



Gasoline and Oil Prices

Robert Pirog
Specialist in Energy Economics

March 16, 2009

Congressional Research Service

7-5700

www.crs.gov

RL34625

Summary

American gasoline consumers faced rapidly escalating prices during the first half of 2008, followed by declining prices in the second half. As gasoline prices increased to over \$4.00 per gallon, consumers faced difficult choices concerning how to allocate limited budgets as the economy slowed. The price increases also adversely affected major industries, including automobile production, transportation, and agriculture. The high gasoline prices also were thought to contribute to the slow-down in economic growth and increased general price inflation. The oil industry earned record corporate profits while other sectors of the economy were negatively affected.

Gasoline prices did not increase on their own over this period. The rising price of gasoline was driven by the increasing price of crude oil, the major cost component of gasoline. Crude oil prices, which peaked at over \$145 per barrel in July, and then turned down, rose more quickly than gasoline prices, and the cost share of crude oil per gallon of gasoline rose, putting cost pressure on the refining, distribution, and marketing sectors of the gasoline supply chain.

While the recent increases in the price of crude oil began in late 2007, the price of oil has been increasing, at different rates, since 2004. Many factors have contributed to the price increases over this period. Over the past five years, the mix of factors affecting price at any particular time has varied.

Recently, several factors, including the continuing increase in world oil demand, the effect of speculation on energy futures markets, the transformation of the energy futures market into a pure financial market rather than a commodity market, the declining value of the dollar, foreign governments' fuel subsidization, and limits on the market's ability to increase supply, have been identified as key factors in explaining oil, and therefore gasoline, price volatility. The key factor of world oil demand is rapidly weakening as world growth in gross domestic product has slowed in the fourth quarter of 2008 and has become negative in 2009.

Policy debates have focused on curbing speculation on oil futures markets by increasing regulatory presence. Over three dozen pieces of legislation were introduced in the 110th Congress to address speculation-related issues. Other possible policy directions have included declaring a moratorium on collection of the federal excise tax on gasoline, conservation, and the use of oil in the Strategic Petroleum Reserve to augment U.S. supplies of crude oil. Additionally, the possibility of drilling in currently excluded areas on the Atlantic and Pacific outer continental shelf, as well as the Gulf of Mexico, have been considered. The potential opening of the Alaska National Wildlife Refuge for oil exploration and development has also been debated.

The oil market has demonstrated a tendency to be cyclic and sharply volatile. Policy measures that assume long-term stability in the market are unlikely to attain the multiplicity of goals for oil policy the American public desires.

Contents

Gasoline and Oil Price Volatility	1
Factors Affecting Oil Prices	4
World Demand.....	4
Financial Speculation	6
Value of the Dollar	9
National Subsidies.....	10
Oil Supply.....	10
Policy Issues	11
Conclusion.....	12

Tables

Table 1. U.S. Monthly Retail Gasoline Prices.....	2
Table 2. Cost Composition of Gasoline, June 2007-2008	2
Table 3. Monthly West Texas Intermediate Oil Spot Price.....	3
Table 4. World Oil Demand, 1997-2007	4
Table 5. Futures and Spot Prices for WTI Crude Oil, 2007-2008	7
Table 6. Commodity Purchases by Index Speculators	8
Table 7. OPEC Excess Crude Oil Capacity	11

Contacts

Author Contact Information	13
----------------------------------	----

During the summer of 2008, American consumers faced gasoline prices that attained record high levels of over \$4.00 per gallon, and oil prices of more than \$140 per barrel.¹ These high prices contributed to a downturn in economic growth and an increase in inflation. They forced consumers to make difficult choices concerning spending patterns, while their general economic well-being declined. The record prices raised costs and adversely affected a wide variety of industries, including transportation, automobiles, and agriculture.

As of the week of March 9, 2009, the price of gasoline was at \$1.94 per gallon and the price of oil was below \$50 per barrel.² However, this favorable news for U.S. consumers came in an environment of continuing financial and credit market problems, and economic recession.

Because there does not seem to be one, easily identifiable, factor that caused the quick surge in oil prices in 2008, consensus on how to mitigate the situation through policy has been elusive. Calls for increased exploration and drilling in Alaska and currently restricted offshore areas, energy conservation, increased reliance on alternative energy sources, curbing speculation on oil futures markets, releasing oil from the Strategic Petroleum Reserve, suspending the federal tax on gasoline, and taxing the profits of oil companies have all been debated.

