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ENERGY MARKETS

Factors That Influence Gasoline Prices

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Highlights of GAO-07-902T, a report to the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

Why GAO Did This Study

Few issues generate more attention and anxiety among American consumers than the price of gasoline. The most current upsurge in prices is no exception. According to data from the Energy Information Administration (EIA), the average retail price of regular unleaded gasoline in the United States has increased almost every week this year since January 29th and reached an all-time high of \$3.10 the week of May 14th. Over this time period, the price has increase 94 cents per gallon and added about \$20 billion to consumers' total gasoline bill, or about \$146 for each passenger car in the United States.

Given the importance of gasoline for the nation's economy, it is essential to understand the market for gasoline and the factors that influence gasoline prices. In this context, this testimony addresses the following questions: (1) what key factors affect the prices of gasoline and (2) what effects have mergers had on market concentration and wholesale gasoline prices?

To address these questions, GAO relied on previous reports, including a 2004 GAO report on mergers in the U.S. petroleum industry, a 2005 GAO primer on gasoline prices and a 2006 testimony. GAO also collected updated data from EIA. This work was performed in accordance with generally accepted government auditing standards.

www.gao.gov/cgi-bin/getrpt?GAO-07-902T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Tom McCoolt at (202) 512-2642 or mccoolt@gao.gov.

ENERGY MARKETS

Factors That Influence Gasoline Prices

What GAO Found

The price of crude oil is a major determinant of gasoline prices. However, a number of other factors also affect gasoline prices including (1) increasing demand for gasoline; (2) refinery capacity in the United States that has not expanded at the same pace as the demand for gasoline; (3) a declining trend in gasoline inventories and (4) regulatory factors, such as national air quality standards, that have induced some states to switch to special gasoline blends.

Consolidation in the petroleum industry plays a role in determining gasoline prices as well. For example, mergers raise concerns about potential anticompetitive effects because mergers could result in greater market power for the merged companies, potentially allowing them to increase and sustain prices above competitive levels; on the other hand, these mergers could lead to efficiency effects enabling the merged companies to lower prices. The 1990s saw a wave of merger activity in which over 2600 mergers occurred in all segments of the U.S. petroleum industry. This wave of mergers contributed to increases in market concentration in the refining and marketing segments of the U.S. petroleum industry. Econometric modeling that GAO performed on eight of these mergers showed that, after controlling for other factors including crude oil prices, the majority resulted in wholesale gasoline price increases—generally between about 1 and 7 cents per gallon. While these price increases seem small, they are not trivial because according to FTC's standards for merger review in the petroleum industry, a 1-cent increase is considered to be significant. Additional mergers occurring since 2000 are expected to increase the level of industry concentration further, and because GAO has not yet performed modeling on these mergers, we cannot comment on any potential effect on gasoline prices at this time. However, we are currently in the process of studying the effects of the mergers that have occurred since 2000 on gasoline prices as a follow up to our previous work on mergers in the 1990s. Also, we are working on a separate study on issues related to petroleum inventories, refining, and fuel prices.

Mr. Chairman and Members of the Committee:

We are pleased to participate in the Energy and Commerce Committee's hearing to discuss the factors that influence the price of gasoline. Few issues generate more attention and anxiety among American consumers than the price of gasoline. Periods of price increases are accompanied by high levels of media attention and consumers questioning the causes of higher prices. The most current upsurge in prices is no exception. Anybody who has filled up lately has felt the pinch of rising gasoline prices. Over the last few years, our nation has seen a significant run up in the prices that consumers pay for gasoline. According to data from the Energy Information Administration (EIA), the average retail price of regular unleaded gasoline in the United States reached \$3.10 per gallon the week of May 14, 2007, breaking the previous record of \$3.06 in September of 2005 following Hurricane Katrina. This year, from January 29th to the present, gasoline prices have increased almost every week, and during this time the average U.S. price for regular unleaded gasoline jumped 94 cents per gallon, adding about \$20 billion to consumers' total gasoline bill, or about \$146 for each passenger car in the United States. Spending billions more on gasoline constrains consumers' budgets, leaving less money available for other purchases.

