of the world's oil has been sold bilaterally with transactions linked to some kind of market-based pricing, such as netbacks or formulas tied to spot, and more recently, futures prices.

…Gives Way to Market Forces

The emergence of spot and futures markets in oil has led to two decades of market forces as the organizing principle of the global oil sector. The deregulation of domestic oil industries and the liberalization of petroleum product pricing have proceeded all over the world as countries have opted to integrate into the large, transparent and relatively low priced global oil market. The view that market forces, rather than government policies, were best suited to allocate resources equitably was mirrored by the rise of Reagan-Thatcher laissez-faire conservatism of the 1980s and the eventual

collapse of the Soviet bloc by the early 1990s. The devaluation of the Russian ruble and the Asian financial crisis later in the 1990s showed the folly of policies that ran counter to market forces in global capital markets. More recently, the market-friendly approach adopted by the Bush White House and China's accession to the World Trade Organization (WTO) have again underscored the dominance of the "market."

Meanwhile, financial institutions have become important participants in the futures markets, buying and selling paper barrels of oil. Futures markets and the liquidity provided by speculators have transformed the global oil market from one dominated by month-to-month pricing to one driven by minute-to-minute pricing. A striking example of the influence of speculation in the futures market on short-term price direction has been the impact of the net position (long or short) of the non-commercials (non-hedgers) on the price of WTI on the NY Mercantile Exchange (NYMEX).[3]

It is not just the existence of spot and futures markets and the political preference for unfettered markets, however, that has allowed the market to reign in oil. Over most of the last 20 years, the global oil market has been characterized by over supply. The capacity to produce oil has significantly exceeded demand. Nominal prices have been flat and real prices have fallen.

The Era of Market Forces May be Coming to an End

Now as we face the next 20 years, the era of "market" as the primary organizing principle may be coming to an end. Market forces are under attack from many sides. This is, in part, due to the state of the physical market itself. Years of relatively low oil prices have supported oil demand not only in the transportation sectors of the industrialized countries, but also in the power generation, industrial and now chemical and transportation sectors of the developing world. Global oil demand has caught up with the capacity to produce oil. The spare capacity held by OPEC has been reduced to a bare minimum. That cushion will not be replaced overnight, unless something distinctly slows oil demand growth.[4]

In the meantime, with low consumer prices for much of the last two decades, refining has been a fairly low margin business, discouraging investment except in countries where refiners are at least partially protected by government policies such as price subsidies or import controls. In sum, both global crude production and global refining are capacity constrained relative to the previous two decades.

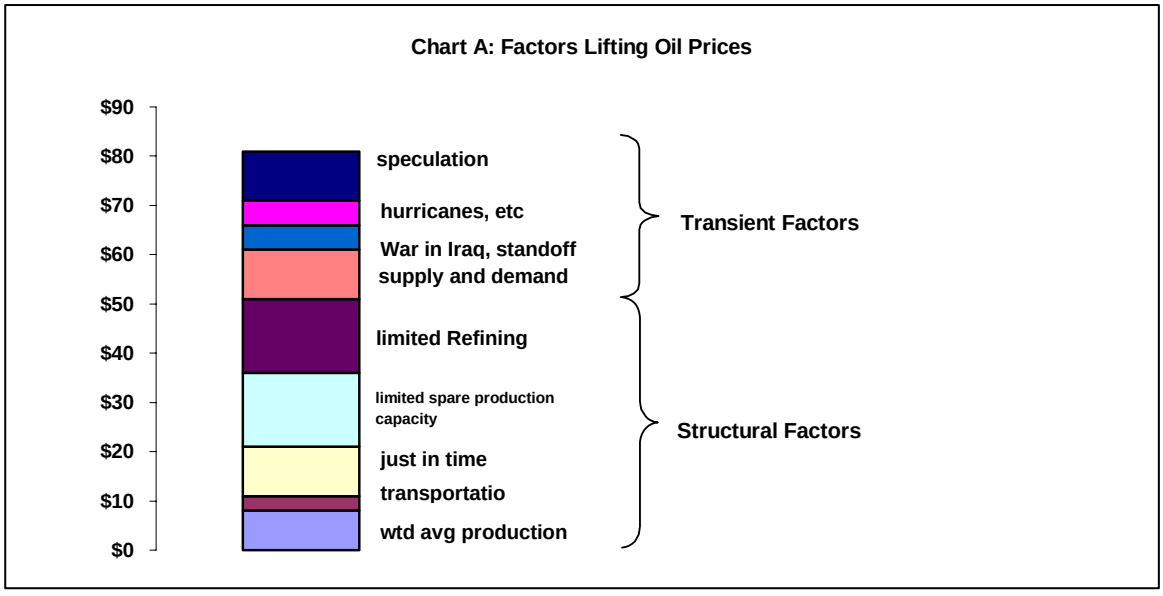
[3] A chart comparing the net long position of the non-commercials with the price of WTI is included in the Appendix