This report examines the extent of price volatility in gasoline and oil markets, focuses on the linkage between the two, and analyzes the causes of the price increases and the likelihood that they have been reversed through market responses or policy measures.

Gasoline and Oil Price Volatility

The Energy Information Administration (EIA) reported that retail gasoline prices increased by 33% from January through July 2008, or, by over \$1 per gallon.³ Although the price was higher in each month in 2008, on a month-by-month basis, compared to 2007, the greatest differential was observed in July, when prices were about \$1.10 per gallon higher than in the previous year.

Price increases led consumers to respond by using less gasoline and driving fewer miles. By mid-July 2008, gasoline demand had declined by about 340,000 barrels per day (b/d), or 3.6%, compared to a similar period in 2007.⁴ By October 2008, gasoline demand compared to the same period in 2007 was down by about 392,000 b/d, or 4.2%.⁵ Miles traveled declined by 3.7% in May 2008 compared to May 2007, and 3.6% in July 2008 compared to July 2007.⁶ These responses are important because they represent a potential market adjustment that contributed to the moderating of the price increases of the first half of 2008. If consumption had not declined in the face of sharp price increases, there would be little incentive for producers not to continue raising prices.

¹ Diesel and aviation fuel prices increased at least as much as gasoline prices.

² Energy Information Administration, West Texas Intermediate Spot Price, and weekly Gasoline Price data available at <http://www.eia.doe.gov>.

³ **Table 1** represents U.S. average, all gasoline grades, all formulations.

⁴ Energy Information Administration, *This Week in Petroleum, Gasoline*, July 23, 2008.

⁵ *Ibid.* October 22, 2008.

⁶ Federal Highway Administration, *Traffic Volume Trends*, May and July 2008.

Table 1. U.S. Monthly Retail Gasoline Prices
(cents per gallon)

	2007	2008	2009
January	228.9	309.5	184.0
February	232.3	307.8	197.5
March	260.9	329.3	
April	289.1	350.7	
May	318.7	381.5	
June	310.2	410.5	
July	301.4	411.4	
August	283.4	383.3	
September	284.9	375.6	
October	285.3	311.2	
November	312.8	220.8	
December	307.0	174.5	

Source: Energy Information Administration, available at <http://www.eia.doe.gov>.

Falling gasoline prices during the fourth quarter of 2008, they could have provided consumers an incentive to increase consumption. However, slower economic growth, job losses, and reduced incomes are likely to depress gasoline consumption. As a result, the price effect which acts to stimulate gasoline consumption, is likely to be offset by an income effect, which acts to reduce gasoline consumption.

During the price increases of the first half of 2008, the cost composition of gasoline changed. **Table 2** shows that not only did crude oil cost more per gallon of gasoline, but its share of the total price increased. Crude oil cost about \$1.54 per gallon of gasoline in June 2007, rose to \$3.00 per gallon of gasoline in June 2008, and fell to \$2.16 per gallon by October 2008.

Table 2. Cost Composition of Gasoline, June 2007-2008
(percent)

	2007	2008
Crude oil	50.5	73.0
Refining	22.7	10.0
Distribution/Marketing	13.7	6.0
Taxes	13.0	11.0

Source: Energy Information Administration, *Gasoline and Diesel Fuel Update*, October 22, 2008.

Refining, as a share of the cost of a gallon of gasoline, declined by over 50%, and fell from \$0.69 per gallon in 2007, to \$0.36 per gallon in 2008. This nearly 48% decline in cash flow to refiners has reversed the economic performance of refiners in recent years, and has put into question the possibility of expanding the U.S. refining capacity base. Distribution and marketing's share of the price of a gallon of gasoline also declined from June 2007 to October 2008, putting pressure on gas station owners as they saw their net return per gallon sold fall. Taxes were less affected by the

growing role of crude oil in the cost structure of gasoline because, while the federal excise tax on gasoline is a fixed \$0.184 per gallon, and as a result will decline in percentage terms as the price of gasoline rises, some state and local taxes on gasoline are percent of value, or *ad valorem*, taxes and will retain a constant share of cost as the price of gasoline rises.

The data presented in **Table 2** suggest that the major reason the price of gasoline has been volatile in 2008 is because the price of crude oil has been volatile. The rise and fall in the price of crude oil has not only affected consumers, it has affected virtually all the parts of the gasoline supply chain.

