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Prepared Statement of the Federal Trade Commission

Market Forces, Anticompetitive Activity, and Gasoline Prices: FTC Initiatives to Protect Competitive Markets

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Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs
Committee on Government Reform
United States House of Representatives

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I. Introduction

Mr. Chairman and members of the Subcommittee, I am Bill Kovacic, General Counsel of the Federal Trade Commission. I am pleased to appear before you to present the Commission's testimony on the two important questions posed by the Subcommittee for this hearing: what factors have contributed to recent gasoline price increases in the United States, and what steps might serve to decrease gasoline prices over the short term and long term?[1]

The petroleum industry plays a crucial role in our economy. Not only do changes in gasoline prices affect consumers directly, but the price and availability of gasoline also influence many other economic sectors. No other industry's performance is more visibly or deeply felt.

The FTC's petroleum industry activities today reflect the sector's importance. The Commission fully exercises every tool at its disposal – including the prosecution of cases, the preparation of studies, and advocacy before other government bodies – to protect consumers from anticompetitive conduct and from unfair or deceptive acts or practices. In doing so, the FTC has built an unequaled base of competition and consumer protection experience and expertise in matters affecting the production and distribution of gasoline.

The Commission's testimony today addresses the Subcommittee's inquiries in two parts. It first reviews the basic tools that the Commission uses to promote competition in the petroleum industry: challenges to potentially anticompetitive mergers, prosecution of nonmerger antitrust violations, monitoring industry behavior to detect anticompetitive conduct, and research to understand petroleum sector developments. This segment of the testimony highlights what we

[1]This written statement represents the views of the Federal Trade Commission. My oral presentation and responses to questions are my own and do not necessarily represent the views of the Commission or any individual Commissioner.

[2] A simple regression of the monthly average national price of gasoline on the monthly average price of West Texas Intermediate crude oil shows that the variation in the price of crude oil explains approximately 85 percent of the variation in the price of gasoline. Data for the period January 1984 to October 2003 were used. This is similar to the range of effects given in United States Department of Energy/Energy Information Administration, *Price Changes in the Gasoline Market: Are Midwestern Gasoline Price.009tednwarStaticky?ɟ2de oil short-0.0009i in the*

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relief in moderately concentrated petroleum markets.[8]

1. Recent FTC Merger Investigations

Three recent merger investigations illustrate the FTC's approach to merger analysis in the petroleum industry. The first is the merger of Chevron and Texaco,[9] which combined assets located throughout the United States. Following an investigation in which 12 states participated, the Commission issued a consent order against the merging parties requiring numerous divestitures to maintain competition in particular relevant markets, primarily in the western and southern United States. Among other requirements, the consent order compelled Texaco to: (a) divest to Shell and/or Saudi Refining, Inc. all of its interests in two joint ventures – Equilon[10] and Motiva[11] – through which Texaco had been competing with Chevron in gasoline marketing in the western and southern United States; (b) divest the refining, bulk supply, and marketing of gasoline satisfying California's environmental quality standards; (c) divest the refining and bulk supply of gasoline and jet fuel in the Pacific Northwest; and (d) divest the pipeline transportation of crude oil from the San Joaquin Valley of California.

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[8]Federal Trade Commission Horizontal Merger Investigation Data, Fiscal Years 1996-2003 (Feb. 2, 2004), Table 3.1, et seq.; FTC Horizontal Merger Investigations Post Merger HHI and Change in HHI for Oil Markets, FY 1996 through FY 2003 (May 27, 2004), *available at* http://www.ftc.gov/opa/2004/05/040527petrolactionsHHIdeltachart.pdf.

[9]*Chevron Corp.*, Docket No. C-4023 (Dec. 18, 2001) (Consent Order).

[10]Shell and Texaco jointly controlled the Equilon venture, whose major assets included full or partial ownership in four refineries, about 65 terminals, and various pipelines. Equilon marketed gasoline through approximately 9,700 branded gas stations nationwide.

[11]Motiva, jointly controlled by Texaco, Shell, and Saudi Refining, consisted of their eastern and Gulf Coast refining and marketing businesses. Its major assets included full or partial ownership in four refineries and about 50 terminals, with the companies' products marketed through about 14,000 branded gas stations nationwide.

A second important oil merger that the Commission recently challenged was the $6 billion merger between Valero Energy Corp. ("Valero") and Ultramar Diamond Shamrock Corp. ("Ultramar").[12] Both Valero and Ultramar were leading refiners and marketers of gasoline that met the specifications of the California Air Resources Board ("CARB gasoline") and were the only significant suppliers to independent stations in California. The Commission's complaint alleged competitive concerns in both the refining and bulk supply of CARB gasoline in California, and the Commission contended that the merger could raise the cost to California consumers by at least $150 million annually for every one-cent-per-gallon price increase at retail.[13] To remedy the Commission's competitive concerns, the consent order settling the case required Valero to divest: (a) an Ultramar refinery in Avon, California; (b) all bulk gasoline supply contracts associated with that refinery; and (c) 70 Ultramar retail stations in Northern California.

As a third example, the Commission challenged the merger of Phillips Petroleum Company and Conoco Inc., alleging that the transaction would harm competition in the Midwest

[12]*Valero Energy Corp.,* Docket No. C-4031 (Feb. 22, 2002) (Consent Order).

[13]The Commission also alleged competitive concerns in the refining and bulk supply of CARB gasoline for sale in Northern California, contending that a price increase of one cent per gallon would increase costs to consumers in that area by approximately $60 million per year.

[14]*Conoco Inc. and Phillips Petroleum Corp.*, Docket No. C-4058 (Aug. 30, 2002) (Analysis of Proposed Consent Order to Aid Public Comment). Not all oil industry merger activity raises competitive concerns. For example, late last year, the Commission closed its investigation of Sunoco's acquisition of the Coastal Eagle Point refinery in the Philadelphia area without requiring relief. The Commission noted that the acquisition would have no anticompetitive effects and seemed likely to yield substantial efficiencies. *Sunoco Inc./Coastal Eagle Point Oil Co.*, FTC File No. 031-0139 (Dec. 29, 2003) (Statement of the Commission).

subsequently made some changes in its methodology, the basic criticisms we made of the draft report apply equally to the GAO's final report. The GAO report still contains major methodological mistakes that make its quantitative analyses wholly unreliable. It relies on critical factual assumptions that are both unstated and unjustified, and it presents conclusions that lack a quantitative foundation. Simply stated, the GAO report is fundamentally flawed.[17]

The Commission appends to today's testimony a detailed FTC staff analysis of the GAO report. That analysis highlights the GAO report's many flaws. Three particularly significant problems are noted here.[18] First, the GAO's models do not properly control for the numerous factors that cause gasoline prices to increase or decrease, and this failure to control for relevant variables significantly undermines any results of the GAO study. We cannot determine with precision the effects of this inadequate control on GAO's results, because GAO has refused to share with us the methodology and documentation (including data) to allow us to do so. Nevertheless, our Bureau of Economics has demonstrated that the GAO report did not account for several factors that affect gasoline prices, including changes in gasoline formulation and seasonal changes in demand. To the extent that these omitted variables are correlated with concentration or mergers or other variables, these omissions bias the GAO's estimates of the effects of concentration and mergers on wholesale gasoline prices.

A second problem is that any reliable price-concentration study must be based on one or more properly defined geographic markets. If a merger affects competition, it does so in the

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[17]The criticisms discussed here and in the detailed staff appendix have taken into account the explanations GAO has provided in response to the concerns the FTC had earlier raised.

[18]The Appendix explains in detail the additional analysis that our staff performed.

particular geographic market in which that competition occurs. Unless the affected geographic area is correctly delineated, the researcher cannot have confidence that his results have anything to do with measured changes in concentration. If the market is defined too broadly or too narrowly, the researcher cannot accurately represent that any change in prices may have been caused by the change in measured concentration.

Through decades of experience, the Commission has developed substantial expertise in defining relevant geographic markets in which to measure concentration and competitive effects. Neither the draft GAO report nor the final report measures concentration in *any* properly defined geographic market. This problem is sufficient to deny the GAO report any validity in assessing the effect of concentration on prices.

Third, the GAO report fails to consider critical facts about the individual mergers it studied – omissions that render its results particularly suspect. For example, the relatively large and statistically significant price increases that the GAO report associates with the Exxon/Mobil merger appear implausible on their face, when considered in conjunction with the extensive restructuring effectuated by the Commission's consent order. Among other remedial measures, as a condition for allowing the transaction to proceed, the FTC required large-scale divestitures of Exxon and Mobil assets (including 1,740 retail outlets in the Northeast and Mid-Atlantic states, pipeline interests, terminals, jobber supply contracts, and brand rights) in the regions in which the GAO identified merger-related price increases. The divestitures essentially eliminated the competitive overlap between Exxon and Mobil in gasoline marketing in New England and the mid-Atlantic states south to Virginia (all in PADD I) and also eliminated marketing overlaps in parts of Texas (PADD III). Particularly with respect to branded prices, therefore, we strongly

[19]The value of

In addition to scrutinizing mergers, the Commission aggressively polices anticompetitive nonmerger activity. When it appears that higher prices might result from collusive activity or from anticompetitive unilateral activity by a firm with market power, the agency investigates to determine whether unfair methods of competition have been used. If the facts warrant it, the Commission challenges the anticompetitive behavior, usually by issuing an administrative complaint.

Several recent petroleum investigations deserve discussion. On March 4, 2003, the Commission issued an administrative complaint, stating that it had reason to believe that the Union Oil Company of California ("Unocal") had violated Section 5 of the FTC Act. The Commission alleged that Unocal deceived the California Air Resources Board in connection with regulatory proceedings to develop the reformulated gasoline ("RFG") standards that CARB adopted. Unocal allegedly misrepresented that certain technology was non-proprietary and in the public domain, while at the same time it pursued patents that would enable it to charge substantial royalties if CARB mandated Unocal's technology in the refining of CARB-compliant

[21]The Administrative Law Judge concluded that the *Noerr-Pennington* doctrine protected much of the conduct alleged to constitute unfair methods of competition, and that the FTC lacked jurisdiction over the remaining allegations because they depended on resolution of substantial questions of patent law.

[22]FTC Press Release, *FTC Closes Western States Gasoline Investigation* (May 7, 2001), *available at* http://www.ftc.gov/opa/2001/05/westerngas.htm. In part, this investigation focused on "zone pricing" and "redlining." *See Statement of Commissioners Sheila F. Anthony, Orson Swindle and Thomas B. Leary, available at*

Marketing, Federal Trade Commission, Bureau of Economics Working Paper (Mar. 2004),

pipeline disruptions, and low inventories. Secondary factors included high crude oil prices that contributed to low inventory levels, the unavailability of substitutes for certain environmentally required gasoline formulations, increased demand for gasoline in the Midwest, and, in certain states, *ad valorem* taxes. Importantly, the industry responded quickly to the price spike. Within three or four weeks, an increased supply of product had been delivered to the Midwest areas suffering from the supply disruption. By mid-July 2000, prices had receded to pre-spike or even lower levels.

The Commission's merger investigations also are relevant to the detection of nonmerger antitrust violations. FTC merger investigations since the mid-1990s uniformly have been major undertakings that have reviewed all pertinent facets of the relevant petroleum markets. These investigations have involved the review of thousands of boxes of documents in discovery, examination of witnesses under oath, and exhaustive questioning of outside experts. During these investigations, Commission staff have not only analyzed traditional merger issues but have also looked for evidence of potential anticompetitive effects related to unilateral market power, collusion, and ongoing illegal conduct.

The discussion above covers but a few of the gasoline pricing investigations to which the Commission has devoted substantial time and resources. To date, we have identified no instances of collusion among petroleum companies or of illegal unilateral firm conduct. Of course, that does not mean that anticompetitive acts cannot occur, which is why the agency continues to be vigilant in pursuing its enforcement mission.

