



The American
Antitrust Institute

Testimony

Before the Joint Economic Committee
United States Senate

**“Is Market Concentration
in the U.S. Petroleum Industry
Harming Consumers?”**

Testimony of

Diana L. Moss

**Vice President and Senior Fellow
American Antitrust Institute**

May 23, 2007

10:00 am

216 Hart Senate Office Building

I. Introduction

I would like to thank Chairman Schumer, Ranking Member Saxton, and the members of the Senate Joint Economic Committee for holding this hearing on concentration in the U.S. petroleum industry and its effects on the American consumer. I appreciate the opportunity to appear here today.¹ The American Antitrust Institute is a non-profit education, research, and advocacy organization. Our mission is to increase the role of competition in the economy, assure that competition works in the interests of consumers, and sustain the vitality of the antitrust laws.

II. Background

“High” petroleum product prices continue to raise public policy concerns in the U.S. A number of factors have attracted particular attention to current gasoline price levels. Retail prices are approaching 25-year highs. The intensity of the most recent price run-up rivals that experienced during the energy crisis of the late 1970s. And while real gasoline prices have actually declined slightly since the early part of the 1900s, the rate of that decrease has fallen off. Together, these factors compound fears that the long-predicted effects of depletion on global supply sources are at last being felt or that other forces such as market power are at work.

The response to high petroleum product prices includes a number of disparate initiatives that directly target high prices or address the underlying structure of the domestic downstream industry that could be driving them. For example, there have been proposals to variously enact, authorize, or implement:

- the U.S. Department of Justice (DOJ) to enforce the Sherman Act against OPEC
- state anti-price gouging laws
- divorcement statutes to limit integrated ownership
- “open supply” regulations enabling lessee-dealer gasoline retailers to purchase supplies from sources other than the lessor-refiner
- unbundling the sale of gasoline at wholesale from the marketing of branded products, thus allowing retailers to “shop” for the commodity
- petroleum-specific extensions or amendments to state and federal antitrust statutes, including merger enforcement
- creation of a government-owned and operated strategic refinery reserve

Most initiatives that target high gasoline prices implicitly acknowledge that crude oil prices, which made up just over 50 percent of retail gasoline prices in 2006, are determined by OPEC--outside the scope of the domestic industry. Thus, most proposals are directed at the downstream segment of the industry controlled by domestic firms. This includes refining, distribution of refined products to storage terminals, and wholesale and retail marketing. These activities collectively make up 30 percent of the retail gasoline

¹ Diana Moss is Vice President and Senior Fellow, American Antitrust Institute (www.antitrustinstitute.org).

price while taxes account for the remaining 20 percent. The forgoing proposals raise a number of important questions.

First, each policy approach purports to have identified the appropriate policy response but it is not clear that there is any consensus on the underlying determinants of high gasoline prices. For example, petroleum commodity prices reflect, to some extent, the effects of resource depletion, technological advances, environmental restrictions (e.g., requirements for reformulated gasoline), low demand and income elasticities, and natural disasters that can result in adverse supply shocks. These factors comprise market forces that can drive price dynamics.

At the same time, however, it is appropriate to look to the structure of downstream petroleum markets for changes in behavioral incentives that could produce anticompetitive conduct resulting in higher prices. For almost 60 years, economists have probed into this possibility. For example, Alfred Kahn and Joel Dirlam in 1952 noted the antitrust agencies' concern over potentially exclusionary conduct in gasoline marketing. The concept of "conscious parallelism" was also applied to gasoline pricing in the 1950s to encourage the Federal Trade Commission (FTC) to recognize that anticompetitive coordination did not necessarily take the form of a conspiracy. The price run-ups of the 1970s generated significant debate on the merits of vertical and/or horizontal divestiture. Finally, refusals to deal and the potential incentives to foreclose rivals associated with integrated refining-marketing have been the subject of earlier analysis, as have entry barriers at the refining level.²

Second, policy proposals highlight the tension between competition policy and broader-based public policy. Competition policy would view domestic petroleum refining and marketing much like any other commodity markets. Antitrust analysis would therefore use accepted methodologies and economic tools to evaluate whether mergers or firm conduct are likely to harm (or harmed) competition and/or consumers. Public policy, on the other hand, is more likely to view high gasoline prices as a societal problem. In addition to traditional consumer welfare and economic efficiency concerns, public policy would also consider quality of life, equity, economic growth, and national security as key factors in crafting approaches. Given these concerns, public policy could view petroleum markets as candidates for special rules or treatment that would not be considered in the realm of competition policy.