Table 3. Monthly West Texas Intermediate Oil Spot Price

(dollars per barrel)

	2007	2008	2009
January	\$54.51	92.97	41.71
February	59.28	95.39	39.09
March	60.44	105.45	
April	63.98	112.58	
May	63.45	125.40	
June	67.49	133.88	
July	74.12	133.37	
August	72.36	116.67	
September	79.91	104.11	
October	85.80	76.61	
November	94.77	57.31	
December	91.69	41.12	

Source: Energy Information Administration, available at <http://www.eia.doe.gov>.

Table 1 and **Table 3** show that while the price of crude oil rose by about 24% in the second half of 2007, the price of gasoline rose by only about 2% over the same time period. While crude oil prices increased by another 44% in the first half of 2008, gasoline prices increased by 34% over the same period. Anticipated and actual cuts in demand for gasoline may have caused firms to resist passing the full cost increases of crude oil on to consumers in 2007, increasing the rate at which gasoline prices rose in early 2008.

Crude oil prices fell by 69% from July through December 2008, while gasoline prices fell by only about 57%. Data for the first two months of 2009 show that the average price of crude oil fell to about \$39 per barrel, or 5% compared to December 2008, while the price of gasoline rose by about 13% during the same period. This pricing result may be due to inventory policies that require the covering of past costs, or to attempts by the refining industry to enhance returns after a period of reduced earnings in 2008.

Factors Affecting Oil Prices

The price of oil is set on a world market, over which no firm has direct control. However, the market differs in significant ways from the economic conception of a free, competitive, market. Five countries—the United States, China, Japan, India, and South Korea—consumed over 45% of the world demand of 85.2 million barrels per day in 2007, while producing only 14% of world production. As a result, these countries, as well as many other net consuming nations, depend on world trade in crude oil. Since production of crude oil depends on a geological formation to yield the oil, only certain places in the world can produce oil at high levels, in excess of their own consumption. These areas are concentrated in the Persian Gulf, where over 60% of known proved reserves are located. Reserves can be augmented, and production can be increased, only after the expenditure of billions of dollars and years of development after a discovery. The Persian Gulf oil producers and others attempt to exercise control of the price of oil through the Organization of the Petroleum Exporting Countries (OPEC).

Because of the characteristics of consumers and producers in the market, both the demand and the supply sides of the market are very inelastic, or price insensitive, in the short and intermediate term. Since neither consumers nor producers can easily make quantity adjustments in response to changing prices, the market price may not be singular. There may be a range of prices that are consistent with the market avoiding physical shortages or surpluses. In this type of market environment, high levels of price volatility are likely.

World Demand

A frequently cited reason for high crude oil prices is the growth of world demand, driven by China and India.

Table 4. World Oil Demand, 1997-2007

(thousand barrels per day)

Year	Demand	% of Growth	Year	Demand	% of Growth
1997	73,598	5.8	2003	79,296	1.9
1998	73,939	0.05	2004	82,111	3.5
1999	75,573	2.2	2005	83,317	1.5
2000	76,340	1.0	2006	84,230	1.1
2001	76,904	0.07	2007	85,220	1.2
2002	77,829	1.2			

Source: BP Statistical Review of World Energy 2008.

Note: Growth is the percentage change in a year over the previous year.

Table 4 shows that the total growth in demand over the past five years of 7.5% is higher than the total growth of 5.3% over the previous five years. Over the past five years, from 2003 to 2007, consumption growth in China totaled 35%, higher than the world growth rate. However, the growth of Chinese demand cannot be considered in isolation. Since the crude oil market is world-

wide, the high level of Chinese growth should be considered only in the context of total world demand growth.⁷

Although 1997 and 2004 stand out as years in which annual growth exceeded the ten year average of 1.3%, the data in **Table 4** might not appear to suggest that demand growth could be sufficient to push crude oil prices to the record levels observed in July 2008. In the case of the oil market, it may be that percentage changes taken alone are misleading.

Because of the nature of oil production, which is characterized by time lags, an inability to easily expand output from existing fields, and low incentives to keep production as excess capacity, the actual volume of demand increases, irrespective of the percentage value, is a key factor. This differentiates the oil industry from other manufacturing and service industries where marginal percentage increments in output can be met by using the existing capital stock and labor force more intensively.