C. Recent Commission Research on Factors That Can Affect Prices of Refined Petroleum Products

[24]Individual firms may have little or no market power even if industry demand is

in prices[25] and then examine whether any such movements might result from anticompetitive conduct that violates Section 5 of the FTC Act. FTC economists developed a statistical model

[25]An "unusual" price movement in a given area is a price that is significantly out of line with the historical relationship between the price of gasoline in that area and the gasoline prices prevailing in other areas.

[26]Natural causes include movements in crude oil prices, supply outages (*e.g.*, from refinery fires or pipeline disruptions), or changes in and/or transitions to new fuel requirements imposed by air quality standards.

Regional price spikes for gasoline have occurred in various parts of the country, and many areas have experienced substantial price increases for gasoline in recent months. As noted above, the FTC is monitoring wholesale and retail gasoline prices in cities throughout the country and will continue to analyze these data to seek explanations for pricing anomalies. A look at some recent price spikes illustrates the kinds of factors, other than crude oil prices, that affect retail price levels.

a. ARIZONA

[27]Marginal supply is the last product brought into a market and effectively sets the equilibrium price. It is also the increment of product that can adjust in the short run to market conditions and thus ameliorate price spikes.

Retail prices in Phoenix increased during the week immediately following the August 8 pipeline shutdown (the week ending August 16) to levels higher than predicted by historical relationships.[28] As California refineries increased supply shipments to Arizona (displacing refining capacity that could otherwise serve California markets), retail prices in Los Angeles increased above the predicted level during the week ending August 23. On August 24, Kinder Morgan opened a temporary by-pass of the pipeline section affected by the rupture, and prices quickly fell. The average price of regular gasoline began to drop immediately. By the end of August, gasoline prices in the Phoenix area were falling. They continued to drop through September and October.[29] (See Figure 4.)

Marked price increases in the wake of a sudden, severe drop in supply are a normal market reaction. Because gasoline is so important to consumers, a large price increase may be required to reduce quantity demanded so that it is equal to available supply. Price increases in turn attract additional supplies, which should then cause prices to decline. This response occurred in the Kinder Morgan rupture.

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[28]Price increases in Phoenix were not large enough to equate short-run supply and demand. Gasoline was effectively rationed by queuing – long lines of motorists – and many stations ran out of gasoline. *See Phoenix Gas Crisis Worsens*, MSNBC News (Aug. 21, 2003) (only 45 percent of retail stations had product to sell), *available at* http://www.msnbc.com/local/AZSTAR/A1061452904.asp?0cv=BB10; *Phoenix Gas Stations Running Dry After Pipeline Shut Down*, Associated Press (Aug. 18, 2003), *available at* http://www.cnn.com/2003/US/Southwest/08/18/phoenix.gas.crunch.ap/.

[29]In examining this pricing anomaly, the FTC staff consulted with the Attorney General offices in Arizona and California.

b. ATLANTA

Another recent price anomaly picked up by the monitoring project occurred in Atlanta, Georgia, and surrounding counties. This anomaly is not the traditional price spike that attracts the public's attention. Instead, it took the form of a small, sustained increase. Atlanta and its surrounding counties have experienced gasoline formulation changes in the past few years that have differentiated it from the rest of the Southeast. On April 1, 2003, an interim low-sulfur standard of 90 parts per million ("ppm") took effect. Soon thereafter, Georgia required the 45-county area surrounding Atlanta to introduce a new 30 ppm low-sulfur gasoline by September 16. These formulation changes increased the cost of producing gasoline. After the 90 ppm standard was implemented, gasoline prices in Atlanta increased.

After the 90 ppm standard was instituted in April, and even more frequently after the 30 ppm standard was instituted in September, the Commission's monitoring project picked up small anomalies in Atlanta gasoline pricing. Atlanta and the surrounding area have experienced slightly higher prices relative to historical levels because of the greater costs of making low-sulfur gasoline. This increase is illustrated at Figure 5.

c. MID-ATLANTIC AREA

A third pricing anomaly occurred in September and October of last year. GTm0.0007 Tcu.9 6Grtf ratpe

The FTC staff's examination of this anomaly, which included consultation with each affected state's Attorney General, ultimately concluded that the elevated price in this area stemmed from a number of factors. In late August 2003, the Northeast was hit particularly hard by an increase in demand that drew down gasoline stocks in all regions of the United States.[30] The August 14 blackout further affected the Northeast, temporarily shutting down seven refineries. While the blackout appeared to have little immediate impact on U.S. retail gasoline prices, the reduction in supply from four refineries in Ontario, Canada, whose operations were hampered by the power outage, significantly affected the price of gasoline in Ontario. Typically, the Northeastern states receive significant gasoline imports from Canada. Throughout much of August, however, wholesale prices in Toronto exceeded wholesale prices in Buffalo by approximately 25 cents per gallon, a sign that Canada was shipping less product into the Northeast. FTC staff confirmed a sizeable drop in exports of gasoline from Canada to the Northeast in August 2003.[31] By the end of September, rack prices in Toronto and Buffalo had returned to rough equality, and imports from Canada returned to their usual level.

On top of the low inventories, both the switch from summer to winter grade gasoline and the switch in New York and Connecticut from MTBE-blended[32] reformulated gasoline to ethanol RFG caused a disincentive to build inventories in August and September. While refineries in the Northeast increased production during this period, important additional supply to this area comes

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[30]DOE, *Inquiry into August 2003 Gasoline Price Spike*, at 35-42 (Nov. 2003).

[31]FTC staff compiled the import data from tariff and trade data from the U.S. Department of Commerce, the U.S. Department of the Treasury, and the U.S. International Trade Commission.

[32]"MTBE" is Methyl Tertiary-Butyl Ether.

by pipeline from the Gulf and imports from abroad. Both of these sources of supply require significant response times, however. Given the shipping lags and the impending switches in formulation, there was limited time – as well as a disincentive – to ship additional summer specification RFG to the Northeast.

d. WESTERN STATES

FTC staff identified a pricing anomaly involving the Western United States during February and March 2004. Figures 7 through 10 show the actual and predicted bounds of the price of retail gasoline in Las Vegas and Reno, Nevada, and Los Angeles and San Francisco, California. Figures 11 and 12 show the actual and predicted range of the wholesale price of gasoline in Los Angeles and San Francisco, respectively.

[33]Information for the wholesale price of gasoline is provided because Nevada receives its gasoline by pipeline from both Los Angeles and San Francisco.

[37]OIL & GAS JOURNAL (Mar.1, 2004).

[38]Testimony of Pat Perez, *supra* note 34; *see also* California Energy Commission, Questions & Answers: California Gasoline Price Increases, *available at*

Commission constantly studies factors that can affect refined petroleum product prices. The Commission held public conferences in 2001 and 2002[40] that made important contributions to our knowledge about the factors that affect gasoline prices. The Commission is preparing a report on the proceedings of these conferences and related work.

The Commission also is updating its 1982 and 1989 petroleum merger reports to focus on mergers and structural change in the oil industry since 1985. In March, Commission staff economists released a retrospective study of the effects of the Marathon-Ashland joint venture in Kentucky.[41] This paper examines the price effects of the Marathon-Ashland joint venture by comparing the wholesale and retail prices of gasoline in a number of regions unaffected by the merger to prices of gasoline in Louisville, Kentucky. The transaction does not seem to have affected the relative price of gasoline in Louisville.

III. Factors Affecting Gasoline Prices

Through its merger and nonmerger enforcement activity, and through its conferences, studies, and advocacy work, the FTC has examined in detail the central factors that may affect the level and volatility of refined petroleum product prices. Below we review just a few of those factors.

The most important factor affecting both the level and movement of gasoline prices in the

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[40]FTC Press Release, *FTC to Hold Second Public Conference on the U.S. Oil and Gasoline Industry in May 2002* (Dec. 21, 2001), *available at* http://www.ftc.gov/opa/2001/12/gasconf.htm.

[41]Christopher T. Taylor & Daniel S. Hosken, *The Economic Effects of the Marathon-Ashland Joint Venture: The Importance of Industry Supply Shocks and Vertical Market Structure*, Federal Trade Commission, Bureau of Economics Working Paper (Mar. 2004), *available at* http://www.ftc.gov/be/workpapers/wp270.pdf.

United States is the price of crude oil.[42] Changes in crude oil prices account for approximately 85 percent of the variability of gasoline prices.[43] When crude oil prices rise, gasoline prices rise. (See Figure 1.) Crude oil prices are determined by supply and demand conditions worldwide, most notably by production levels set by OPEC countries.[44] Other factors that affect the supply of and demand for crude oil, such as the fast-growing demand for petroleum in China, also influence the price of gasoline in the United States.

Inventories of both crude oil and refined products also have an important effect on retail

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[42]While the impact of crude oil prices on gasoline prices is widely recognized, it is often alleged that gasoline prices are "sticky downward" – that is, gas prices go up like "rockets" and come down like "feathers"in response to changes in oil prices. For a review of the empirical literature testing this hypothesis, see John Gewecke, *Issues in the "Rockets and Feathers" Gasoline Price Literature*, submitted in conjunction with the Federal Trade Commission Conference, *Factors That Affect the Price of Refined Petroleum Products II* (May 8, 2002), *available at* http://www.ftc.gov/bc/gasconf/comments2/gewecke2.pdf. This paper indicates there are serious and sometimes fundamental flaws with the papers showing asymmetric response.

[43]*See* note 2, *supra*.

[44]OPEC members today account for 40 percent of world crude oil production and 80 percent of world crude oil reserves. As a substantive matter, competitor cartels that limit supply or fix prices are illegal under U.S. antitrust laws. However, the U.S. antitrust agencies must account for considerations beyond the substantive merits of a case before bringing such a lawsuit. *See* Federal Trade Commission, Prepared Statement, *Competitive Problems in the Oil Industry*, Before the Committee on the Judiciary, United States House of Representatives (Mar. 29, 2000).

The share of world crude oil production accounted for by U.S.-based companies declined from 10.8 percent in 1990 to 8.5 percent in 2003; the share of these firms is similarly low for world crude oil reserves. Recent large mergers among major oil companies have had little impact on concentration in world crude oil production and reserves. For example, Exxon and Mobil, which merged in 1999, had worldwide shares of crude oil production in 1998 of 2.1 percent and 1.3 percent, respectively; in 2001, the combined firm's share was 3.4 percent. The BP/Amoco merger combined firms with world crude oil reserves of 0.7 percent and 0.2 percent in 1997; the combined firm's world crude oil reserve share in 2001, which reflects the acquisition of ARCO in 2000 and the divestiture of ARCO's Alaska North Slope crude oil to Phillips, was 0.8 percent.

gasoline prices. At our August 2001 conference,[45] a representative of the Energy Information Administration reported that "OPEC [production] cuts and high crude prices affect gasoline prices directly through the feedstock cost but also indirectly by reducing gasoline inventories."[46] Participants also commented that average inventories for refined products have declined over time,

[45]Transcripts of the conference and papers submitted to the *Federal Trade Commission Public Conference: Factors that Affect Prices of Refined Petroleum Products*, are available at http://www.ftc.gov/bc/gasconf/index.htm. The dates of the conferences were August 2, 2001, and May 8 and May 9, 2002.

[46]John Cook (EIA), Aug. 2 tr. at 52.

[47]Thomas Greene (California Attorney General Office), Aug. 2. tr. at 11 ("[i]n the 1990's, reserves and inventories [in California] have declined roughly 20-plus percent"); Rothschild (Podesta/Mattoon), Aug. 2 tr. at 82 (consistently below an average of 5 days of gasoline inventory); Mark Cooper (Cons. Fed. of Am.), written statement at 21.