However, for the average person understanding the complex interactions of the oil industry, consumers and the government can be daunting. For example, gasoline prices are affected by the decisions of the industry regarding refining capacity and utilization, gasoline inventories, as well as changes in industry structure such as consolidations; by consumers' decisions regarding the kinds of automobiles they purchase; and by government's regulatory standards. These are some of the key factors affecting gasoline prices that we will discuss today.

Given the importance of gasoline for our economy, it is essential to understand the market for gasoline and what factors influence the prices that consumers pay. You expressed particular interest in the role consolidation in the U.S. petroleum industry may have played. In this context, this testimony addresses the following questions: (1) what key factors affect the prices of gasoline? (2) What effects have mergers had on market concentration and wholesale gasoline prices?

To address these questions, we relied on information developed for a previous GAO report on mergers in the U.S. petroleum industry, the GAO primer on gasoline markets, and a previous testimony on gasoline prices and other aspects of the petroleum industry.¹ We also reviewed reports and other documents by the Federal Trade Commission (FTC) on the U.S. petroleum industry.² In addition, we obtained updated data from EIA. This work was performed in accordance with generally accepted government auditing standards.

In summary, we make the following observations:

- The price of crude oil is a major determinant of gasoline prices. A number of other factors also affect gasoline prices including (1) increasing demand for gasoline; (2) refinery capacity in the United States that has not expanded at the same pace as demand for gasoline in recent years, which coupled with high refinery capacity utilization rates, reduces refiners' ability to sufficiently respond to supply disruptions; (3) gasoline inventories maintained by refiners or marketers of gasoline that have seen a general downward trend in recent years; and (4) regulatory factors, such as national air quality standards, that have induced some states to switch to special gasoline blends that have been linked to higher gasoline prices. Finally, consolidation in the petroleum industry plays a role in determining gasoline prices. For example, mergers raise concerns about potential anticompetitive effects because mergers could result in greater market power for the merged companies, potentially allowing them to increase and sustain prices above competitive levels; on the other hand, these mergers could lead to efficiency effects enabling the merged companies to lower prices.
- The 1990s saw a wave of merger activity in which over 2,600 mergers occurred in all segments of the U.S. petroleum industry. Almost 85 percent of the mergers occurred in the upstream segment (exploration

¹GAO, *Energy Markets: Effects of Mergers and Market Concentration in the U.S. Petroleum Industry*, GAO-04-96 (Washington, D.C.: May 17, 2004); GAO, *Motor Fuels: Understanding the Factors That Influence the Retail Price of Gasoline*, [GAO-05-525SP](#) (Washington, D.C.: May 2005); GAO, *Energy Markets: Factors Contributing to Higher Gasoline Prices*, GAO-06-412T (Washington D.C.: February 1, 2006).