The demand increase of 3.5%, or over 2.8 million b/d, in 2004, reduced spare capacity in the world, and created a tight balance between demand and supply. When growth fell to 1.5% in 2005, that, nonetheless, represented a further expansion of required world production by 1.2 million b/d. Because world production could not expand quickly enough to meet this new demand, further reductions in excess capacity occurred and the tight market conditions continued. When an increase in demand causes total demand to exceed current production, it must be met by reducing excess capacity. When excess capacity in the industry falls, markets anticipate that the reduced excess capacity is less able to accommodate future possible supply disruptions and, as a result, the price increases.

The solution to rising prices, if one concludes that world demand growth cannot be controlled in the long run, is expansion of output. However, the largest oil reserves are believed to be already discovered and in production. Future fields might well be smaller and more costly. Data shows that in 2007, the world level of proven reserves declined from 1.239 trillion barrels to 1.237 trillion barrels, suggesting that new discoveries did not offset 2007 production levels.⁸

Estimates of world oil demand for 2009 are being revised downward. The International Energy Agency (IEA) cut its estimated world demand for crude oil to 85.7 million b/d for 2008. In addition, it cut 1.2 million b/d from its forecast for 2009. These revisions yield a 2009 world oil demand of 84.4 million b/d, some 1.3 million b/d under 2008 consumption levels.⁹ Although the IEA sees demand declining in the industrialized nations, it sees demand declining less in the emerging markets.

The reason for the reduction in forecast world oil demand is a declining outlook for world economic growth. The International Monetary Fund (IMF) forecast for world gross domestic product growth for 2008 was 3.9%, and for 2009 is 3.0%, after 5.0% growth in 2007. The financial crisis being experienced on world markets and the continuing effects of high commodity prices are blamed for reduced growth.¹⁰

⁷ For example, total consumption demand in Japan and Europe declined between 2006 and 2007. This reduced demand translated into more available supply to satisfy Chinese demand.

⁸ *BP Statistical Review of World Energy 2008*, June 2008, p. 6.

⁹ International Energy Agency, *Oil Market Report*, March 2009.

¹⁰ International Monetary Fund, *World Economic Outlook*, October 2008.

Financial Speculation

One of the most debated factors in rising oil prices has been the role of speculators, particularly those investing through commodity index funds. Speculators have always been part of energy futures markets, but it generally has been as the other side of hedging transactions by physical traders.¹¹ Their role has been to accept price risk when physical traders sought to transfer it, and lock-in prices. Recently, however, commodities' futures markets have become part of financial investor portfolio strategies. As a result, the market has seen an inflow of new participants that have no interest in the physical commodity, beyond the possibility of profiting from its price variations.

The oil futures market is actually composed of three different markets; regulated futures exchanges like the New York Mercantile Exchange (NYMEX), electronic trading facilities like the Intercontinental Exchange (ICE), and the Over the Counter (OTC), or swap market. Each market offers a different contract, traded under different rules, and with different degrees of regulatory control.¹² The focus for oil price effects has recently been on the NYMEX where a standardized futures contract, based on West Texas Intermediate (WTI) crude oil, deliverable at Cushing, Oklahoma, is traded under the regulation of the Commodities Futures Trading Commission (CFTC). This market is financial in nature, in the sense that little or no oil actually is traded, or changes hands. Almost all contract gains and losses are settled in cash, and positions, either long (as a holder of the right to buy oil) or short (as a holder of the right to sell oil) can be closed out, or offset by purchasing a contract that offsets the original position.

In principle, there is little reason why any transaction on the oil futures markets should affect the current price of oil. What is being traded in these markets is a contract that obligates an investor to buy oil one month, or more, in the future at a known, set, price. If more investors desire to be in that position, the demand for the contract goes up, taking with it the contract price at which that oil might be traded. Again, in principle, this transaction does not affect any demand or supply fundamental in the physical oil market, and should not necessarily affect the current price of oil. In general, it is more likely that shifts in the underlying fundamentals of oil demand and supply could affect the expectations of future prices held by investors, and alter their behavior causing them to buy or sell, leading to price variations that reflect the evolving market forces in the physical market.

In the real market for oil, it is possible that purely financially based expectations, realized through changing positions in the financial markets, might affect the real price of oil. The spot market, a market for the delivery of real crude oil, bases its price on the futures market, and EIA data show that the two prices vary only by a few cents as observed in **Table 5**.