[48]In a recent study of the petroleum inventory system, the National Petroleum Council concluded that the trend toward lower product inventories was "the result of improved operating efficiencies partially offset by operational requirements for an increased number of product formulations to comply with environmental regulations," noting also that "[s]ince holding inventory is a cost, there is an underlying continuous pressure to eliminate that which is not needed to meet customer demand or cannot return a profit to the holder." National Petroleum Council, *U.S. Petroleum Product Supply–Inventory Dynamics*, at 11 (Dec. 1998). The National Petroleum Council study also concluded that "[c]ompetition has resulted in the consumer realizing essentially all of the cost reductions achieved in the downstream petroleum industry." *Id*. at 22.

refineries with limited gasoline production capacity.[55] Despite these closures, refining capacity

[55]*See* Figure 15, Refinery Closures, 1995 to 2003, showing crude oil distillation capacity of closed refineries.

[56]*See* EIA, *Petroleum Supply Annual 1996* (Table 36); EIA, *Weekly Petroleum Status Report,* Table 2, U.S. Petroleum Activity, January 2003 to present.

[57]For example, the FTC examined bulk product supply conditions affecting the Midwest in its investigation of price spikes affecting that area in the spring of 2000. Since that time product pipeline capacity from the Gulf to the Midwest has increased significantly. The Centennial pipeline, with a capacity of 210 MBD, opened in 2002. *See* Marathon Oil Company, *Marathon Ashland Petroleum, LLC, available at* http://www.marathon.com/Our_Business/Marathon_Ashland_Petroleum_LLC/. Explorer, another major pipeline bringing refined products from the Gulf to the Midwest, added 110 MBD of capacity in an expansion project that was completed in 2003. *See* Willbros Group Inc., *Explorer Mainline Expansion, available at* http://www.willbros.com/pdf/0277.pdf.

[58]Environmental Protection Agency, *Air Quality and Emissions Trends Report* (2002).

The Environmental Protection Agency estimates that the cost of producing a gallon of reformulated gasoline is 4 to 8 cents per gallon more than the cost of producing conventional gasoline.[59] These costs may be even higher during supply disruptions, when significant marginal costs are incurred as firms attempt quickly to alter previously determined production runs.

In addition, several participants at the FTC conferences reported that the proliferation of different environmentally mandated gasoline blends has reduced the ability of firms to ship gasoline from one region to another in response to supply disruptions.[60] (Figure 16 illustrates

[59]Robert Larson (EPA), May 8 tr. at 74.

[60]*E.g.*, John Felmy (American Petroleum Institute), Aug. 2 tr. at 26; Benjamin Cooper (Ass'n of Oil Pipe Lines), Aug. 2 tr. at 102. According to one participant, "[t]ight specifications for reformulated gasoline sold in [California] and limited pipeline interconnections . . . isolate the California gasoline market from gasoline markets in the rest of the country," thus contributing to higher prices in the state. Richard Gilbert (U. Cal. Berkeley), written statement at 3-4.

[61]A number of different fuel blend requirements have been introduced since passage of the Clean Air Act of 1990. For example, regulations governing fuel blends in California have been introduced and implemented in 1992, 1996 and 2003 (CARB I, II, and III.). Additionally, RFG Phase 1 (1995) and RFG Phase 2 (2000) affect various other states. Tier 2 low-sulfur gasoline regulations are being phased in now. Additionally, various regional specifications have been phased in over the last decade.

the President's National Energy Report (May 2001). The President's Report directed the EPA Administrator to "study opportunities to maintain or improve the environmental benefits of state and local 'boutique' fuels programs, while exploring ways to increase the flexibility of the fuels distribution infrastructure, improve fungibility, and provide added gasoline market liquidity."[62] The FTC staff commented that the EPA might find it beneficial to use a framework similar to the one the FTC uses to analyze mergers, to determine the competitive effects likely to result from changes in fuel mandates in particular relevant markets.[63] The FTC staff offered suggestions to the EPA concerning how it might perform such an analysis.

Other federal and state laws and regulations were identified by conference participants as affecting gasoline prices. For example, a federal statute known as the Jones Act[64] increases the

[62]*Study of Unique Gasoline Fuel Blends ("Boutique Fuels"), Effects on Fuel Supply and Distribution and Potential Improvements*, EPA Staff White Paper at 1-2.

[63]The FTC's experience shows that economically relevant gasoline markets are regional for refining and transportation, and local for gasoline distribution or retail sales. For example, a refinery that does not – or cannot in the short run – produce the type of gasoline currently in short supply in a certain region cannot be considered to be in that market for purposes of resolving short-run price spikes. FTC Staff Comments, Study of Unique Gasoline Fuel Blends ("Boutique Fuels"), Effects on Fuel Supply and Distribution and Potential Improvements, Dkt. No. A-2001-20, Before the Environmental Protection Agency at 4 (Jan. 30, 2002).

[64]Sec. 27 of the Merchant Marine Act of 1920, as amended, 46 App. U.S.C. §883; *see also* 19 C.F.R. §§4.80, 4.80b.

the assumption that a foreign ship has operating costs of only 59 percent of a Jones Act ship.[65] The observed cost of transportation of refined petroleum products from the Gulf Coast to the West Coast, 10-25 cents per gallon,[66] implies that the Jones Act imposes an additional cost of at least 4 cents per gallon when it is necessary to transport gasoline using Jones Act ships.

A number of states have also adopted statutes or regulations that substantially influence

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[65]The Economic Effects of Significant U.S. Import Restraints, U.S. International Trade Commission, Pub. No. 3519 (June 2002).

[66]California Energy Commission, Gulf Coast to California Pipeline Feasibility Study (Aug. 2003).

[67]*See* Michael G. Vita, *Regulatory Restrictions on Vertical Integration and Control: The Competitive Impact of Gasoline Divorcement Policies*, 18 J. REG. ECON. 217 (2000) (finding that retail gasoline prices are two to three cents per gallon higher in states with divorcement laws); Asher A. Blass & Dennis W. Carlton, *The Choice of Organizational Form in Gasoline Retailing and the Cost of Laws that Limit that Choice*, 44 J. L. & ECON. 511 (2001) (estimating that divorcement increases costs of operation by about three to four cents per gallon) .

[68] *See* Vita, *supra* note 67 (noting that in 1993 – at that time the last year for which data were available – the price of regular unleaded gasoline in those states that banned self-service was three cents per gallon higher than in states that allowed self-service); *see also* R. Johnson & C. Romeo, *The Impact of Self-Service Bans in the Retail Gasoline Market*, 82 REV. ECON & STAT. 625 (2000) (finding the cost of self-service bans to be three to five cents per gallon).

[69]The Minnesota Department of Commerce recently ordered Kwik Trip, Inc., and Murphy Oil USA Inc. to "cease and desist" from selling gasoline at too low a price. The allegation in both cases was that the respondent had "engaged in the offer and sale of gasoline below the minimum allowable price." Minnesota Department of Commerce, *Enforcement Actions May*

Competition, et al., to Wisconsin State Rep. Shirley Krug (Oct. 15, 2003),

Figure 1

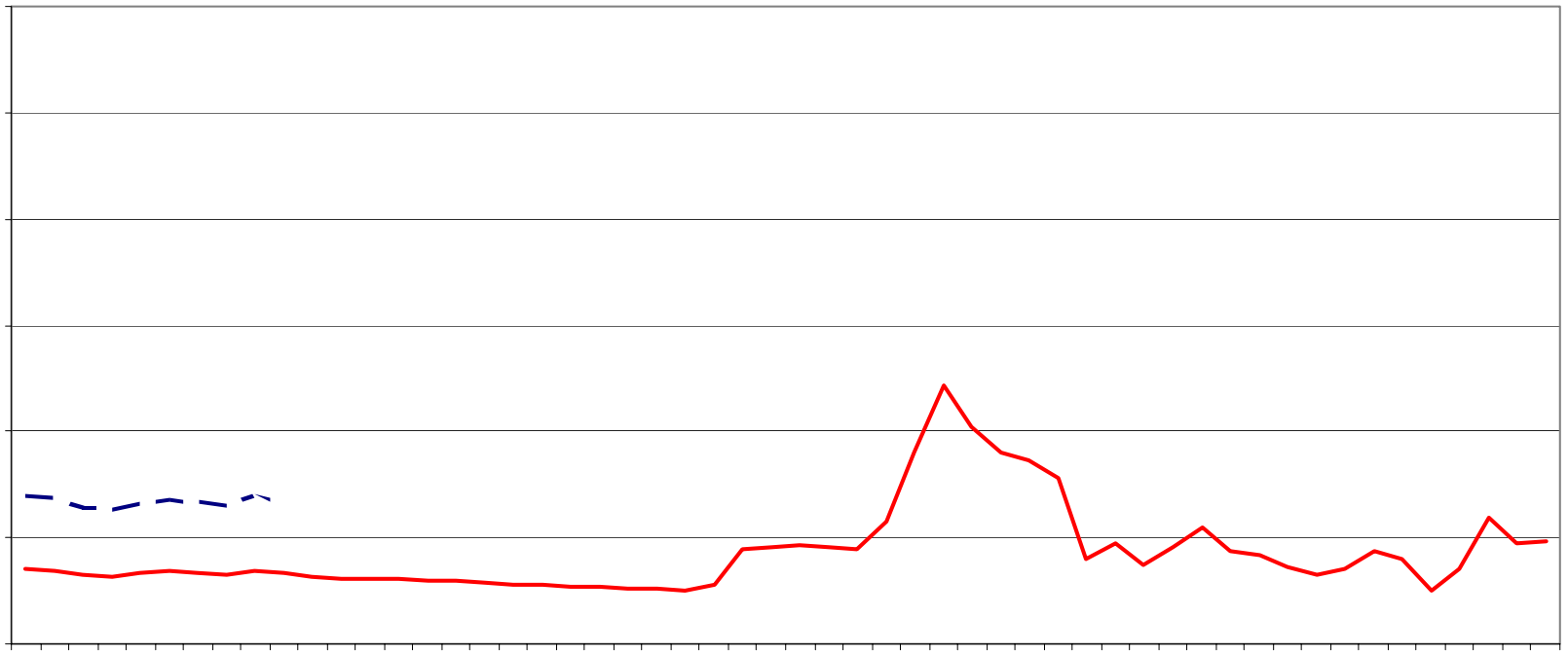


Figure 2

FTC Merger Enforcement Actions in the Petroleum Industry, 1981-2003

Firms (Year)*	Markets Affected	Theory of Anti-competitive Effects	Concentration (HHI)	FTC Enforcement Action
Mobil/ Marathon[1] (1981)	Wholesale marketing of gasoline and middle distillates in various markets in the Great Lakes area	Unilateral / Coordinated[2]		

Figure 2 *(continued)*

Firms (Year)*	Markets Affected	Theory of Anti-competitive Effects	Concentration (HHI)	FTC Enforcement Action
	2. Transport of light products to the inland Southeast	Coordinated[12]	Not publicly available	Divestiture of Gulf's interest in the Colonial Pipeline
	3. Wholesale distribution of gasoline and middle distillates in numerous markets in West Virginia and the South	Coordinated	Not publicly available	Divestiture of all Gulf marketing assets in six states and parts of South Carolina
	4. Transport of crude oil from West Texas/New Mexico	Unilateral / Coordinated[13]	Not publicly available	Divestiture of Gulf interests in specified crude oil pipelines, including 51% of Gulf's interest in the West Texas Gulf Pipeline Company
Conoco/ Asamera[14] (1986)	1. Bulk supply (from refineries and pipelines) of gasoline and other light products to eastern Colorado	Unilateral[15] / Coordinated	Not publicly available	FTC voted to seek preliminary injunction; parties abandoned the transaction
	2. Purchasing of crude oil in the Denver-Julesberg Basin of northeastern Colorado	Unilateral	Not publicly available	As above
PRI/Shell[16] (1987)	1. Terminaling and marketing of light petroleum products on the individual island of Oahu, HI	Unilateral / Coordinated	Not publicly available	FTC won preliminary injunction in U.S. District Court; prior approval required for future acquisitions
	2. Terminaling and marketing of light petroleum products on the individual islands of Maui, Hawaii, and Kauai in the state of Hawaii (potential competition)	Unilateral / Coordinated	Not publicly available	As above
Sun/Atlantic[17] (1988)	Terminaling and marketing of light products in Williamsport, PA and Binghamton, NY	Coordinated	Not publicly available	Divestiture of terminal and associated owned retail outlets in each area
Shell/Texaco[18] (1997)	1a. Refining of gasoline for the Puget Sound area	Unilateral / Coordinated	Post-merger 3812 Change 1318	Divestiture of Shell refinery at Anacortes, WA; Shell jobbers and dealers given option to contract with purchaser
	1b. Refining of jet fuel for the Puget Sound area	Unilateral / Coordinated	Post-merger 5248 Change 481	As above