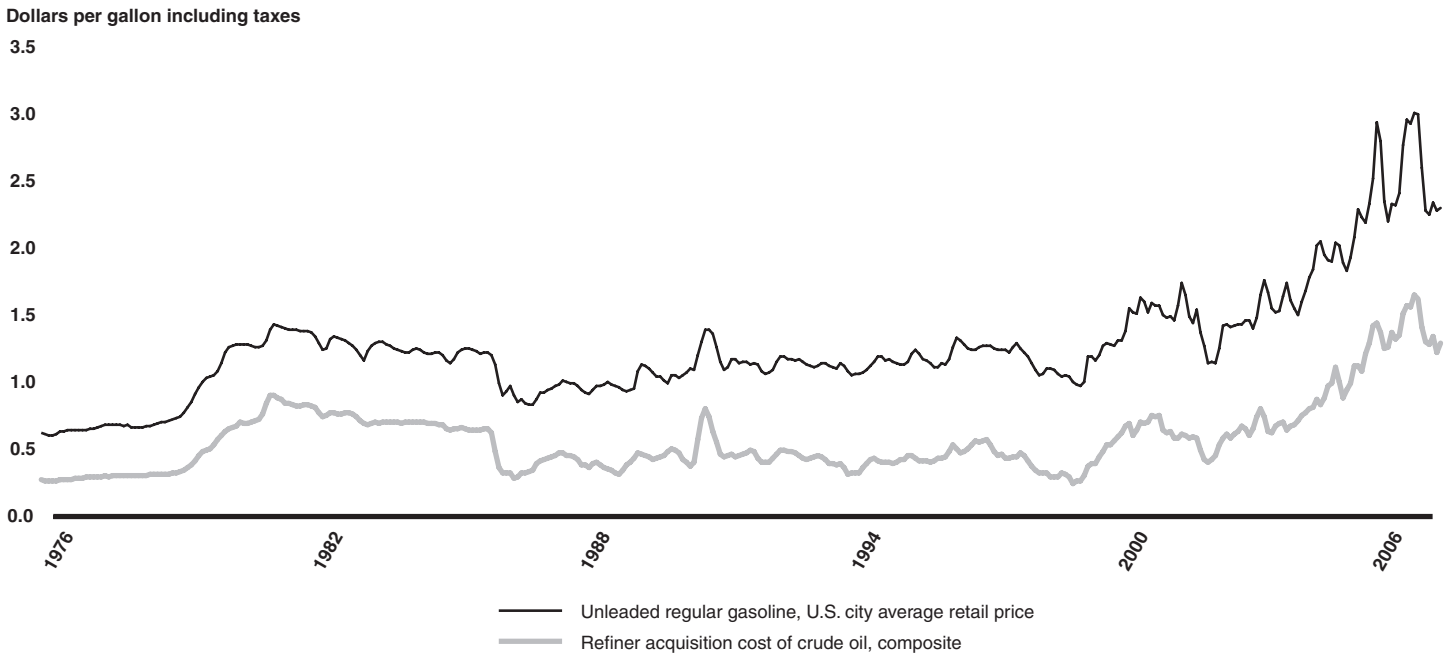
² See, for example, *FTC, The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement*, An FTC Staff Study, August 2004.

and production), while the downstream segment (refining and marketing of petroleum) accounted for 13 percent, and the midstream (transportation) accounted for about 2 percent. This wave of mergers contributed to increases in market concentration in the refining and marketing segments of the U.S. petroleum industry. Anecdotal evidence suggests that mergers may also have affected other factors that impact competition, such as vertical integration and barriers to entry. Econometric modeling we performed of eight mergers involving major integrated oil companies that occurred in the 1990s showed that, after controlling for other factors including crude oil prices, the majority resulted in wholesale gasoline price increases—generally between about 1 and 7 cents per gallon. While these price increases seem small, they are not trivial because according to FTC’s standards for merger review in the petroleum industry, a 1-cent increase is considered to be significant. Additional mergers since 2000 are expected to increase the level of industry concentration. However, because we have not performed modeling on these mergers, we cannot comment on any potential effect on gasoline prices at this time.

Crude Oil Prices and Other Factors Affect Gasoline Prices

Crude oil prices are a major determinant of gasoline prices. As figure 1 shows, crude oil and gasoline prices have generally followed a similar path over the past three decades and have risen considerably over the past few years.

Figure 1: Gasoline and Crude Oil Prices—1976-2006 (Not adjusted for inflation)



Source: GAO analysis of EIA data.

Also, as is the case for most goods and services, changes in the demand for gasoline relative to changes in supply affect the price that consumers pay. In other words, if the demand for gasoline increases faster than the ability to supply it, the price of gasoline will most likely increase. In 2006, the United States consumed an average of 387 million gallons of gasoline per day. This consumption is 59 percent more than the 1970 average per day consumption of 243 million gallons—an average increase of about 1.6 percent per year for the last 36 years. As we have shown in a previous GAO report, most of the increased U.S. gasoline consumption over the last two decades has been due to consumer preference for larger, less-fuel efficient vehicles such as vans, pickups, and SUVs, which have become a growing part of the automotive fleet.³