The reason for this close correlation is that the spot price is in itself a forward price. Oil contracted today on the spot market must generally be delivered within twenty-one days, with notice given to the buyer prior to delivery. The near month futures contract generally covers thirty days or less into the future, hence there is substantial overlap between futures market contract

¹¹ See CRS Report RL31923, *Derivatives, Risk Management, and Policy in the Energy Markets*, by Robert Pirog, for more on the mechanics of the hedging process.

¹² See CRS Report RL34555, *Speculation and Energy Prices: Legislative Responses*, by Mark Jickling and Lynn J. Cunningham, for more on the focus and degree of oversight and regulation.

delivery and spot market delivery. As a result, the NYMEX near month futures price is the basis for the spot market price, adjusted for relatively minor differences in delivery time and other factors. This linkage between the spot and futures market price is the connection between the financial oil market and the real oil market. It allows investment decisions by financial institutions and investment funds to be transferred quickly and directly to gasoline consumers.

Table 5. Futures and Spot Prices for WTI Crude Oil, 2007-2008

(dollars per barrel)

	Spot price 2007	Future price 2007	Spot price 2008	Future price 2008
January	\$54.51	\$54.35	\$92.97	\$92.93
February	59.28	59.39	95.39	95.35
March	60.44	60.74	105.45	105.45
April	63.98	64.04	112.58	112.46
May	63.45	63.53	125.40	125.46
June	67.49	67.53	133.88	134.02
July	74.12	74.15	133.37	133.37
August	72.36	72.36	116.67	116.67
September	79.91	79.63	104.11	104.11
October	85.80	85.55	76.61	76.72
November	94.77	94.63	57.31	57.44
December	91.69	91.74	41.12	42.04

Source: Energy Information Administration, available at <http://www.eia.doe.gov>.

It is possible to take almost the reverse position on the spot versus future price correlation. In this view, the futures price must always adjust to the spot price. At the expiration date of the futures contract, the spot price must equal the futures price on the expiring contract because the holder of futures contracts can always choose to receive oil rather than a cash settlement if desired. Futures prices are seen as driven by expectations of the future spot price. In this market conception, the primary control mechanism is that essentially all of the futures market participants are real commodity hedgers.¹³

Several factors are important in balancing these arguments. The approach that claims futures markets control the spot price are based on investor behavior that is at odds with that of the perfectly rational financial investor of economic theory. For this approach to have validity, two tests should be met. First, there should be a class of participants in the market that are not hedgers in the sense of having a need to lock in the price of oil for commercial use, for example, purely financial investors. Second, there should be some explanation, and evidence, that the non-commercial class of market participants were likely making investment decisions driven by some other rationale beyond that of rational economic, financial analysis.

¹³ David L. Crawford, "Oil Futures" Are a Phony Target, Philadelphia Daily News, August 4, 2008.

No definite, quantitative evidence is available for either condition; however, testimony given at congressional hearings indicates that new participants may be entering the oil futures markets in the form of investment by commodity index funds.¹⁴

Table 6. Commodity Purchases by Index Speculators

(millions of barrels)

	Holdings 1/1/03	Holdings 3/12/08	Net Purchases
WTI Crude Oil	99.88	638.38	538.99
Brent Crude Oil	47.07	191.59	144.52
Gasoline	2,624.24	8,549.15	5,924.90

Source: Michael W. Masters, *Testimony before the Committee on Homeland Security and Governmental Affairs*, United States Senate, May 20, 2008.

The data in **Table 6** show that over a five year period, holdings of crude oil and gasoline in the form of futures contracts, by investors in commodity index funds increased by over 500% in the case of WTI crude oil, and over 200% in the case of gasoline. Investors in these funds include pension funds, university endowments, private investors, hedge funds and sovereign wealth funds. Commodity index funds pool investors' funds and purchase futures contracts in a wide variety of commodities markets, including agriculture, livestock, energy, base, and precious metals. In each of these markets, the funds have expanded their holdings since 2003 in amounts comparable to those observed in **Table 6**.¹⁵

The purpose of commodity index fund investment is not to gain title to commodities; the funds settle their contract positions in cash. The goal is the benefit of diversification as well as the potential for high rates of return. Commodity prices are thought to vary inversely with financial investments in traditional corporate shares and bonds. For example, if the Dow Jones Industrial Average of corporate shares declines on a particular day, investors might expect to observe an increase in the index value of commodity futures. This inverse performance of financial and commodity markets reduces the over-all risk in investors' portfolios, and presents investors a more favorable risk/return profile.