Figure 2 *(continued)*

Firms (Year)*	Markets Affected	Theory of Anti-competitive Effects	Concentration (HHI)	FTC Enforcement Action
	2. Gasoline marketing in five metro areas of Texas	Unilateral / Coordinated	Post-merger range from 1000-1800 Change >100 to Post-merger >1800 Change >50 (all inferred)	Divestiture of Mobil's retail outlets and supply agreements
	3. Gasoline marketing in Arizona (potential competition)	Coordinated	Not applicable	Termination of Exxon's option to repurchase retail outlets previously sold to Tosco
	4. Refining and marketing of "CARB" gasoline in California	Unilateral / Coordinated	Post-merger 1699 Change 171 (measured by refining capacity)	Divestiture of Exxon's refinery at Benicia, CA, and all of Exxon's marketing assets in CA, including assignment to the refinery buyer of supply agreements for 275 outlets
	5. Refining of Navy jet fuel on the west coast	Unilateral / Coordinated	Post merger >1800 (inferred) Change >50 (inferred)	As above
	6. Terminaling of light products in Boston, MA and Washington, DC areas	Unilateral / Coordinated	Post merger >1800 (inferred) Change >50 (inferred)	Divestiture of a Mobil terminal in each area
	7. Terminaling of light products in Norfolk, VA area.	Unilateral / Coordinated	Post merger >1800 (inferred)	Continuation of competitor access to wharf
	8. Transportation of light products to the Inland Southeast	Coordinated[23]	Post-merger >1800 (inferred)	Divestiture of either party's pipeline interest
	9. Transportation of Crude Oil from the Alaska North Slope	Coordinated[24]	Post-merger >1800 (inferred) Change >50 (inferred)	Divestiture of Mobil's 3% interest in TAPS
	10. Terminaling and gasoline marketing assets on Guam	Unilateral / Coordinated	Post-merger 7400 Change 2800	Divestiture of Exxon's terminal and retail assets on the island

Figure 2 *(continued)*

Firms (Year)*	Markets Affected	Theory of Anti-

Figure 2

Figure 2 *(continued)*

Firms (Year)*	Markets Affected	Theory of Anti-competitive Effects	Concentration (HHI)	FTC Enforcement Action

[10] Both Texaco and Getty owned refineries and proprietary pipeline systems in the relevant market. While Texaco produced less heavy crude oil than it could refine, Getty produced more than it could refine on the West Coast. The Complaint alleged that the merger was "likely to increase Texaco's incentives and ability to deny non-integrated refiners heavy crude oil and access to proprietary pipelines." Texaco/Getty (1984), Complaint ¶ 50-57.

[11] Chevron/Gulf (1984), Complaint ¶ 15-41.

[12] Gulf owned the largest share, 16.78%, of Colonial Pipeline, while Chevron owned the second largest share, 27.13%, of Plantation Pipeline, Colonial's only direct competitor. Chevron/Gulf (1984), Complaint ¶ 25-26.

[31] The FTC alleged that BP Amoco, ARCO, and Exxon Mobil were the only three companies that held "sufficiently large volumes of gas reserves to have the potential to develop those reserves for significant commercial use." BP/ARCO (2000), Analysis of Proposed Consent Order to Aid Public Comment.

[32] BP and ARCO together accounted for 43% of storage capacity, 49% of pipeline capacity, and 95% of trading services at Cushing. BP/ARCO (2000), Analysis of Proposed Consent Order to Aid Public Comment.

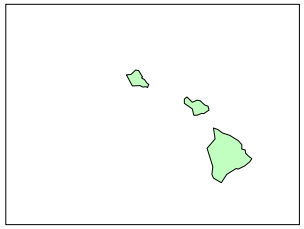
[33] Chevron/Texaco (2001), Complaint ¶ 12-57; Analysis of Proposed Consent Order to Aid Public Comment.

[34] Chevron held a 17% interest in Explorer Pipeline, and Texaco and Equilon (Texaco's joint venture with Shell) together held 36%. Explorer is the largest pipeline supplying bulk Phase II Reformulated Gasoline (RFG II) to St. Louis; at the time, Equilon also had a long-term contract that gave it control of much of the output of a local St. Louis area refinery. Chevron/Texaco (2001), Analysis of Proposed Consent Order to Aid Public Comment.

[35] Equilon owned 100% of Delta, and Chevron owned 50% of Cypress; these two pipelines were the only means of transporting crude from the Eastern Gulf of Mexico to on-shore terminals. Chevron/Texaco (2001), Analysis of Proposed Consent Order to Aid Public Comment.

[36] Texaco owned 33% of the Discovery Gas Transmission System; Chevron and its affiliate Dynegy together owned 77% of the Venice Gathering System, one of only two other pipeline systems for transporting natural gas from this area. Chevron/Texaco (2001), Analysis of Proposed Consent Order to Aid Public Comment.

[37] Chevron owned 26% of Dynegy, which held large interests in two of the four fractionators in the market, and had representation on Dynegy's Board of Directors;



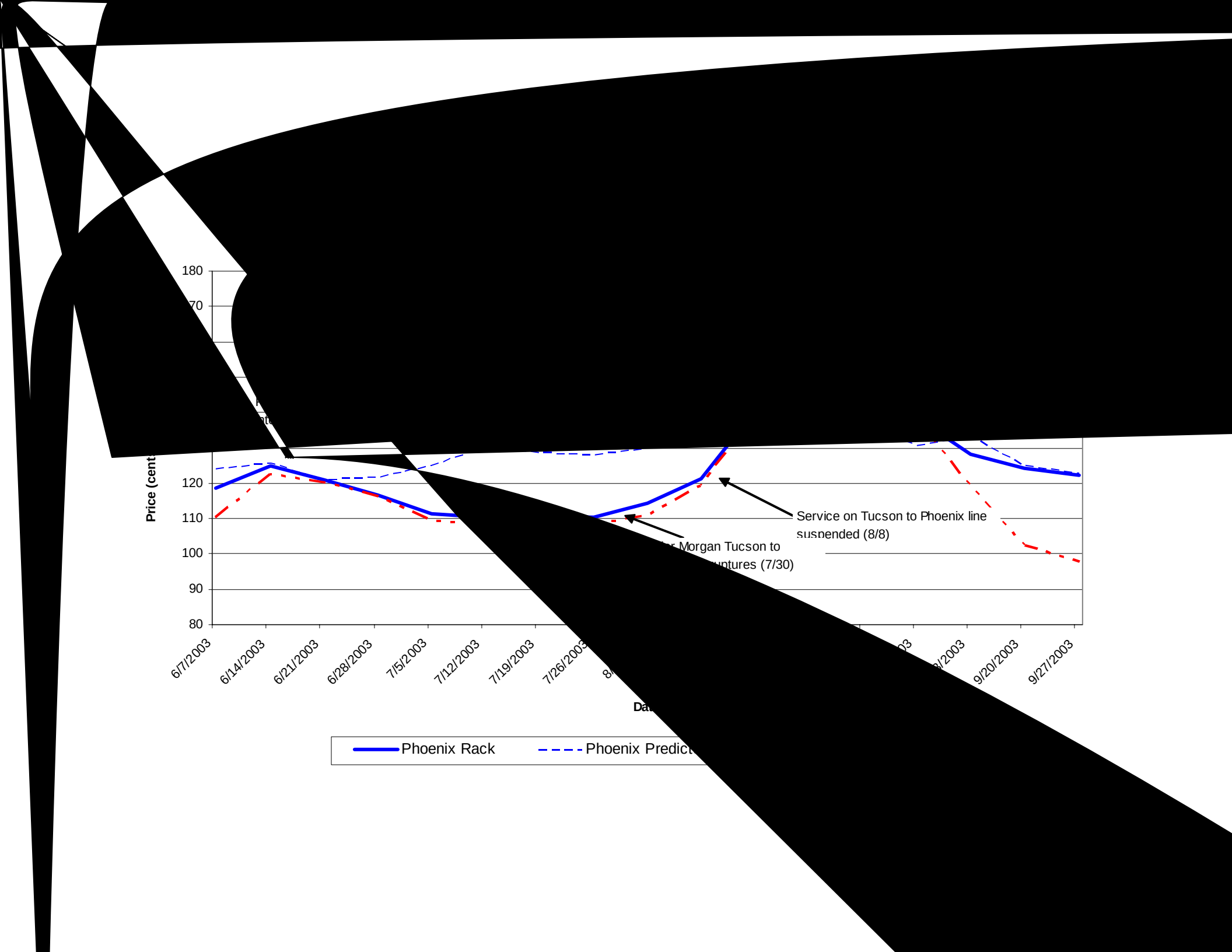

180
120
110
100
90
80
6/7/2003
6/14/2003
6/21/2003
6/28/2003
7/5/2003
7/12/2003
7/19/2003
7/26/2003
9/20/2003
9/27/2003
Service on Tucson to Phoenix line
suspended (8/8)
Phoenix Rack