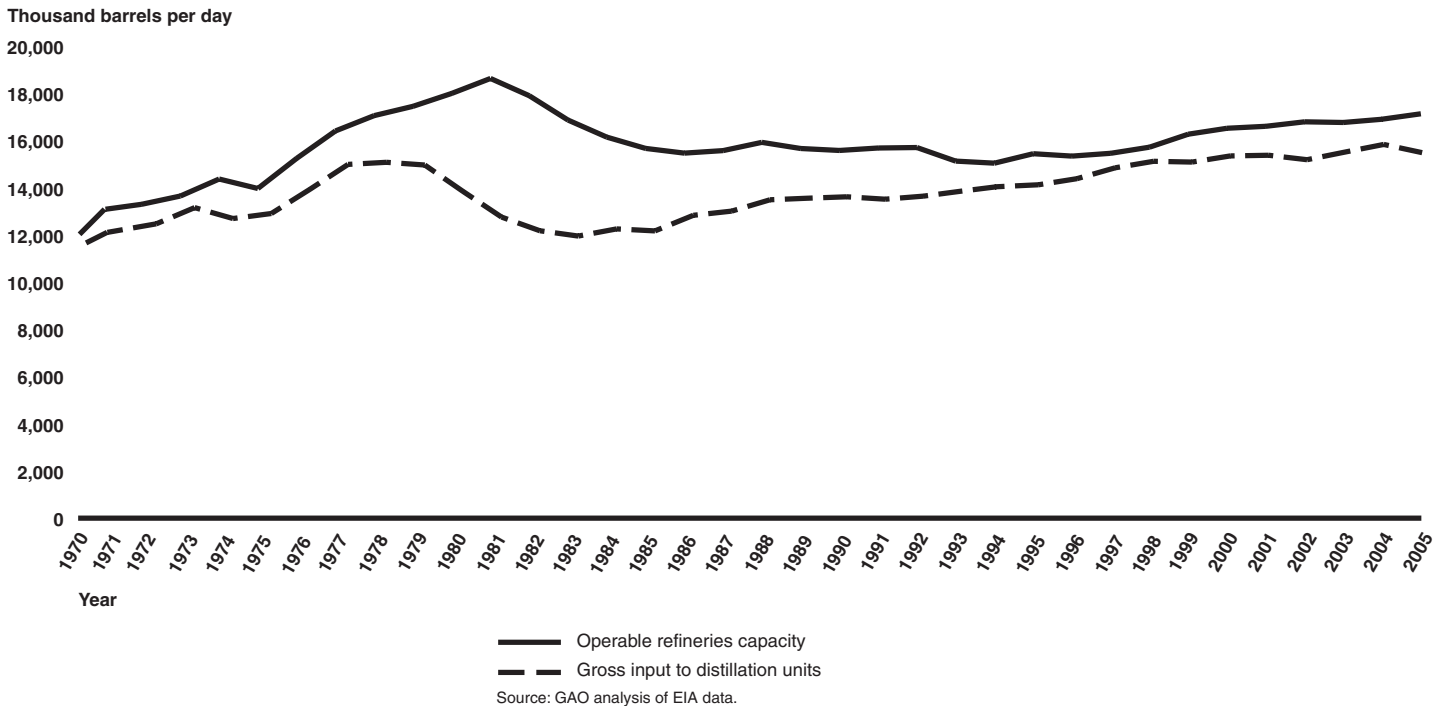
Refining capacity and utilization rates also play a role in determining gasoline prices. Refinery capacity in the United States has not expanded at

³ GAO, *Motor Fuels: Understanding the Factors That Influence the Retail Price of Gasoline*, GAO-05-525SP, (Washington, D.C.: May 2005).

the same pace as demand for gasoline and other petroleum products in recent years. According to FTC, no new refinery still in operation has been built in the U.S. since 1976. As a result, existing U.S. refineries have been running at very high rates of utilization averaging 92 percent since the 1990s, compared to about an average of 78 percent in the 1980s.⁴ Figure 2 shows that since 1970 utilization has been approaching the limits of U.S. refining capacity. Although the average capacity of existing refineries has increased, refiners have limited ability to increase production as demand increases. While the lack of spare refinery capacity may contribute to higher refinery margins, it also increases the vulnerability of gasoline markets to short-term supply disruptions that could result in price spikes for consumers at the pump. Although imported gasoline could mitigate short-term disruptions in domestic supply, the fact that imported gasoline comes from farther away than domestic supply means that when supply disruptions occur in the United States it might take longer to get replacement gasoline than if we had spare refining capacity in the United States. This could mean that gasoline prices remain high until the imported supplies can reach the market.