² See, e.g., for discussion of various competitive issues: J. B. Dirlam and A. E. Kahn, "Leadership and Conflict in the Pricing of Gasoline," *Yale L. J.* 61, 1952, pp. 818-855; B. Turner, "Conscious Parallelism in the Pricing of Gasoline," *Rocky Mtn. L. Rev.* 32, 1959-1960, pp. 206-222. W. Adams, "Vertical Divestiture of the Petroleum Majors: An Affirmative Case," *Vand. L. Rev.* 30(6), 1977, pp. 1115-1147; J. W. Markham and A. Hourihan, "Horizontal Divestiture in the Petroleum Industry," *Vand. L. Rev.* 31(2), 1978, pp. 237-247; W. L. Novotny, "The Gasoline Marketing Structure and Refusals to Deal with Independent Dealers: A Sherman Act Approach," *Ariz. L. Rev.* 16, 1974, pp. 465-488; and E. V. Rostow and A. S. Sachs, "Entry into the Oil Refining Business: Vertical Integration Re-examined," *Yale L. J.* 61, 1952, pp. 856-914.

Third, if implemented together or in a haphazard manner, various proposals targeting the domestic petroleum industry could open a “Pandora’s Box” of competing and potentially conflicting objectives, stakeholder agendas, and effects on economic efficiency and consumer welfare. It is thus important that approaches attempt to identify the underlying source(s) of high petroleum product prices and chose the appropriate policy instruments for dealing with them. Consolidation and concentration in the domestic petroleum refining and marketing industry should receive a good deal of scrutiny in making this assessment.

III. Concentration in Domestic Petroleum Refining and Marketing

One of the most important features of the domestic petroleum industry has been the significant level of consolidation at the refining and marketing level over the last 20 years. The FTC reports 1,165 mergers in the domestic petroleum industry between 1985 and 2003, at an estimated total value (for transactions of \$10 million or more) of about \$500 billion dollars.³ The Government Accountability Office (GAO), however, cites a much higher figure over a shorter period of time--2,600 transactions from 1991 to 2000.⁴

A number of features of recent petroleum merger activity stand out. First, this activity has shadowed the wave-like, economy-wide pattern in consolidation over the last two decades. Second, the average size of a petroleum merger was three times larger than the average merger deal. Moreover, billion-dollar mergers accounted for about 86 percent of the total \$500 billion in larger transactions.

Third, merger transactions have been disproportionately allocated over various segments of the industry. For example, GAO estimates that 85 percent of mergers proposed during the 1990s were in upstream exploration and production. Two percent of mergers occurred in midstream pipeline transportation and 13 percent of transactions involved downstream refining and markets.⁵ Despite the intensity of merger activity in the upstream segment of the industry, about two-thirds of billion-dollar petroleum mergers in the U.S. involved downstream, integrated assets. Data on mergers enforced by the FTC confirm this observation. For example, of the 72 relevant markets defined by the agency in 15 petroleum merger enforcement actions in the 1980s and 1990s, 36 percent were related to refining and 33 percent involved marketing.⁶ Several transactions (beginning in the mid 1990s) were sizable combinations involving integrated “majors” such as BP-Amoco and

³ Federal Trade Commission (August 2004). *The Petroleum Industry: Mergers, Structural Change, and Antitrust Enforcement*, Tables 4-6 and 4-11.

⁴ Government Accountability Office (July 15, 2004). *Mergers and Other Factors That Affect the U.S. Refining Industry*, p. 0.

⁵ Jim Wells (September 21, 2005). *Factors Contributing to Higher Gasoline Prices*, Testimony of the Director, Natural Resources and Environment, Government Accountability Office, p. 2.

⁶ Data are for the 1980s and 1990s Enforcement actions are those cases in which the FTC required divestiture or other remedial conditions to address competitive concerns. See Federal Trade Commission (undated). “FTC Enforcement Actions in the Petroleum Industry, 1981-2002.”

Exxon-Mobil and the unintegrated “independents” such as Ultramar Diamond Shamrock-Total.