Figure 5

Figure.6

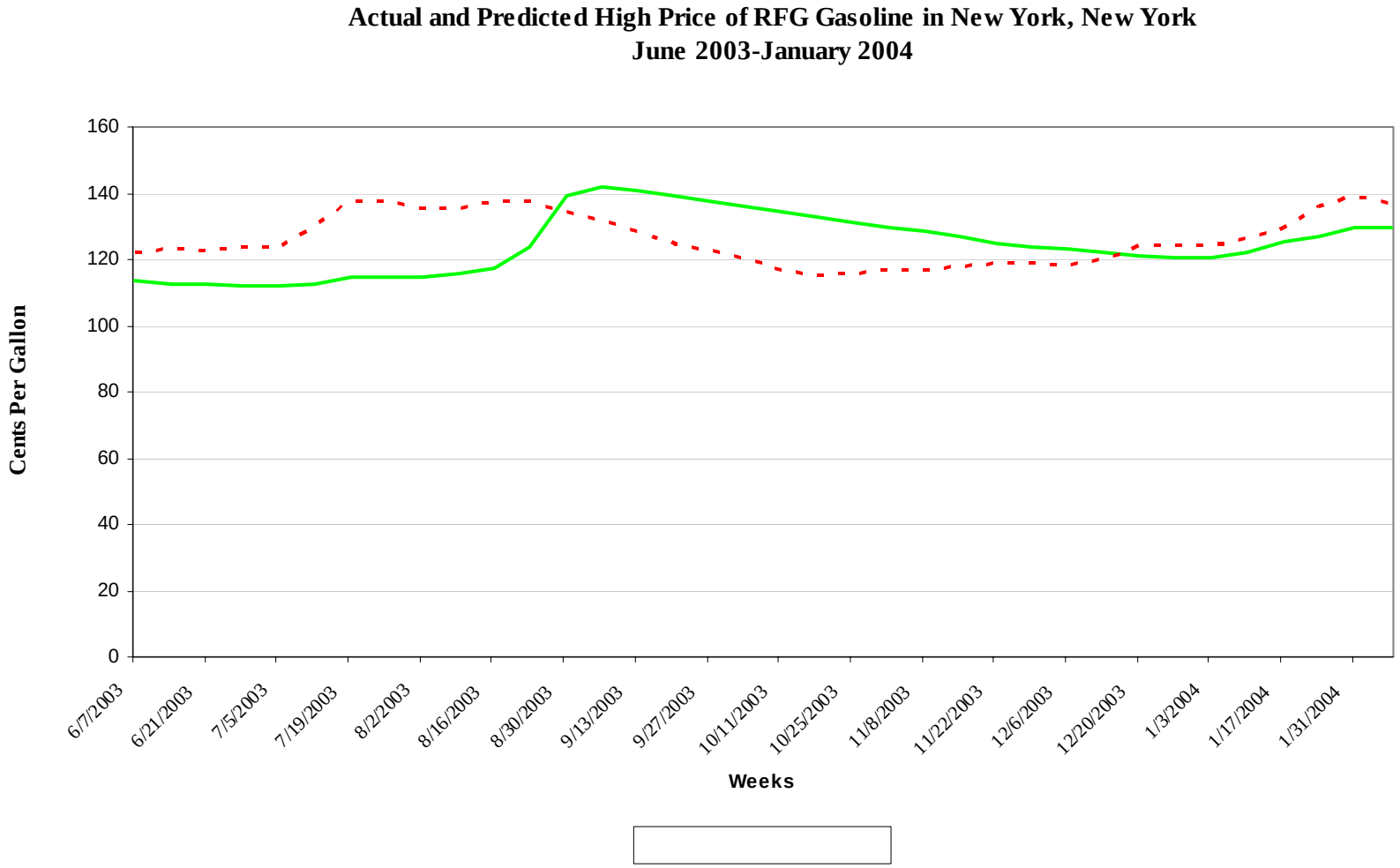

Actual and Predicted High Price of RFG Gasoline in New York, New York
June 2003-January 2004
Cents Per Gallon
160
140
120
100
80
60
40
20
0
6/7/2003
6/21/2003
7/5/2003
7/19/2003
8/2/2003
8/16/2003
8/30/2003
9/13/2003
9/27/2003
10/11/2003
10/25/2003
11/8/2003
11/22/2003
12/6/2003
12/20/2003
1/3/2004
1/17/2004
1/31/2004
Weeks

Figure 7

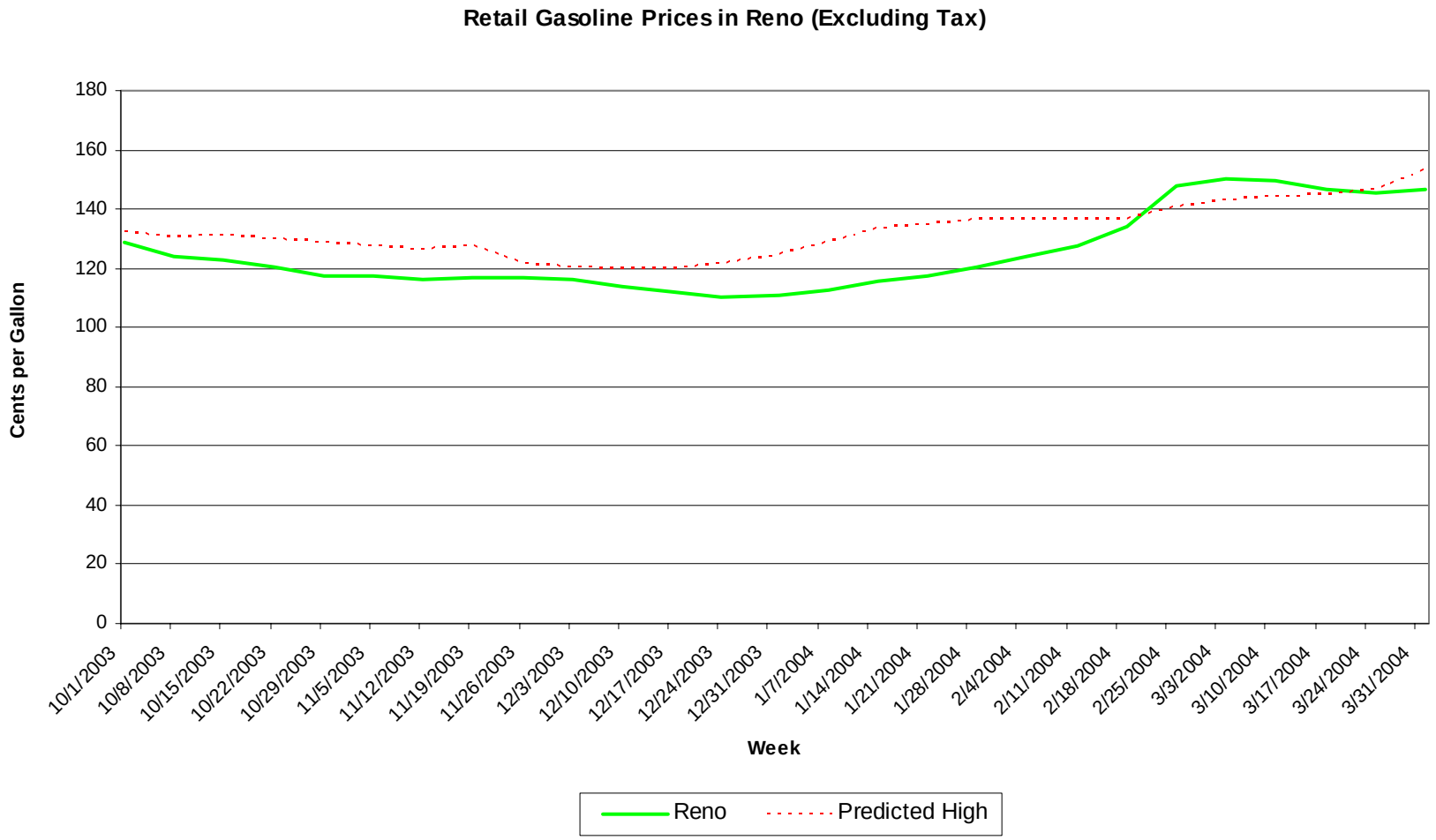

Retail Gasoline Prices in Reno (Excluding Tax)
Cents per Gallon
180
160
140
120
100
80
60
40
20
0
10/1/2003
10/8/2003
10/15/2003
10/22/2003
10/29/2003
11/5/2003
11/12/2003
11/19/2003
11/26/2003
12/3/2003
12/10/2003
12/17/2003
12/24/2003
12/31/2003
1/7/2004
1/14/2004
1/21/2004
1/28/2004
2/4/2004
2/11/2004
2/18/2004
2/25/2004
3/3/2004
3/10/2004
3/17/2004
3/24/2004
3/31/2004
Week
Reno
Predicted High

Figure 8

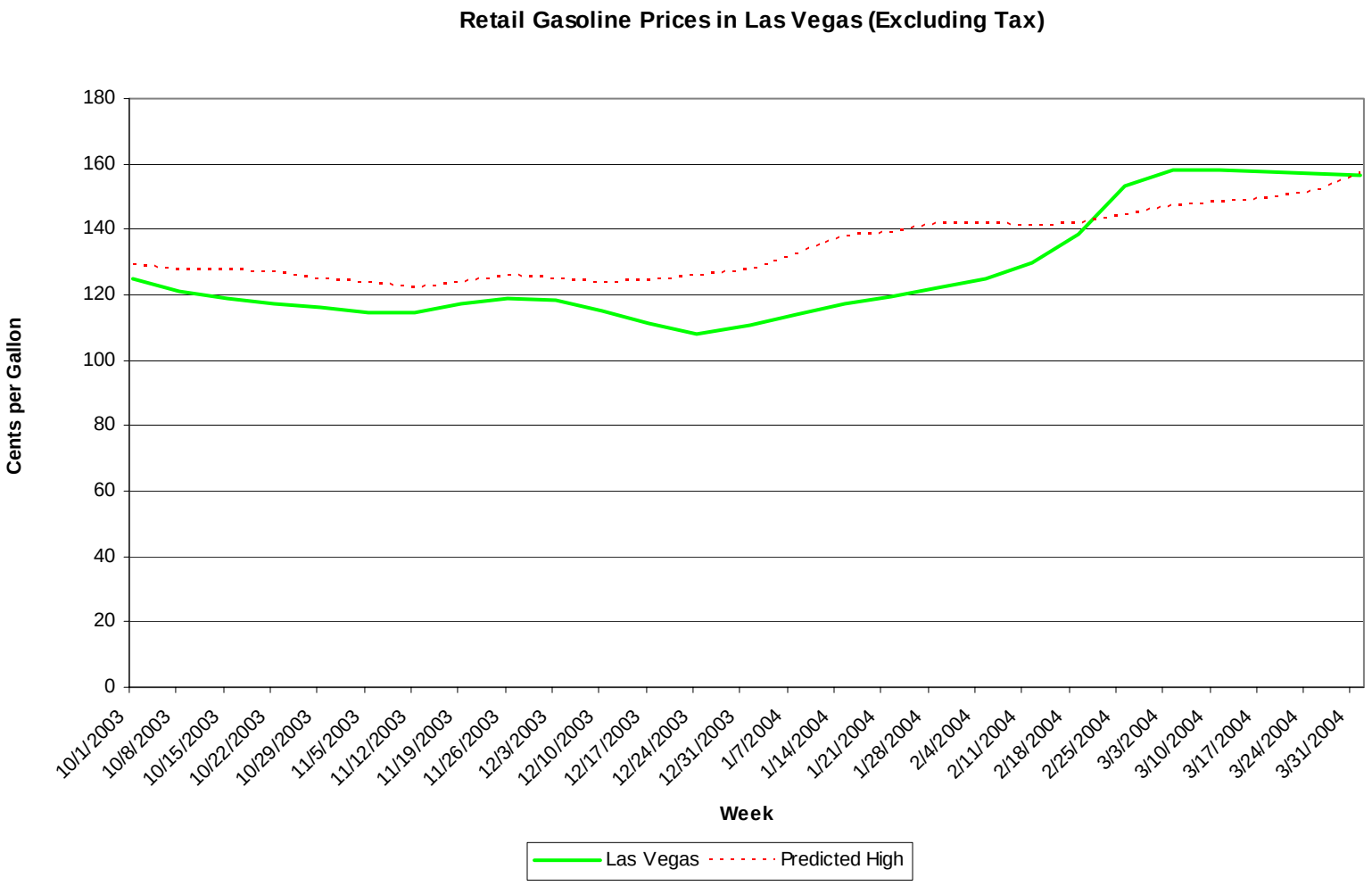

Retail Gasoline Prices in Las Vegas (Excluding Tax)
Cents per Gallon
180
160
140
120
100
80
60
40
20
0
10/1/2003
10/8/2003
10/15/2003
10/22/2003
10/29/2003
11/5/2003
11/12/2003
11/19/2003
11/26/2003
12/3/2003
12/10/2003
12/17/2003
12/24/2003
12/31/2003
1/7/2004
1/14/2004
1/21/2004
1/28/2004
2/4/2004
2/11/2004
2/18/2004
2/25/2004
3/3/2004
3/10/2004
3/17/2004
3/24/2004
3/31/2004
Week
Las Vegas
Predicted High