[4] A global balance that compares global oil demand with global supply is presented in the Appendix. Spare production capacity is held by OPEC and is presented graphically later in the text in Chart C.

But that is only part of the physical market story. The market impact of the capacity crunch has been intensified by government efforts to protect the environment. Policies to cut polluting emissions have led to fuel specification changes that have chipped away at the profitability of refining by forcing refiners to focus on investments to refine predominantly medium sour crude into clean low sulfur transportation fuels rather than investments to expand capacity. These refining investments have barely kept pace with demand for cleaner products, so the global market for clean products is supported not only by tight distillation capacity but also limits on the upgrading and desulphurization capacity available to make cleaner and lighter fuels.

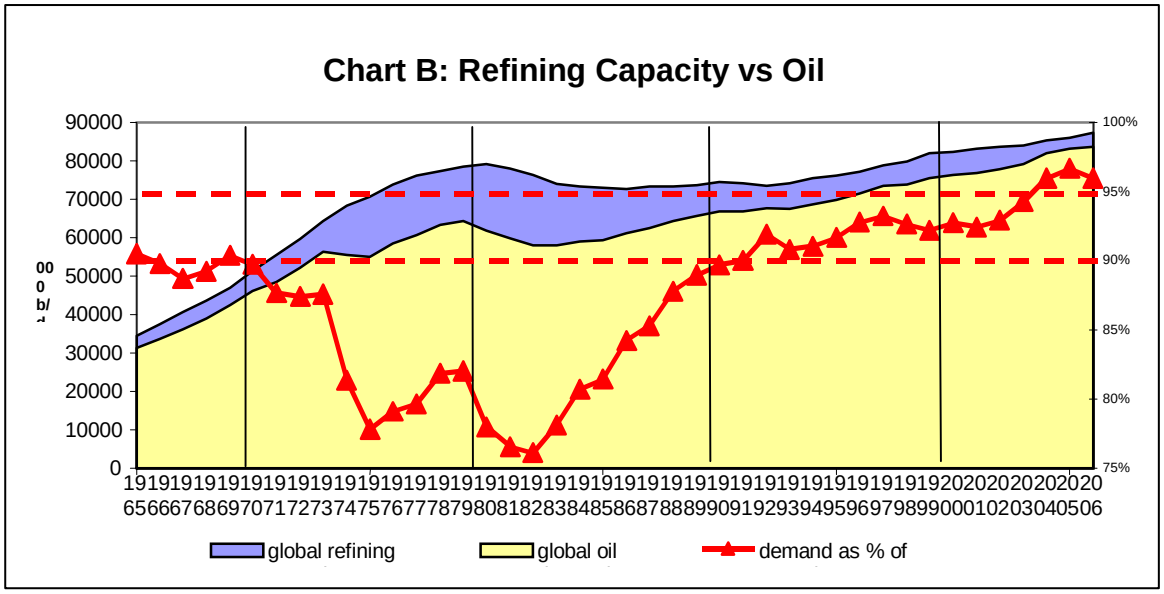
High Oil Prices

In thinking about the factors that have led crude oil prices from $30 to almost $100, some are structural factors that will take years to change. Others are more transient factors that change almost daily. As shown in the chart A, the structural factors include basic items such as weighted average production costs and transportation, but they also include supply chain factors such as the preference for just in time inventories, limited refining capacity and thin spare production capacity.[5] These supply chain factors are not easily or quickly changed and they have made the current era of pricing a departure from the previous 20 years when companies carried a lot of inventory and there was significant spare refining and production capacity.