⁴ The ratio of input to capacity measures the rate of utilization.

Figure 2: U.S. Refinery Capacity and Capacity Utilization, 1970 to 2005



Further, gasoline inventories maintained by refiners or marketers of gasoline can also have an impact on prices. As have a number of other industries, the petroleum industry has adopted so-called “just-in-time” delivery processes to reduce costs leading to a downward trend in the level of gasoline inventories in the United States. For example, in the early 1980s U.S. oil companies held stocks of gasoline of about 40 days of average U.S. consumption, while in 2006 these stocks had decreased to 23 days of consumption. While lower costs of holding inventories may reduce gasoline prices, lower levels of inventories may also cause prices to be more volatile because when a supply disruption occurs, there are fewer stocks of readily available gasoline to draw from, putting upward pressure on prices.

Regulatory factors play a role as well. For example, in order to meet national air quality standards under the Clean Air Act, as amended, many states have adopted the use of special gasoline blends—so-called “boutique fuels.” As we reported in a recent study, there is a general consensus that higher costs associated with supplying special gasoline blends contribute to higher gasoline prices, either because of more

frequent or more severe supply disruptions, or because higher costs are likely passed on, at least in part, to consumers. Furthermore, changes in regulatory standards generally make it difficult for firms to arbitrage across markets because gasoline produced according to one set of specifications may not meet another area's specifications.

Finally, market consolidation in the U.S. petroleum industry through mergers can influence the prices of gasoline. Mergers raise concerns about potential anticompetitive effects because mergers could result in greater market power for the merged companies, either through unilateral actions of the merged companies or coordinated interaction with other companies, potentially allowing them to increase and maintain prices above competitive levels.⁵ On the other hand, mergers could also yield cost savings and efficiency gains, which could be passed on to consumers through lower prices. Ultimately, the impact depends on whether the market power or the efficiency effects dominate.

Mergers in the 1990s Increased Market Concentration and Led to Small But Significant Increases in Wholesale Gasoline Prices; However the Impact of More Recent Mergers is Unknown

During the 1990s, the U.S. petroleum industry experienced a wave of mergers, acquisitions, and joint ventures, several of them between large oil companies that had previously competed with each other for the sale of petroleum products.⁶ More than 2,600 merger transactions occurred from 1991 to 2000 involving all segments of the U.S. petroleum industry. These mergers contributed to increases in market concentration in the refining and marketing segments of the U.S. petroleum industry. Econometric modeling we performed of eight mergers involving major integrated oil companies that occurred in the 1990s showed that the majority resulted in small but significant increases in wholesale gasoline prices. The effects of some of the mergers were inconclusive, especially for boutique fuels sold in the East Coast and Gulf Coast regions and in California. While we have not performed modeling on mergers that occurred since 2000, and thus cannot comment on any potential effect on wholesale gasoline prices at this time, these mergers would further increase market concentration nationwide since there are now fewer oil companies.

Some of the mergers involved large partially or fully vertically integrated companies that previously competed with each other. For example, in

⁵Federal Trade Commission and Department of Justice have defined market power for a seller as the ability profitably to maintain prices above competitive levels for a significant period of time.

⁶We refer to all of these transactions as mergers.

1998 British Petroleum (BP) and Amoco merged to form BPAmoco, which later merged with ARCO, and in 1999 Exxon, the largest U.S. oil company merged with Mobil, the second largest. Since 2000, we found that at least 8 large mergers have occurred. Some of these mergers have involved major integrated oil companies, such as the Chevron-Texaco merger, announced in 2000, to form ChevronTexaco, which went on to acquire Unocal in 2005. In addition, Phillips and Tosco announced a merger in 2001 and the resulting company, Phillips, then merged with Conoco to become ConocoPhillips.

Independent oil companies have also been involved in mergers. For example, Devon Energy and Ocean Energy, two independent oil producers, announced a merger in 2003 to become the largest independent oil and gas producer in the United States at that time. Petroleum industry officials and experts we contacted cited several reasons for the industry's wave of mergers since the 1990s, including increasing growth, diversifying assets, and reducing costs. Economic literature indicates that enhancing market power is also sometimes a motive for mergers, which could reduce competition and lead to higher prices. Ultimately, these reasons mostly relate to companies' desire to maximize profits or stock values.