Third, consolidation in refining and marketing generated a relatively higher level of antitrust scrutiny. On average, about 13 percent of petroleum and marketing transactions that were cleared for investigation by either FTC or DOJ were challenged, as compared to roughly two percent of all transactions. These challenges include transactions in which one of the agencies filed a complaint, requested injunctive relief, or settled the case through consent decree. In the majority of merger enforcement actions in downstream petroleum, the FTC has posited horizontal theories of harm in which the merged firm could unilaterally withhold capacity to drive up price or achieve the same result through coordinated interaction. It is not clear, however, if vertical theories of harm have played a substantive role in petroleum merger analysis. These include, for example, the foreclosure of rival gasoline retailers by vertically integrated refiner-marketers in order to increase profits in retail markets. Enforcement statistics for all industries indicate that in only about nine percent of merger cases did the agencies propose a vertical theory of harm.⁷

IV. The Role of Refining

Refining is a major feature that defines the landscape of the domestic downstream petroleum industry. Much like electricity transmission, refining is arguably a production “bottleneck,” or a level through which all inputs produced in complementary markets must flow to ultimately reach the consumer. Control of bottleneck facilities—particularly with integrated ownership—has long raised concerns over market power, via: (1) unilateral withholding of output or restricted investment in capacity; (2) leverage of market power from the bottleneck level to a complementary level; or (3) the possibility of oligopolistic coordination involving production or capacity investment decisions.

Several major features of refining highlight its bottleneck characteristics. For example, the number of operating refineries declined by 44 percent from the mid 1970s through early 2000s with no new refinery additions. This apparent tightening of refining capacity in the U.S. should be considered in light of several developments. The phase-out of crude oil price controls in 1981 reduced incentives to operate small, inefficient facilities so the decline in refinery numbers over time may reflect the work-off of obsolete inefficient capacity. Since the early 1980s, refiners have also developed higher capacity and more technologically advanced facilities through increased computerization, employment of advanced catalysts, additional processing units at existing facilities, networking of refinery facilities, and other improvements that allow refiners (among other things) to process more sulfurous crudes as inputs and net greater volumes of more valuable refined products. A 15 percent increase in crude oil distillation capacity at U.S. refineries over the last 20 years, however, should be considered with care.⁸ For example, the majority of refining capacity resides in large facilities that account for the bulk of operating

⁷ FTC, *Horizontal Merger Investigation Data, Fiscal Years 1996-2005*, Table 1.

⁸ See <http://tonto.eia.doe.gov/dnav/pet/hist/mocgggu2A.htm>.

distillation capacity.⁹ Utilization rates at this smaller number of larger refineries have also increased over time,¹⁰ rising from a low of almost 70 percent in 1981 to around 95 percent in the late 1990s and early 2000s.

Concentration in U.S. refining markets should be carefully scrutinized against the backdrop of fewer, larger and more sophisticated refineries operating at very high utilization rates. At the broadest level, refining markets have become more concentrated over the last 20 years.¹¹ Concentration in most PADD districts has increased since 1985, in some cases by over 100 percent. By the DOJ/FTC *Horizontal Merger Guidelines (Guidelines)* standards, concentration in PADD II, III, IV, and V was moderate (between around 1,000 and 1,200 HHI) and high in PADD I (around 1,900 HHI) by the early 2000s.

PADD-based refining concentration statistics, however, do not reflect the actual geographic dimensions of markets. For example, PADD boundaries are likely to encompass far broader areas than what consumers would consider in searching out alternative sources of supplies. Those areas--determined by pipeline constraints and production cost differentials—are likely to be much smaller and more concentrated than PADD-based markets.

Data on relevant antitrust markets is helpful for developing a more accurate picture of refining concentration. For example, concentration statistics are available for about 20 relevant downstream petroleum markets defined by the FTC in 15 enforcement actions in the 1980s and 1990s. About two-thirds of these markets would be considered highly concentrated on a pre-merger basis, with HHIs ranging from 1,800 to as high as 6,700.¹² The remaining one-third of relevant markets are unconcentrated to moderately concentrated. These statistics are significantly higher than PADD-based concentration figures.