Figure 9

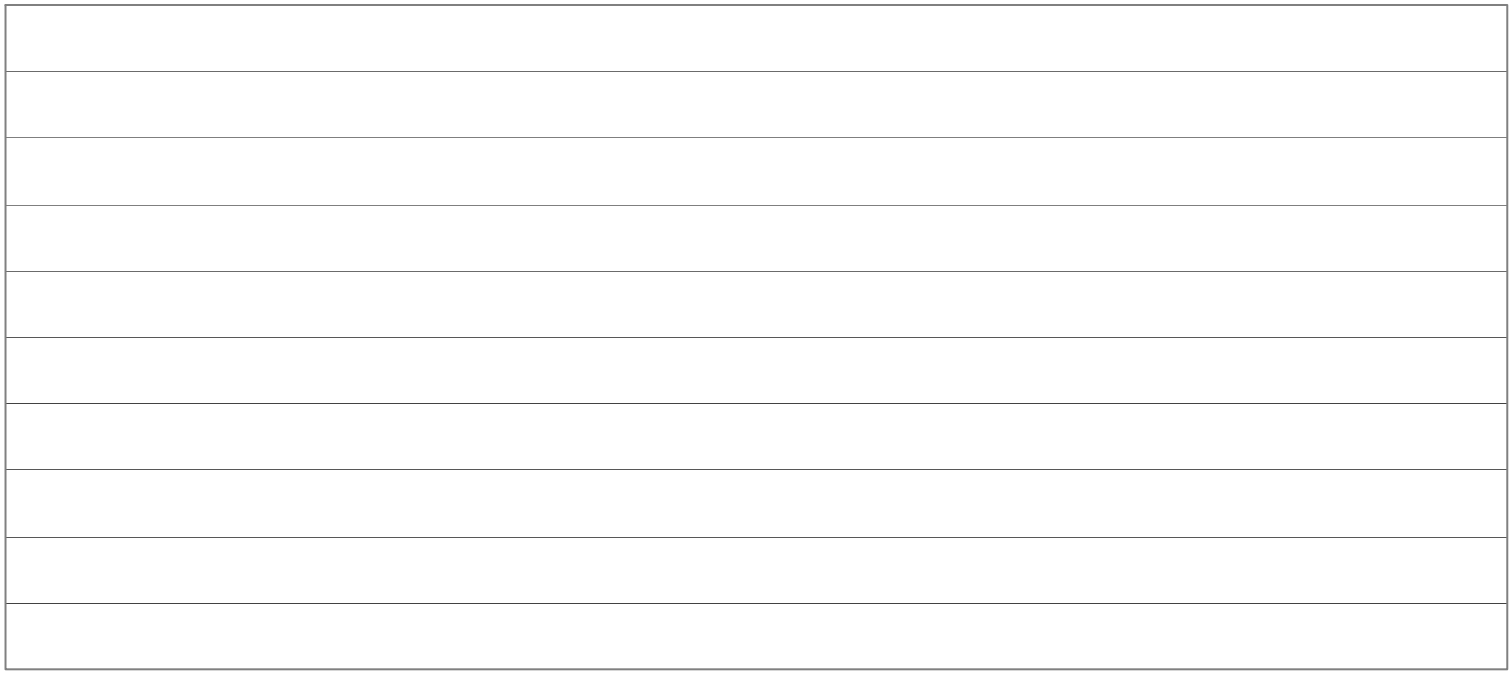


Figure 10


Retail Gasoline Prices in Los Angeles (Excluding Tax)
180
160
140
120
100
80
60
40
20
0
11/1/2003
11/8/2003
11/15/2003

Figure 11

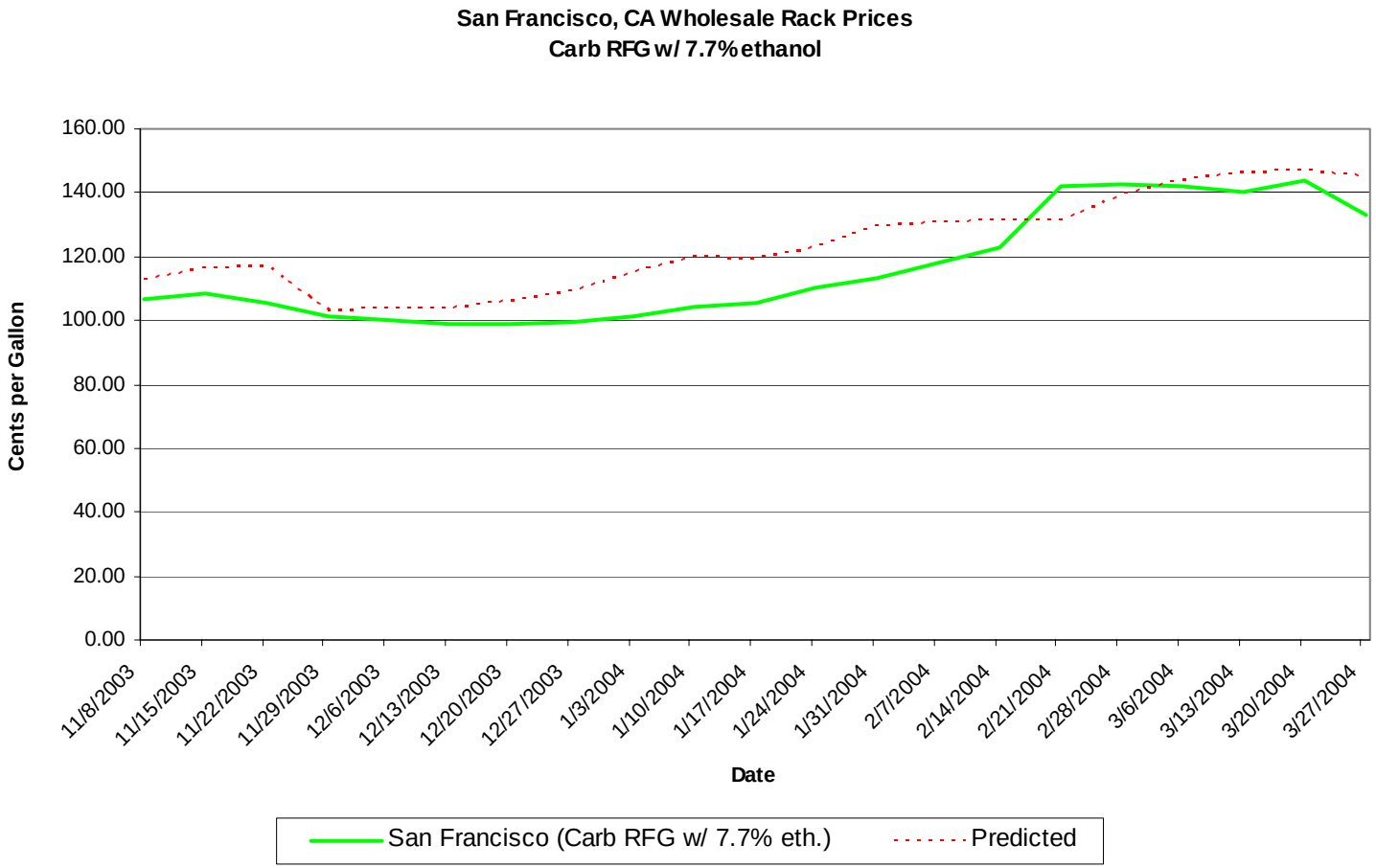

San Francisco, CA Wholesale Rack Prices
Carb RFG w/ 7.7% ethanol
Cents per Gallon
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
11/8/2003
11/15/2003
11/22/2003
11/29/2003
12/6/2003
12/13/2003
12/20/2003
12/27/2003
1/3/2004
1/10/2004
1/17/2004
1/24/2004
1/31/2004
2/7/2004
2/14/2004
2/21/2004
2/28/2004
3/6/2004
3/13/2004
3/20/2004
3/27/2004
Date
San Francisco (Carb RFG w/ 7.7% eth.)
Predicted