Proposed mergers in all industries are generally reviewed by federal antitrust authorities—including the Federal Trade Commission (FTC) and the Department of Justice (DOJ)—to assess the potential impact on market competition and consumer prices. According to FTC officials, FTC generally reviews proposed mergers involving the petroleum industry because of the agency's expertise in that industry. To help determine the potential effect of a merger on market competition, FTC evaluates, among other factors, how the merger would change the level of market concentration. Conceptually, when market concentration is higher, the market is less competitive and it is more likely that firms can exert control over prices.

DOJ and FTC have jointly issued guidelines to measure market concentration. The scale is divided into three separate categories: unconcentrated, moderately concentrated, and highly concentrated. The index of market concentration in refining increased all over the country during the 1990s, and changed from moderately to highly concentrated on the East Coast. In wholesale gasoline markets, market concentration increased throughout the United States between 1994 and 2002. Specifically, 46 states and the District of Columbia had moderately or highly concentrated markets by 2002, compared to 27 in 1994.

To estimate the effect of mergers on wholesale gasoline prices, we performed econometric modeling on eight mergers that occurred during the 1990s: Ultramar Diamond Shamrock (UDS)-Total, Tosco-Unocal, Marathon-Ashland, Shell-Texaco I (Equilon), Shell-Texaco II (Motiva), BP-Amoco, Exxon-Mobil, and Marathon Ashland Petroleum (MAP)-UDS.

- For the seven mergers that we modeled for conventional gasoline, five led to increased prices, especially the MAP-UDS and Exxon-Mobil mergers, where the increases generally exceeded 2 cents per gallon, on average.
- For the four mergers that we modeled for reformulated gasoline, two—Exxon-Mobil and Marathon-Ashland—led to increased prices of about 1 cent per gallon, on average. In contrast, the Shell-Texaco II (Motiva) merger led to price decreases of less than one-half cent per gallon, on average, for branded gasoline only.⁷
- For the two mergers—Tosco-Unocal and Shell-Texaco I (Equilon)—that we modeled for gasoline used in California, known as California Air Resources Board (CARB) gasoline, only the Tosco-Unocal merger led to price increases. The increases were for branded gasoline only and were about 7 cents per gallon, on average.

Our analysis shows that wholesale gasoline prices were also affected by other factors included in the econometric models, including gasoline inventories relative to demand, supply disruptions in some parts of the Midwest and the West Coast, and refinery capacity utilization rates.

Concluding Observations

Our past work has shown that, the price of crude oil is a major determinant of gasoline prices along with changes in demand for gasoline. Limited refinery capacity and the lack of spare capacity due to high refinery capacity utilization rates, decreasing gasoline inventory levels and the high cost and changes in regulatory standards also play important roles. In addition, merger activity can influence gasoline prices. During the 1990s, mergers decreased the number of oil companies and refiners and our findings suggest that these changes in the state of competition in the industry caused wholesale prices to rise. The impact of more recent mergers is unknown. While we have not performed modeling on mergers that occurred since 2000, and thus cannot comment on any potential effect

⁷Unbranded (generic) gasoline is generally priced lower than branded gasoline, which is marketed under the refiner's trademark.

on wholesale gasoline prices at this time, these mergers would further increase market concentration nationwide since there are now fewer oil companies.

We are currently in the process of studying the effects of the mergers that have occurred since 2000 on gasoline prices as a follow up to our previous report on mergers in the 1990s. Also, we are working on a separate study on issues related to petroleum inventories, refining, and fuel prices. With these and other related work, we will continue to provide Congress the information needed to make informed decisions on gasoline prices that will have far-reaching effects on our economy and our way of life.

Mr. Chairman, this completes my prepared statement. I would be happy to respond to any questions you or the other Members of the Committee may have at this time.

GAO Contacts and Staff Acknowledgments

For further information about this testimony, please contact me at (202) 512-2642 (mccoolt@gao.gov) or Mark Gaffigan at (202) 512-3841 (gaffiganm@gao.gov). Godwin Agbara, John Karikari, Robert Marek, and Mark Metcalfe made key contributions to this testimony.

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