V. The Role of Marketing

Another important feature of the domestic petroleum industry is how refined products—particularly gasoline—are marketed. Much like refining, the structure of wholesale markets has changed significantly. For example the number of terminals in the U.S. decreased by almost 50 percent over the 1980s to 1990s.¹³ By the late 1990s, PADD V was highly concentrated (around 2,000 HHI) and the remaining PADDs were moderately

⁹ FTC (2004), Table 7-4.

¹⁰ Among other things, higher utilization minimizes the opportunity cost of holding excess capacity. See FTC (2004) at 7.

¹¹ How refining capacity is measured raises a number of important issues. Most quoted figures use distillation capacity, but alternative measures could be based on type of refined product and sources of crude inputs.

¹² Merger-related increases in concentration in many of these markets are as high as 1,600 HHI points.

¹³ FTC (2004), Table 9-1.

concentrated (between around 1,100 and 1,600 HHI). Increases in concentration are the most pronounced in PADDs I, II and III.

Much like refining, broad regional concentration statistics may not accurately reflect wholesale market structures. Terminal networks are likely to be defined around smaller, metropolitan areas which encompass a consumer's universe of economic alternatives. We turn again to merger data to sharpen the picture. For example, about eight relevant markets identified by the FTC in the 15 enforcement actions discussed earlier involve terminalling and marketing. Over one-half of these markets are highly concentrated (1,565 to 4,600 HHI) and the remaining are moderately concentrated. As in the case of refining, merger-specific wholesale concentration statistics are significantly higher than regional PADD-based statistics.

Brand concentration in retail markets has also increased over time. The GAO observes, for example, that one of the major changes in gasoline marketing has been a decrease in sales of unbranded (generic) gasoline relative to branded gasoline. For example, brand concentration increased by 25 percent and 36 percent in PADD III and PADD IV, respectively, during the 1990s to early 2000s.¹⁴ Accompanying an increase in brand concentration is a smaller number of retail outlets (e.g., a 16 percent decrease overall and a 63 percent decrease in outlets owned by the majors).¹⁵ Some of the decrease in numbers of retail outlets is likely due to the increasing capital intensity of gasoline marketing. Growth of the convenience store/gasoline distribution channel reflects the rise of higher-volume outlets owned by independents such as Sheetz and RaceTrac. Hypermarkets such as Costco, Walmart, and club warehouses are also accounting for an increasing percentage of retail outlet share.¹⁶

VI. What Economic Analysis Tells Us

There is a sizable body of research on competitive issues involving the domestic downstream petroleum industry, much of which has arisen from the debate over high and/or volatile gasoline prices. The research addresses three major topics that relate to the competitive implications of downstream petroleum market structures and behavioral incentives facing firms: (1) "asymmetry" between upstream and downstream petroleum prices; (2) effects of divorcement and open supply regulation; and (3) merger-related price effects.

The first type of analysis attempts to determine the statistical significance of the tendency for downstream petroleum prices to increase faster than upstream prices when upstream prices are on the rise, but to fall more slowly when upstream prices are on the decline. Such "asymmetry" or the so-called "rockets and feathers" effect occurs most often

¹⁴ FTC (2004), Table 9-7.

¹⁵ See EIA (August 19, 2004) and FTC (2004), Table 9-3.

¹⁶ FTC (2004) at 11. The GAO reports (July 2004 at 0) that refiners deal more with large distributors and retailers than in the past.

between wholesale and retail gasoline prices, followed by crude oil-retail gasoline prices and spot gasoline-crude oil prices. There are various theories that could explain asymmetry, including oligopolistic coordination (e.g., signaling adherence to a collusive agreement at the refining or retail levels), consumer search costs, and inventory adjustment costs. However, no single theory emerges as a prevailing explanation.

A second category of analysis responds to various proposals to limit integration between refiners and gasoline retailers (i.e., “divorcement” legislation). Other proposals would allow lessee-dealer retailers to purchase gasoline supplies from sources other than the lessor-refiner—otherwise known as “open supply” regulation. Here, the research appears to show that forced deintegration of refiners and retailers is associated with higher costs and/or consumer prices. Such policies are therefore not likely to be the most effective in dealing with vertical competitive concerns unless it can be determined that such integration creates incentives for anticompetitive conduct.