Figure 12

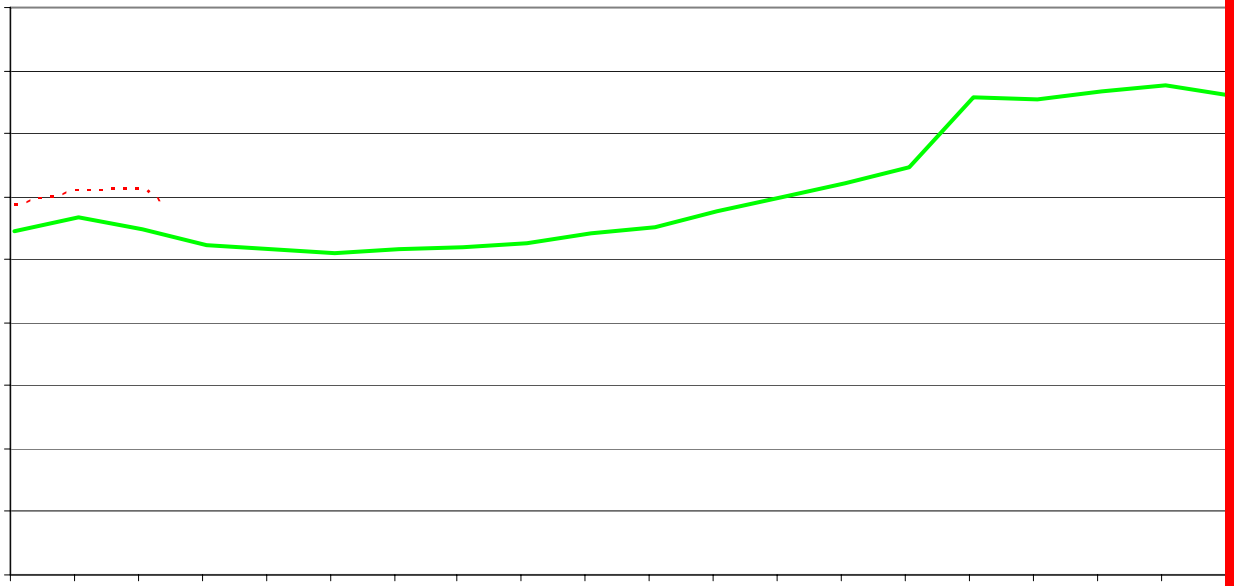


Figure 13

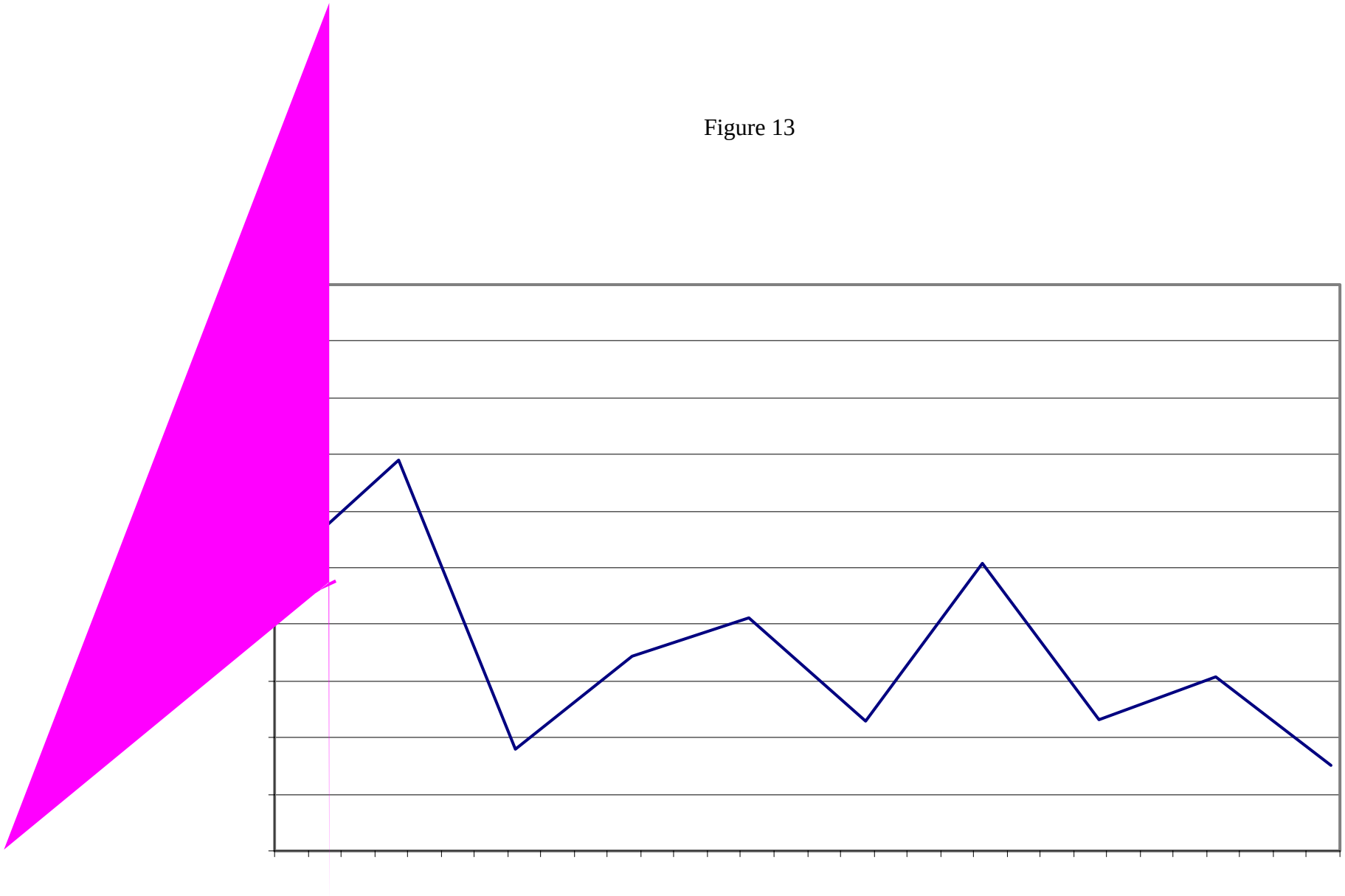


Figure 14 - Size Distribution of Operating Refineries 1986 and 2003

Operating Distillation Capacity (barrels per day)	1986 Number of Refineries	1986 Percent of Capacity	2003 Number of Refineries	2003 Percent of Capacity
1-10,000	41	1.8	14	0.5
10,001-25,000	25	2.9	20	2.1
25,001-50,000	40	10.6	12	2.9
50,001-100,000	38	19.2	37	15.9
100,001-200,000	27	26.2	29	27.6
Greater than 200,000	19	39.4	29	51.0
Total[1]	190		141	

Source: EIA, *Petroleum Supply Annual*, (1985, 2002). Capacity as at January 1 of year shown.
Note: [1]Excludes refineries that were classified as "operable" by EIA, but listed with zero operating capacity.

Appendix

Staff Analysis of General Accounting Office Report[1]

Bureau of Economics
Federal Trade Commission

Introduction

The U.S. General Accounting Office's May 2004 report on effects of concentration and mergers in the petroleum industry considers an important subject with direct relevance for past and prospective antitrust policy in the petroleum industry.[2] The Commission takes its mandate to protect consumers against anticompetitive business practices and mergers very seriously and bases its enforcement decisions on sound legal and economic foundations. These decisions are frequently informed by well documented, careful empirical economic studies by Commission staff or such studies submitted to the Commission by respondents in law enforcement investigations. The Commission accords weight to such studies only when it is fully satisfied with their methodological soundness, the robustness of their results to alternative assumptions and specifications, and their replicability. The GAO report falls short of the standards that the Commission insists on in discharging its law enforcement responsibilities.

It is not possible at this point to assess completely the GAO report's conclusions, nor to

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[1]This Appendix on the GAO Report is a memorandum prepared by the staff of the FTC's Bureau of Economics and does not necessarily represent the views of the Commission or any individual Commissioner.

[2]U.S. General Accounting Office, *Energy Markets: Effects of Mergers and Market Concentration in the U.S. Petroleum Industry* (May 2004) (hereinafter, "GAO report"). As the Commission said in its August 2003 letter commenting on a draft of this report, the draft was fundamentally flawed. The relatively minor changes made in the report since then do not change that conclusion.

of the joint venture, a finding broadly consistent with GAO's finding. Unlike GAO, Commission economists could not conclude that this price increase was attributed to the joint venture because the price increase occurred about a year and half after the formation of the joint venture and because the price increase occurred about the same time as regulatory changes affecting the demand and supply of fuels with certain specifications. Commission economists, however, saw no evidence of an increase in *retail* prices after the formation of the joint venture. Apparently stations facing the higher wholesale rack price were not able to pass through these

PADD-level refinery capacity concentration and wholesale prices.[10] The report provides a total

[10]The GAO report's price-concentration regression results are presented in Tables 24 through 27 at 143-150.

[11]GAO's estimates of the effect of concentration on wholesale prices for CARB gasoline were significant only at the 10% level; this is a level of significance less stringent than is usually employed by researchers.

[12]The GAO report's merger regression results are presented in Tables 21 through 23 at 143-146.

ranging from about 0.4 cpg to 6.9 cpg. In seven cases, GAO finds a negative and statistically significant effect, ranging from about -0.4 cpg to -1.8 cpg. In the other five cases, GAO finds no statistically significant effect.

The remainder of this analysis will explain weaknesses in the GAO report. Because of these weaknesses, the results of the GAO analyses are unreliable.

Problems Common to Both the Price-Concentration and Merger Analyses[13]

The GAO analyses did not adequately account for factors other than changes in concentration or mergers that influenced wholesale gasoline prices during the relevant period.[14]

[13]We also have serious concerns with statistical techniques GAO used in conducting its studies. Specifically, from its description, it is not clear that GAO correctly implemented its instrumental variables estimator. Also GAO's standard errors in some regressions are unusually small; this result raises concerns about how they were estimated. The extremely high levels of significance on many of the coefficient estimates on Tables 21 and 24 (with accompanying t-statistics of 50 or greater) suggest that the standard errors are severely downward biased. This problem is common when attempting to measure the effect of aggregate public policy variables (mergers or concentration) on smaller micro units (racks) by merging the aggregate data with micro observations, based upon the assumption that each micro unit (rack) is an independent unit. See Moutlon, Brent R., "An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units," *Review of Economics and Statistics*, May 1990, 72(2) at 334-38.

[14]As a first step to test the robustness of the GAO estimating equation, Commission economists used terminal rack price data from 1997 through 2000 for five cities for reformulated gasoline. Commission economists estimated the GAO's equation for rack price minus the price of crude using GAO's variables (PADD ratio of inventory to expected demand, national refinery utilization, a Midwest gasoline crisis variable, and a fixed effect for each city). Commission economists added variables for seasonality, imports, price of MTBE, the GAO inventory variable in other PADDs, and alternative measures for supply disruptions in the summer of 2000. As discussed below, in a regression containing all these additional variables, each was estimated to be statistically significant in explaining variation in wholesale gasoline prices.

demonstrate that a number of factors that have significant effects on wholesale gasoline prices were not taken into account in the GAO study. This result is extremely important. All researchers know that failure to control for relevant variables undermines the results of a study. To the extent that these omitted variables are correlated with concentration or mergers, these omissions will bias GAO's estimates of the effects of concentration and mergers on wholesale gasoline prices.[15]

[15]The GAO report (at 207) agrees that omitted variables could bias regression estimates, but claims that this criticism does not apply to its models. The GAO report, however, offers no basis for a claim that omitted variables are not an important potential problem in its estimations of the effects of mergers and concentration on price, other than assertions that all necessary control variables have been included. The GAO report (also at 207) cites to a textbook by William H. Greene (Econometric Analysis, 4th edition, at 334-337), which the GAO report describes as providing "a more relevant discussion" of the effects of omitted variables upon regression results, a discussion that uses a simple estimation of the demand for gasoline as an illustrative example. However, Greene's discussion is merely a technical articulation of the potential bias of regression estimates due to omitted variables--a discussion with which we fully agree. It does not provide any support for the proposition that the GAO report's estimates do not suffer from significant omitted variable bias.

[16]One exception is in the GAO report's estimation of the effects of concentration on unbranded conventional gasoline prices in PADDs I through III. In that estimation, GAO found

We believe that GAO's measures of supply disruptions are both incomplete and poorly implemented. For example, GAO assumed that the effects of the Midwest gasoline crisis were limited to rack prices in PADD II (the Midwest) during June 2000.[17] In fact, the Midwest gasoline crisis began in mid-May, in the case of reformulated gasoline, and prices for conventional gasoline continued to be elevated well into July in some cities, Detroit in particular. Also, the Midwest gasoline crisis significantly impacted prices outside PADD II. Figure A-2 shows the variation in the wholesale price of gasoline (less the price of crude oil) in Boston, after controlling for GAO's variables for national refinery capacity utilization and the ratio of inventories to expected demand. This gasoline price spike in Boston at the time of the summer 2000 Midwest gasoline crisis demonstrates that GAO did not adequately control for the Midwest gasoline crisis.

Similarly, Figure A-2 reveals a price spike in Boston in March/April 2000, which occurred during a switch from winter to summer specifications for reformulated gasoline. This switch was difficult to accomplish because 2000 was the first year of the reformulated gasoline phase 2 program.[18] The fact that the March/April 2000 spike can be observed in Figure A-2 demonstrates that GAO is incorrect in claiming that its variables measuring refinery capacity utilization and the ratio of inventory to estimated demand account for price effects associated

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that concentration had a positive, statistically significant effect on prices if the Midwest gasoline crisis variable were omitted from the regression but that concentration had no statistically significant effect if this disruption variable were included.

[17]GAO report at 115-116, 120.

[18]The GAO report (at 198) incorrectly states that the switch from reformulated gasoline phase I to phase II affected only the Midwest. This major change in reformulated gasoline formulation affected all areas in the nation requiring reformulated gasoline in 2000.

with formulation changes.

Because of GAO's failure adequately to control for the summer 2000 Midwest gasoline crisis and the March/April 2000 formulation change, GAO's analysis may have incorrectly attributed these two prices spikes to the Exxon-Mobil merger, which GAO assumed became effective on March 1, 2000. The GAO analysis of the Exxon-Mobil merger is likely to have similar deficiencies in other areas outside PADD II.[19]

More generally, supply disruptions and changes in fuel formulations during the 1990s present difficult analytical challenges in isolating any effects of concentration and mergers on prices. The GAO report concedes that its controls for supply disruptions are "crude, at best."[20] We agree. Unfortunately for the reliability of the GAO report, "crude" in this context equates with a significant source of inaccuracy.

A further complicating factor is that there are a number of different formulations of conventional gasoline with different Reid Vapor Pressures (RVP) and oxygenates. These differences in conventional formulations can have a significant impact on prices. For example, Michigan and large parts of Ohio, Indiana, and Illinois use standard conventional gasoline, with the exception of the greater Detroit area, which since 1996 has required a low RVP variant of conventional gasoline. Testifying in 2002, then Michigan Attorney General Jennifer M.

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[19]According to Oil Price Information Service data in our possession, these 2000 price spikes occurred in other cities in PADD I that required reformulated gasoline. The prices of conventional gasoline in PADD I were also affected by the problems in the Midwest to a lesser extent.

Supply disruptions other than those associated with the Midwest gasoline crisis and the West Coast disruptions in 1999 and 2000 identified by the GAO report may also have effects extending beyond PADD boundaries for particular gasoline formulations.

[20]GAO report at 116.

and post-merger periods, or "windows." The pre-merger window refers to a period before the merger has taken place. The post-merger window refers to a period during which the researcher assumes that the merger's effect on prices would have occurred. Because some of the post merger windows used by GAO include more summer months than others, GAO's inadequate method of accounting for seasonality may confound a merger effect with a seasonal effect.