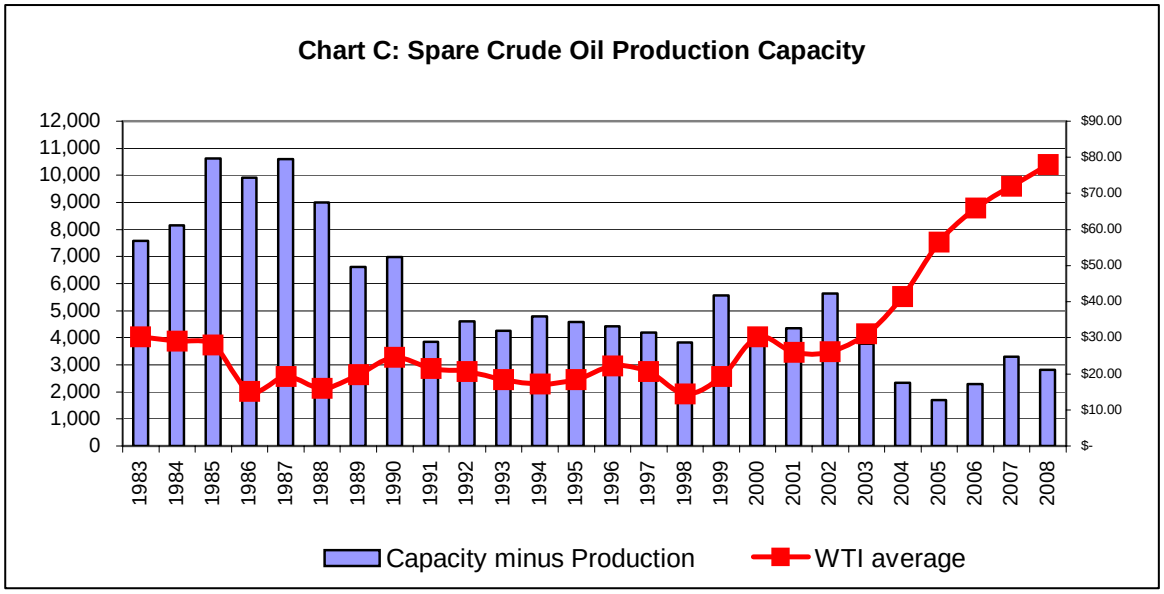


[5] The values in this chart are the judgment of the author.

Charts B and C illustrate the elimination of spare capacity in both refining and crude oil production. In the case of global refining capacity, since 1990, the global utilization rate (here defined



as global demand/global capacity) has exceeded 90 percent, but since 2004 has exceeded 95 percent.[6] 2004 was a remarkable year because oil demand grew very quickly around the world, but especially in the U.S. and China. Indeed, China's demand growth was extraordinary. Even though China's oil demand growth has slowed since then, that one-year spike drew a great deal of attention. China's



[6] Data for chart B is based on the BP Statistical Review and ESAI's own database

growth will continue on a steady pace, but is unlikely to return to 2004 levels. In any event, the enormous increase in oil demand in 2004 led to a commensurate increase in crude oil production, especially in OPEC countries.[7] That jump in output eliminated a significant volume of spare capacity. Since then, some spare capacity has been rebuilt as some new fields are brought on line in OPEC countries and as global oil demand has slowed down distinctly in 2005-2007. Indeed, oil demand growth in 2005 through 2007 has averaged about 1.2 million b/d whereas oil demand in 2004 was roughly 3.0 million b/d on the back of the Chinese surge.