Since futures contracts in energy markets have a finite time horizon, when the contracts expire, new contracts must be purchased to keep the target balance between stocks, bonds, and commodities in place. As a result, once commodity index fund managers determine that commodity investments are a desirable part of their portfolios, this new source of demand is, in effect, permanent. Any new source of demand, driven not by the fundamentals, or expectations, of oil demand and supply, but by portfolio decisions is likely to raise the price of an oil contract on the futures market, which is transmitted directly to consumers through the linkage between the futures and spot market prices.

For commodity index investments to be an important factor in the increasing price of oil over time, not only must there be an initial expansion of demand, but growing demand in each subsequent time period. This type of demand growth might result from favorable expectations

¹⁴ Michael W. Masters, *Testimony before the Committee on Homeland Security and Governmental Affairs*, United States Senate, May 20, 2008.

¹⁵ *Ibid.*, p. 3.

concerning the fundamentals of the oil market, or it could result from a herd mentality among portfolio managers, which could contribute to a financial bubble due to speculators entering the commodity futures market and driving up prices of contracts. If the commodity futures market has a bias toward this type of upward price movement, and it is supported by strong fundamentals in the real commodity markets, growing demand and/or tight supplies, it is likely that the result will be increasing prices, as observed in the price of oil since 2004.

If the effects of financial speculation either increased the price of oil or caused the price to rise faster than justified by market fundamentals during the first half of 2008, they are likely to have similar, but reverse, effects during the current market downturn. The financial crisis has provided incentives for financial firms and hedge funds to move to a more liquid investment position, increasing their cash balances. This allows the firms to strengthen their balance sheets by reducing their holdings of risky assets, and provides readily accessible reserves should investors demand to withdraw their funds.

Although data is not available, it is likely that some speculative, financial positions on commodity markets have been liquidated as firms strive to increase their cash holdings. This attempt to sell oil could possibly cause the price of oil on the NYMEX to fall, or fall more quickly than justified by the weakening fundamentals in the world oil market.

Value of the Dollar

Many analysts believe the price of oil varies inversely with the value of the dollar against other major currencies, notably the euro. Oil is priced in dollars on the international market. If the dollar falls in value against another currency, it takes fewer units of that currency to purchase the requisite number of dollars needed to buy a barrel of oil. As a result, oil becomes cheaper in the other currency, say the euro, than in dollars. The price of oil measured in dollars then rises. Each dollar purchases a smaller fraction of a barrel of oil as a result. Holding oil, rather than dollars, becomes a way to protect against a declining dollar.

Over the period of rising oil prices, 2004 to mid-2008, the euro/dollar exchange rate has been variable. From January 2, 2004 to January 3, 2005, the euro increased in value relative to the dollar, by 7%. From January 3, 2005 to January 3, 2006, the euro declined in value relative to the dollar by 11%. From January 3, 2006, to January 2, 2007 the euro increased in value relative to the dollar by 10.8%. From January 2, 2007 to January 2, 2008 the euro increased in value relative to the dollar by 10.9%.¹⁶

The increasing value of the euro in 2007 may have been a factor in the increasing price of oil over the same period. As of the end of October 2008, the dollar had begun to strengthen, or increase in value, with respect to the euro and the British pound sterling. This increase in the value of the dollar would tend to weaken the price of oil if the same relationship observed in 2007 continues to hold.

¹⁶ An increase in the value of the euro is the same as a decrease in the value of the dollar.

National Subsidies

In many areas of the world, gasoline consumers have been protected from the effects of higher world oil prices by their governments through fuel subsidies. For example, it was reported that in July 2008 the price for a gallon of gasoline in Venezuela was \$0.12, \$0.40 in Iran, \$0.45 in Saudi Arabia, and \$0.89 in Egypt.¹⁷ High population countries like China, Indonesia, and Russia also subsidize gasoline.

The effect of fuel subsidies is to reduce the ability of the natural market forces of demand to lower price. Consumers make decisions based on artificially set prices. Consumption is higher than it would be if they faced the market price. Producers see less reason to lower prices because demand continues to be strong. The demand effect also affects consumers in nations that do not subsidize. Although consumers in the non-subsidy countries may cut back on consumption when faced with higher prices, their decisions may be negated by demand growth in subsidized markets. In this way, governments that subsidize fuel costs in their domestic markets are adopting a strategy which supports oil producers and high prices.