Imports

GAO's analyses fail to account for the competitive role of imports. There are sizeable seasonal and annual fluctuations in gasoline imports: between 1994 and 2000 the percentage of weekly U.S. consumption provided by imports ranged from 1.5 percent to 10 percent. When a variable for gasoline imports is added to the GAO report's variables, we found that this variable is significantly related to gasoline prices.

Price of MTBE

The GAO report does not control for the price of the oxygenate MTBE, which is an important additive and cost component for reformulated and CARB gasoline. Between 1995 and 2000, reformulated gasoline (other than upper Midwest reformulated gasoline, which uses ethanol as an oxygenate) and California's CARB gasoline contained by volume up to 10 percent MTBE. The price of MTBE fluctuated from a low of approximately 50 cpg in early 1999 to over $1.60 a gallon in the summer of 2000. When the price of MTBE is added as an explanatory variable to the GAO's control variables, it adds statistically significant explanatory power.

Inventories in Other PADDs

The GAO does not account for linkages among PADDs and inventories in other PADDs in explaining prices for gasoline in a given PADD. PADDs east of the Rockies are linked by product pipelines and in some cases barge and tanker traffic. As a result, inventories in other

PADDs may affect gasoline prices in a given PADD. We found that the addition of variables measuring the ratio of inventory to estimated demand in other PADDs has a statistically significant effect in explaining wholesale gasoline prices in a given PADD.

Difference-in-Difference Estimation

In models that attempt to determine the effect of changes in concentration or mergers on prices, even the addition of variables, as we have suggested above, may not adequately control for other factors that affect prices. To alleviate this problem, modern economists often examine how prices change in markets affected by a merger *relative* to markets unaffected by the merger.[23] This approach is called difference-in-difference estimation. GAO did not use this modern method. The result is that GAO failed adequately to control for many factors that have significant effects on wholesale gasoline prices, and therefore GAO is likely to have attributed to changes in concentration and to mergers price changes that occurred for reasons unrelated to those changes in industry structure.

Problems Specific to the GAO's Price-Concentration Analyses

As the Commission and its staff told GAO last August, price-concentration studies of the type carried out by GAO are subject to several serious problems. Because these problems are now widely understood, modern economists seldom use this technique. Moreover, the

[23]Vita, M. and S. Sacher, "The Competitive Effects of Not-for-Profit Hospital Mergers: A Case Study," *Journal of Industrial Economics*, 49(1), March 2001, pp. 63-84; Kim, E.H, and V. Singal,"Mergers and Market Power: Evidence from the Airline Industry," *American Economic Review*, 83(3), June 1993, pp. 549-69; Hastings, J. "Vertical Relationships and Competition in Retail Gasoline Markets: Empirical Evidence from Contract Changes in Southern California," *American Economic Review*, 94(1), March 2004, pp. 317-328.

methodology used in GAO's price-concentration analyses has additional serious deficiencies.[24]

Improper Measures of Supplier Concentration

Use of Inappropriate Geographic Markets

Any reliable price-concentration study must be based on properly defined geographic markets. If concentration affects competition, it will do so in the particular geographic area in which that competition occurs. Unless the researcher measures this geographic area correctly, the researcher can have no confidence that the results of the analysis have anything to do with measured changes in concentration. If the market is defined too broadly or too narrowly, the researcher cannot tie any change in prices that may have occurred to the change in measured concentration.

Through decades of experience, the Commission has developed expertise in defining the relevant geographic areas, or markets, in which to measure concentration. Neither the draft GAO report, which the Commission and its staff reviewed last summer, nor the final report measures concentration in *any* properly defined geographic markets.

The GAO report measures concentration for refinery capacity at the PADD level in analyzing rack prices in the corresponding PADD.[25] Our experience indicates that the

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[24]Letter to James E. Wells, Director of Natural Resources & Environment, U.S. General Accounting Office, from Timothy J. Muris, Chairman, Federal Trade Commission (plus enclosures), August 25, 2003.

[25]GAO's August 2003 draft report used state-level gasoline sales as the basis for measuring concentration. In its final report, GAO concluded that concentration based on PADD-level refinery capacity is a more appropriate measure on the grounds that this measure more effectively captures refiners' ability to control gasoline sales. The focus on refinery capacity ignores potential effects of ownership of other assets, such as pipelines, product terminals, and branded marketing assets, including brand capital, contractual arrangements with jobbers, and retail locations. Many of the Commission's petroleum merger divestitures have involved such non-refinery assets.

geographic markets that are relevant to competition in wholesale gasoline do not coincide with PADDs. PADDs are much too large to be properly defined geographic markets for GAO's purposes. Because GAO has measured concentration incorrectly, its analyses of the relationships between concentration and prices are invalid. For this reason alone, the price-concentration results reported in the GAO report should be given no weight.

Neglect of Pipeline and Water Deliveries of Gasoline

Furthermore, the GAO report's measure of supplier concentration overlooks the fact that local refineries are not the only important sources of supply for wholesale gasoline. Pipeline and water deliveries are also important in some geographic markets.

PADD I provides an illustration of the importance of the preceding two weaknesses of the GAO methodology. While the GAO report treats PADD I as a single market, product terminals in the northern and southern parts of PADD I have significantly different sources for wholesale gasoline. Moreover, these sources include pipelines and water shipments. The southern part of PADD I (Maryland and south) has few refineries and is very dependent on shipments on the Colonial and Plantation pipelines and water shipments from the Gulf area refineries in PADD III. The northern part of PADD I (Pennsylvania and north) has greater local refinery production, but still receives significant supplies from foreign imports and from PADD III.

Errors in Measurement of Relevant Capacity

GAO's measure of concentration potentially suffers from other important errors. To the extent that concentration of refinery capacity is relevant to gasoline prices, the capacity in question should measure capacity to produce gasoline. Yet, GAO used crude oil distillation capacity rather than gasoline production capacity. The share of crude oil distillation capacity

that can be used to produce gasoline varies among refineries and may change over time for a given refinery. As a result, changes in GAO's measure of concentration do not necessarily reflect changes in concentration for gasoline production capacity.[26]

Spurious Correlations Do Not Indicate Causation

Another serious problem with the GAO price-concentration analyses is spurious correlation. GAO's measures of concentration tend to increase over time. This increase is explained, at least in part, by technological and regulatory changes that have increased economies of scale. Wholesale gasoline prices may have tended to increase over time as well. This increase may be explained, at least in part, by the higher costs of producing cleaner fuels. Even if there is in fact no causal link between concentration and wholesale prices, because of time trends in both variables there may be a positive correlation between concentration and wholesale prices. Thus, these correlations do not necessarily imply causation.

Overstatement of Statistical Significance

In addition, GAO seeks to explain *weekly* variation in wholesale prices at individual racks with an *annual* PADD-level measure of concentration. For this regression, GAO is essentially replicating the same observation multiple times but is assuming that each observation provides independent information

[26]Moreover, measures of capacity do not account for the fact that capacity utilization varies among refineries and over time. GAO controlled imperfectly for capacity utilization because utilization rates are available only at the national level.

[27]Furthermore, the EIA data on which GAO based its concentration measure were not available for two years (1996 and 1998). As a result, in each case GAO computed an average of concentration in the two adjacent years and used this value for the missing year. The fact that GAO created the values of concentration for two of the seven years in its study casts further

Problems Specific to the GAO's Analyses of the Effects of Particular Mergers

Unexpected Results

On their face, some of GAO's findings regarding the effects of particular mergers are contrary to expectation.[28] Compared to markets for gasoline in other areas of the country, California markets for CARB gasoline are relatively isolated from outside sources of supply. Yet, in three of the four reported regressions for CARB gasoline, GAO finds that mergers affecting CARB gasoline had no significant price effect or were associated with a statistically significant *decrease* in price.

In the fourth instance, branded gasoline in the case of the Tosco/Unocal merger, GAO found a large, statistically significant price increase. Yet this price increase for branded gasoline is puzzling, because the GAO report found that this merger was associated with a decrease (albeit a statistically insignificant one) in the price of unbranded gasoline. Tosco had a branded presence in few of the cities affected by this merger, and where it did, Unocal typically did not have a significant branded presence.[29] Under these circumstances, it is virtually impossible to imagine an anticompetitive theory that would be consistent with a large increase in branded prices but no increase in unbranded prices. Had the GAO researchers understood this problem,

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doubt on the reliability of the results.

[28]Moreover, the GAO report notes (at 140) that in its data sample an average of ten suppliers posted at racks selling conventional gasoline. (The average numbers of posting suppliers for reformulated and CARB gasolines were not reported.) In markets with ten significant suppliers, competitive problems are unusual.

[29]See, e.g., Justine Hastings and Richard Gilbert, "Market Power, Vertical Integration and the Wholesale Price of Gasoline, " Working Paper (June 2002), at 13-14. Tosco sold unbranded gasoline at the rack in all the areas considered in their analysis, while Unocal sold unbranded gasoline at the rack in some areas but not others.

[30]Exxon and Mobil also directly competed on the West Coast in production of CARB gasoline and other products. As another condition for proceeding with the merger, the Commission required the parties to divest the Exxon refinery in Benecia, California, plus related marketing assets. Although the Commission found other refiners in California to be highly integrated into retail operations, Exxon was found to differ because it sold much of its output on an unbranded basis to non-integrated marketers and through other channels. See the Commission's Analysis of Proposed Consent Order to Aid Public Comment, In the Matter of Exxon Corporation and Mobil Corporation, File No. 9910077, Docket No. C-3907, available at

wholesale prices following the Exxon/Mobil transaction can not be explained by the merger.[31]

Robustness Testing

It is standard practice in an event study to vary the length and timing of the pre- and post-event windows to ascertain the robustness of the results. If the results of the estimation vary significantly when the windows are changed within reasonable limits, the estimation does not provide a basis for reliable conclusions. GAO acknowledges that it did not undertake robustness checks using windows of different lengths, and acknowledges that the lack of such testing limits its results.[32]

The GAO report also asserts that the effects of a merger can be reasonably determined with its post-merger windows, which are as short as six months.[33] This is doubtful. Event studies typically use post-merger windows long enough to allow merging firms to capture any

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[31]Given the GAO report's emphasis on concentration in PADD-level refinery capacity, it is worth highlighting that at the time of the merger neither Exxon nor Mobil had a refinery in PADD I. Both had refineries in PADD III, but their combination did not significantly increase refinery capacity concentration. According to our analysis of EIA data on refinery capacity as of January 1, 1999, the merger of Mobil's and Exxon's refineries increased PADD III concentration as measured by the Herfindahl-Hirschman Index (HHI) from 586 to 700. Taking PADDs I and III together, the merger increased concentration from 520 to 600. Moreover, these statistics do not reflect the additional competitive constraints imposed by imported gasoline. No practitioner or scholar who is knowledgeable about antitrust would conceive that such levels of HHIs could lead to competitive problems.

Note, however, that concentration based on refinery ownership does not reflect any contractual arrangements between different refiners, such as refinery gate supply contracts or exchange agreements. In some instances, such contractual arrangements may be important to the analysis of competitive overlaps at the refinery or marketing level.

[32]GAO report at 140. Moreover, as the Commission staff enclosure with the Commission's August 2003 letter to GAO (at 15-17) explains, results reported in the August 2003 draft were not robust in many cases. As noted in Chairman Muris's statement of May 27, 2004, the results in the final report appear more robust simply because alternatives that were in the draft report were not presented.

[33]GAO Report at 213.

[34]See Focarelli, D. and F. Panetta, "Are Mergers Beneficial to Consumers? Evidence from the Market for Bank Deposits,"

market. Finally, the results of merger effects analysis are very mixed and frequently contrary to expectations.

As a consequence of these many problems, the GAO report does not provide a reliable foundation for conclusions regarding the effects of changes in concentration or past mergers on prices in the petroleum industry.