The other factors included in chart A are more transient factors, which may have a shorter life span than structural factors. They include short-term developments in supply and demand, geopolitical events involving oil-producing countries like Nigeria, Iraq, Iran and Venezuela, supply chain mishaps like pipeline explosions or hurricanes hitting refining facilities. There is also speculation when non-commercial traders buy crude oil either as a short-term speculative investment or a hedge against something else like inflation. Each of these categories of factors has different impacts. Under the supply and demand developments, some factors have more lasting impact. The previously mentioned oil demand surge in 2004 was driven, in part, by a sudden acceleration in China's oil use. That was really a one-year phenomenon, although China continues to post healthy demand growth. Another example is the start up of a new oil field or a warmer or colder than normal winter. The rest of the transient factors are largely surprise events that are generally difficult to predict, but also relatively short lived. Regardless of the severity or duration of the threat these transient factors pose to the supply of crude or products, their impact on prices can be tremendous because of the absence of spare capacity in the global supply chain. This is well known by speculators who are inclined to "buy" oil at the first news of an actual or potential supply interruption.

Will Market Forces Bring Oil Prices Down?

In response to these oil market realities, a pure market economist might contend that high oil prices will spur conservation and temper demand growth while encouraging investment in crude oil production. The result will be more supply and less demand and oil prices will fall signaling the end of the current cycle. At current prices, even development of the least conventional sources of liquid hydrocarbon production (i.e., gas and coal to liquids and tar sand, shale and bituminous deposits) is affordable. In short, conventional oil gets a boost from the traditional investors and oil sands, bitumen,

[7] Data for chart C comes from ESAI's own proprietary database. ESAI maintains a country-by-country database of supply, demand, inventories, refinery operations, crude production, production capacity for crude oil and each petroleum product for the entire world. All of ESAI's market analysis is based on a bottom-up approach to analyzing supply and demand at the national regional and global level.

oil shale, biodiesel, and other alternatives get a boost from the entrepreneurs. The current boom cycle comes to an end, the market equilibrates and prices fall.

The mean reversion, market equilibrates view of today's prices, however, does not yield an accurate characterization of where we go from here. Given that many of the factors that have led to $100 oil are structural ones, the amount of investment in new production of oil (or alternatives) and the demand restraint required to re equilibrate the market is substantial. Moreover, the players in the market, whether they are national governments or private companies, are either changing altogether or developing new attitudes towards oil.

Governments May Not Think So…and May Intervene in Markets

In today's market, oil supply disruptions are perceived to be more likely and more difficult to counteract. The recent strength in oil prices is, in part, because they have internalized the energy security concerns highlighted by the War in Iraq and terrorist attacks in and outside of the Middle East. Civil unrest in Nigeria, the standoff between the U.S. and Iran over nuclear weapons, and tensions between the Bush Administration and President Chavez of Venezuela underscore historical concerns about the security of supplies. In a well-supplied market, the consequences of a supply disruption can be managed through alternative supplies. In a capacity constrained market, however, every disruption has more severe consequences. These energy security concerns have moved energy higher on the public policy agenda in many countries.

Higher oil prices have also lent perhaps undeserved credence to the claim that the volume of conventional oil production is at or very close to its peak. Pinpointing the year in which conventional oil production peaks or plateaus is unnecessary and far too contentious an exercise. What matters is that alternative liquid hydrocarbons like syncrudes from oil sands or bitumen and alternative fuels from biomass and agricultural crops will increasingly become part of the liquid fuel mix over the next few decades. The expansion of ethanol in the U.S. gasoline pool is an early and instructive example of the trend towards greater volumes of non-traditional hydrocarbons or non-hydrocarbons in the petroleum product pool. This trend will become more widespread.

Regardless of the veracity of the "Peak Oil" argument, it has raised a red flag about the long-term supply of conventional oil and its adequacy for meeting oil demand. This has led the major stakeholders, including producers, consumers and government regulators to rethink the alternatives. In some countries, especially those without oil production, the government response to these concerns is likely to be more conservation. Regulations that improve efficiency and reduce consumption seem almost inevitable in some countries. Likewise, countries with dwindling oil production, which are