Nations that subsidize fuel costs do pay a price, whether they are oil exporters or not. The subsidy is generally a large drain on the national treasury, causes inefficient allocation of resources, and anomalies in trade. For example, Iran exports over 2 million barrels per day of crude oil, but imports gasoline because of domestic demand for gasoline that exceeds Iran's refining capacity.

Oil Supply

Oil supply is relatively insensitive to price changes in the short run. More oil production can enter the market in times of high prices only if excess capacity exists at producing fields, given the level of demand.¹⁸ Similarly, production only minimally declines when prices fall, because it is uneconomic to cut production rates at producing fields, due to the wide spread between the cost of extraction and typical levels of price observed over the past five years, as well as high fixed costs. Excess capacity is thought to exist only in the Organization of the Petroleum Exporting Countries (OPEC).

Excess capacity hit a recent peak of about 7 million barrels per day in 2002, and has been lower than peak, but increasing, since 2004. **Table 7** shows the pivotal role played by Saudi Arabia in the world oil market. Saudi excess capacity accounted for 82% of OPEC spare capacity in 2005, and 61% in 2007. Nigerian oil production is subject to disruption due to political upheaval, and Iran and the oil importing nations are at odds over Iran's nuclear ambitions. The most direct way to augment spare capacity in the short-run is through demand reduction, generally as a result of higher prices and slowing economic growth. Because excess capacity has increased over the 2007-2008 period, it is unlikely that excess capacity constraints were the major factor in the recent price increases.

In the longer term, if world demand for oil continues to grow as more nations develop and gain income and wealth, excess capacity is likely to be tight, unless high levels of investment in

¹⁷ CNN Special Report, *U.S. Gas: So Cheap it Hurts*, July 15, 2008.

¹⁸ Excess capacity is sometimes referred to as "spare capacity."

productive capacity take place. Investment in productive capacity is limited by “resource nationalism.” Resource nationalism refers to the practices of countries with known, or suspected, oil reserves that limit access to those potential supplies. If national oil companies, either due to lack of funding, or expertise, or political direction, fail to develop oil resources the world oil market is likely to have difficulty keeping up with world demand, perpetuating high prices.

Table 7. OPEC Excess Crude Oil Capacity
(thousands of barrels per day)

	2005	2006	2007	2008 ^a	2010 ^a
Saudi Arabia	1,473	2,032	2,673	3,456	3,218
Angola	NA	NA	0	47	343
Kuwait	0	128	222	300	294
Qatar	2	28	17	55	136
Neutral Zone	4	53	121	141	115
Algeria	21	10	3	3	103
UAE	21	267	252	339	42
Libya	30	17	34	72	40
Iran	15	143	316	148	40
Nigeria	231	653	720	665	207
Iraq	0	0	0	0	0
Venezuela	0	0	0	0	0
Indonesia	0	0	0	0	0
Total OPEC	1,797	3,332	4,358	5,226	4,539

Source: Petroleum Intelligence Weekly, September 3, 2007.

a. Values for 2008 and 2010 are estimates.

Oil importing countries can create excess capacity in the world market by reducing their own demand, or augmenting their own oil production, if they hold oil reserves. While it is unlikely that any importing countries hold undeveloped reserves comparable to those in the larger OPEC nations, even more modest increases in production may reduce prices due to the price insensitive nature of oil demand. In this type of market, with a low degree of price sensitivity, relatively small changes in production might affect both current and future prices.

Policy Issues

The increases in gasoline and oil prices have led to a number of congressional initiatives. Based on the number of bills introduced, a primary focus of the 110th Congress was on curbing oil speculation activities. Proposed legislation focused on: closing a variety of regulatory loopholes that have prevented regulatory authorities from exercising oversight, increasing regulatory resources, assigning emergency regulatory powers, and attempting to reduce the desirability of

energy futures trading by increasing margin requirements, as well as data reporting.¹⁹ Over three dozen pieces of proposed legislation were considered in the 110th Congress. It is possible, that because activities on the oil futures markets may have escaped regulatory scrutiny, strategies were undertaken that resulted in price manipulation.