A third class of studies evaluates the effect of mergers on wholesale and retail gasoline prices. These assessments range over the price effects of increased market concentration, to the role of independent gasoline retailers in disciplining retail gasoline prices, to incentives for exclusionary conduct associated with vertical integration. The research appears to at least support the notion that merger activity in the U.S. since the mid-1990s involving refiner-marketer combinations has increased wholesale and, sometimes, retail prices. However, petroleum merger studies have generated a good deal of technical controversy inside the economic community.

VII. Synthesis and Recommendations

The industry trends discussed above sketch out a picture of an industry that has undergone significant change in the last decade. A number of observations are worth making. First, the bulk of merger activity has been concentrated in very large transactions that involve downstream, integrated refining and marketing assets. Moreover, while the share of refining capacity owned by the majors fell from 72 percent in 1990 to 54 percent in 1998, the independents (e.g., Citgo/PDV America, Ultramar Diamond Shamrock, and Valero Energy) tripled their share of capacity from eight to 23 percent—largely by buying the divested assets of the majors.¹⁷ These independents are now vertically integrated downstream to a significant degree.

Higher levels of concentration in refining, at wholesale, and at the retail level, are not particularly surprising in light of this activity. Indeed, it should raise significant questions regarding the availability of competitive alternatives available to: (1) jobbers and other distributors that purchase at the rack, (2) independent gasoline retailers that potentially face the prospect of dealing more and more with integrated refiner-markets, and (4) consumers in obtaining supplies of competitively priced gasoline.

¹⁷ EIA (August 19, 2004). All other domestic refiners maintained stable market shares from 1990 to 1998.

Second, the transformation of the U.S. refining industry emphasizes the increasingly bottlenecked nature of the segment. High sunk costs, environmental regulations, and the declining availability of domestic crude inputs collectively act to discourage new entry that could inject additional competition into refining. Moreover, technological change and the phase-out of price controls have driven the movement to fewer, higher-capacity refineries that operate at high utilization rates. And while efficiency in the refining sector has likely increased, it is also the case that operation of bottlenecks at high utilization levels can create unique opportunities for the exercise of market power.

Third, economists have made valiant attempts to estimate the price effects of both horizontal and vertical domestic petroleum mergers. At the same time, this research has been met with considerable resistance, largely over the robustness of findings to different econometric specifications. For example, the FTC--in critiquing the GAO's studies--convened a panel of experts that called for additional research in order to "test the validity of assumptions that underlie existing methodologies used to estimate merger price effects."¹⁸ This debate reveals an often observed tension in economic analysis involving controversial policy issues. Thus, the results of petroleum merger studies (which appear to show, on balance, merger-induced increases in wholesale and retail prices) should probably motivate even more rigorous antitrust scrutiny.¹⁹

Merger review could probably be improved within the existing framework of the antitrust agency *Guidelines*. Rigorous approaches to market definition should clearly identify refining bottlenecks. Theories of competitive harm should consider how a merger affects the firm's ability and incentive to adversely affect prices or output. Here, it is particularly important to consider not only horizontal theories of harm, but vertical ones, including the possibility of vertical foreclosure. It may be the case—as in electricity markets—for example, that manipulation of even small amounts of strategic refining capacity may result in very profitable anticompetitive price increases. Thus, small market shares may not necessarily mean small market power. Simulation models are also useful for evaluating unilateral price effects under alternative scenarios. Finally, evaluation of joint ventures and alliances should focus on the ways that such coordination may reduce the intensity of competition without necessarily being reflected in concentration statistics.²⁰

¹⁸ FTC Staff Technical Report (December 21, 2004). "Robustness of the Results in GAO's 2004 Report Concerning Price Effects of Mergers and Concentration Changes in the Petroleum Industry," p. 2. L. M. Froeb, et al, (2005). "Economics at the FTC: Cases and Research, with a Focus on Petroleum" *Review of Industrial Organization* 27, pp. 237.

¹⁹ Not all studies evaluate the net effect of mergers on retail prices, which would provide some sense of the consumer welfare impact of mergers. While the magnitude of estimated price increases described by various studies may seem small, they can translate into a significant loss of welfare in a market that amounts to billions of dollars in annual retail gasoline sales.

²⁰ See, e.g., threshold issues litigated in *Texaco v. Dagher*, 126 S. Ct. 1276 (2006).