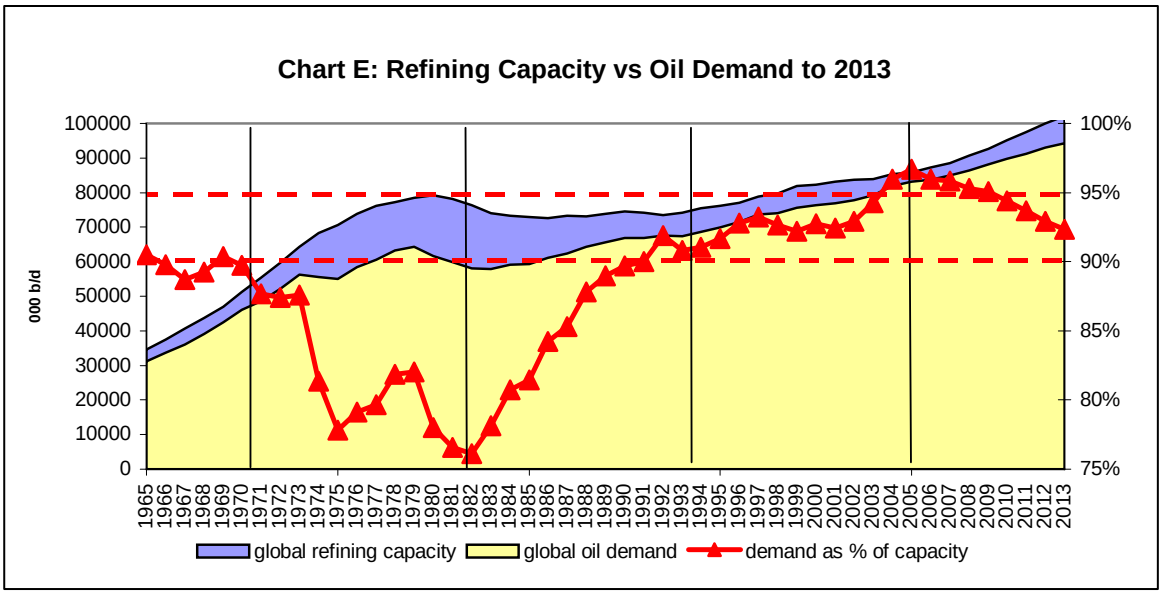
becoming bigger and bigger net importers are pursuing policies to secure foreign supplies. Meanwhile, all net oil-importing countries are considering changes to their energy mix if their resource endowments allow.

Finally there is the environment. Efforts to reduce emissions and clean up fuels, especially transportation fuels, will continue around the world. But behind those efforts is a far bigger environmental issue for the global oil sector: reducing greenhouse gas (GHG) emissions.

In sum, the continued dominance of the "market" as the organizing principle of global oil is under attack by two overriding concerns: energy security and the environment. One could argue that these challenges have always existed, but it seems clear that the absence of "spare" capacity in production and refining has dramatically underscored the energy security issue while growing consensus on climate change has transformed the environment issue. With this in mind, market regulation in the petroleum sector is far more likely in the next two decades than in the last two.[8]