Other policy approaches suggested to reduce gasoline prices included the suspension of the federal excise tax on gasoline. This tax is \$0.184 cents per gallon, and the revenue generated is applied to the Highway Trust Fund. Concern was expressed as to whether the tax suspension would be passed on to consumers by refiners who collected the tax, and whether highway construction projects and the local employment they support would be adversely affected.²⁰

In September of 2008, the Highway Trust Fund was approaching a zero balance, a condition that would threaten the continuation and completion of construction projects all over the country. The shortfall in funds came about as a result of reduced revenues linked to declining gasoline purchases resulting from higher prices. A transfer of \$8 billion from the U.S. Treasury to the Highway Trust Fund (P.L. 110-318) was authorized on September 15, 2008.

The United States maintains a Strategic Petroleum Reserve of almost 750 million barrels of oil. Some have suggested that releasing oil from the reserve might reduce prices at the pump. Others felt that the amounts of oil that could be feasibly released were insufficient to affect gasoline prices, or that the OPEC nations might cut their output in response, cancelling any price effect.

Debate also has taken place concerning expansion of domestic supply, by drilling the restricted areas of the outer continental shelf, and other areas. This centered on areas currently excluded from oil development on the Atlantic and Pacific coasts, as well as some excluded areas in the Gulf of Mexico.²¹ Also discussed was opening restricted areas in the Alaska National Wildlife Reserve to exploration and development. It is believed that producible oil deposits exist in these areas, but environmental concerns, the time lag required to complete development, as well as whether the deposits would be significant enough to affect prices in the current and future market, were critical factors in the debate.

Conclusion

Since the 1970s, the oil market has been both cyclic and volatile. Periods of high prices have been followed by price collapses. Up and down turns in price have been abrupt as well as drawn out. Policy proposals that assume that market behavior is predictable and can be projected into the future, are likely to be of limited effectiveness.

Additionally, there have been many goals set out for oil policy, some of them contradictory. For example, over the first half of 2008 there has been interest in lowering gasoline prices, reducing oil dependence, and reducing carbon emissions associated with global warming. Success in

¹⁹ For more on these topics, see CRS Report RL34555, *Speculation and Energy Prices: Legislative Responses*, by Mark Jickling and Lynn J. Cunningham.

²⁰ For more on this topic, see CRS Report RL34475, *Transportation Fuel Taxes: Impacts of a Repeal or Moratorium*, by Robert Pirog and John W. Fischer.

²¹ For more on this topic, see CRS Report RL33493, *Outer Continental Shelf: Debate Over Oil and Gas Leasing and Revenue Sharing*, by Marc Humphries.

lowering gasoline prices would likely increase consumption, which likely would lead to increased oil imports, given the inability of the United States to increase production in the very short term. Increased consumption of petroleum products increases carbon emissions which could make the attainment of any desired emission target more difficult to obtain.

Market forces, both fundamental and financial, changed the direction of both the prices of oil and gasoline. In the 16-week period July 7, 2008, to March 9, 2009, national average gasoline prices fell from \$4.165 to \$1.993 per gallon, a decline of more than 52%. NYMEX oil futures prices were \$145.29 per barrel for WTI on July 3, 2008. On March 16, 2009, WTI was trading at about \$47 per barrel, a decline of about 67%. These declines in prices were as unanticipated as the price increases from January through July. The oil market can be volatile and change direction quickly. That these observed price decreases come as Russia invaded Georgia, threatening oil pipeline shipments from Azerbaijan, unrest and violence continue to occur in Nigeria, and other destabilizing factors affect the market, makes their timing unanticipated.

Should these declines in price persist, and reverse most, or all, of the price increases that took place in the first half of 2008, the immediate pressure to control oil and gasoline prices through government policy might be reduced. Nevertheless, the market conditions that drove oil to record levels could quickly re-appear, if for example, U.S. economic growth picked up.

Policy making in a volatile market is difficult. It may also be hard for the industry to carry out a satisfactory investment plan that is consistent with policy objectives. The capital intensity and high costs of major oil projects require target prices to be attained to provide economic justification. In a sharply volatile market, the industry might not respond in the desired way to a policy measure. For example, policy measures that have the goals of increasing exploration and development of new oil fields, or expanding the capacity the oil refining sector as a way to mitigate high consumer prices, might not be undertaken by the industry if corporate planners view high prices as transitory, and lower prices are incorporated in the company's investment planning.

Author Contact Information

Robert Pirog
Specialist in Energy Economics
rpirog@crs.loc.gov, 7-6847