Where Do We Go from Here

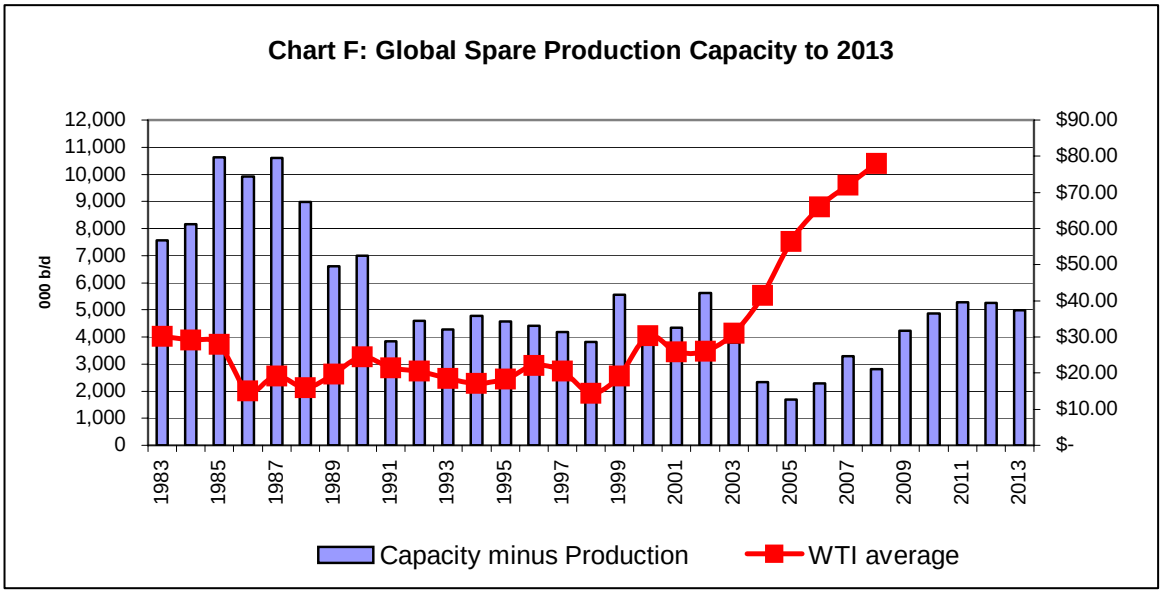
It is difficult to look very far out when examining the structural factors shaping oil prices today, but one can say something about the next 5 years or so with some confidence. As described earlier, the two most important structural factors contributing to high oil prices are tight refining



capacity and limited spare crude production capacity. But investment is underway and in the medium

[8] The recent signing of the 2007 Energy bill into law already signals more government intervention in the U.S. oil sector as it raises CAFÉ (fuel economy) standards to 35 mpg by 2020 and calls for 36 billion gallons of alternative fuels used in transportation fuels by 2022.

term those problems will ease. Charts E and F are projections of Charts B and C presented earlier. Based on ESAI's analysis of global expansion of refining capacity and production capacity, both improve. The refining capacity projection indicates that the global utilization rate should fall below 95 percent. This is still a high number, but more consistent with the 1990s when oil prices were lower. The production capacity projection is more speculative because it encompasses many countries with declining oil fields and a handful of countries with expanding production. All of the spare capacity is



held in OPEC and the view in Chart F is probably optimistic in magnitude but accurate in direction.

Beyond 2013, the picture is much more difficult to draw because the structural tightness in the global supply chain never disappears. It just improves and deteriorates depending on the ebb and flow of investment and demand. With that in mind it is difficult to imagine a return to $30 crude oil. At the same time, $90-100 crude oil will be hard to sustain. In short, market equilibrium is much more loosely defined and probably refers to a price range of $50-$80 with more potential to break above that range than below that range.

Conclusions

The last two decades of deregulation and reliance on market forces as the defining principle of the oil markets has run its course and, on the margin, regulation is moving back into the oil patch. The confluence of high prices, limited upstream and downstream spare capacity, instability in producing countries and concerns over climate change are encouraging coalitions that endorse change in energy policies. Whether it is in the name of environmentalism, national security, resource stewardship or

mercantilism, many different political and economic interests are looking for a change to the regulatory status quo. Slowly their efforts will gain ground in countries all over the world.

In the meantime, the global oil market remains perched on a three-legged stool of high oil prices, a weak dollar and huge flows of petrodollars into investments around the world. This stool has been fairly steady over the last several months, but it does not represent a status quo that will satisfy most governments. The high oil prices, in particular, are a direct concern for consuming governments and an indirect concern for producing governments if they see consumers turning to conservation and alternatives. The weak dollar is a concern for U.S. consumers and must make oil producers worry about inflation in their economies. Consuming governments will be compelled to take action to protect their economies. Producing governments will invest to broaden their oil price windfall and, in the process, perhaps take the edge off high prices. But it will take time to effectively slow demand growth and increase supply growth. Moreover, slower demand and faster supply will not be smooth and not commensurate, especially as governments take a bigger role in markets. So the stool may rock, but remain upright for some time. Oil prices will eventually moderate (and the stool will topple), but prices will remain volatile and unpredictable as the steps taken by governments unfold.