

Divorced from the Facts: Retail Gasoline Divorcement Redux

Periodically, proposals are made to limit the control of refiners over retail gasoline stations as a means of enhancing competition and bringing lower prices to consumers. On occasion, such proposals have been enacted into law. Most recently, restrictions have been proposed in San Francisco and San Diego.

Retail gasoline prices can be higher in one market than another for a number of reasons---special supply problems, fuel quality differences, higher infrastructure and operating costs, fewer service stations, etc. But there is no evidence that the presence of refinery-operated stations is one of them. Indeed, the most careful case studies on the subject suggest the opposite. The imposition of divorcement has reduced competition and resulted in somewhat higher retail prices and shorter opening hours.

This report presents a review of the issues concerning divorcement and of the major studies that are available. Promoting competitive markets is of course an important function of government. But as the report indicates, divorcement is not a tool for doing so.

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Introduction

Periodically, proposals are made to limit the control of refiners over retail gasoline stations as a means of enhancing competition and bringing lower prices to consumers. On occasion, such proposals have been enacted into law. Divorcement, or outright prohibition of refiners from direct operation of gasoline stations, has been in effect for a number of years in Connecticut, Delaware, Maryland, Nevada, and in the District of Columbia.¹ Most recently, restrictions have been proposed in San Francisco and San Diego as a means of bringing down prices toward Los Angeles levels, an acknowledged, fiercely competitive market.²

It's hardly surprising that retail prices can be higher in one market than another. Price differences can be due to a number of reasons---special supply problems, fuel quality differences, higher infrastructure and operating costs, fewer service stations, etc. But there is no evidence that the presence of refinery-operated stations is one of them. Indeed, the most careful case studies on the subject, associated with the Maryland divorcement law, suggest the opposite. The imposition of divorcement has reduced competition and resulted in somewhat higher retail prices and shorter opening hours. While some retail dealers benefited, the effects on consumers were higher costs and less convenience.

This report presents a review of the issues concerning divorcement and of the major studies that are available. Promoting competitive markets is of course an important function of government. But as the report indicates, divorcement is not a tool for doing so.

Distributing the Product

Refiners transform crude oil into gasoline, which then, through a variety of channels, is brought to final consumers, who, in most cases, get the product at their local retail stations. There are many options, both physical and contractual, for moving the product from the refiner to the consumer. A traditional method of doing so has been through the use of "branded" gasoline stations, where the refiner's name is on the station. The relationship between the branded station and the refiner can take several forms. The refiner can own the station outright and either operate it directly with salaried employees, lease it to an independent dealer, or have it run by an independent operator on a commission basis. Divorcement laws such as Maryland's targeted directly owned and operated service stations as well as commission agent operations. Proposals have also been made, such as those in San Diego and San Francisco, to restrict refiner relationships with lessee dealers in the areas of supply and pricing.

¹ Nevada froze the number of stations operated by refiners in 1987. In 1988, the state imposed a cap of 15 on the number of refinery-operated stations. The Nevada law was revised in 1997 to allow for additional refinery-operated stations. Although not listed, Virginia has a law prohibiting new refiner-operated service stations within 1.5 miles of an existing, registered dealer.

² The proposed San Francisco ordinance, would allow gas station dealers, most of whom are franchises, to buy wholesale gasoline from the oil company they are affiliated with or from an independent wholesaler if cheaper.

The available evidence suggests that, at least among the larger companies, only a minority of branded stations are owned by refiners. Most branded stations of large refiners appear to be supplied through jobbers and commissioned agents. There are also some "open dealers" who own their stations and enter into supply arrangements with refiners that can be open to competition from other suppliers when contracts expire.

The table below shows the number of the branded retail outlets of the top 10 motor fuel marketers by type of operation and method of supply for 1996

Top 10 US Marketer Service Stations by Type of Operation and Method of Supply: 1996

	Total Number	% Company --- of which:			Total	% Open Dealer	% Supplied through Jobbers/Commission Agents	% Direct Supply
		Salaried Employee	Lessee	Commission				
Citgo	14,529	0.1	0	0	0.1	0	99.9	0.1
Texaco*	4,407	9.3	9.4	0.7	19.4	6.4	73.2	25.8
Amoco	9,184	5.4	22.9	0.2	28.5	7.1	64.4	35.6
Chevron	8,614	7.2	14.3	0	21.5	7.2	61.2	28.7
Shell	8,609	1.3	43.7	0	44.9	3.1	51.6	48.4
Exxon	8,400	5.2	20.2	0	25.5	1.9	72.6	27.4
Mobil	7,589	8.0	28.4	0	36.5	15.3	48.2	51.8
Phillips	6,888	4.6	0	0	4.6	0	95.4	4.6
BP America	6,752	7.5	6.0	0.2	13.7	3.4	82.9	17.1
Conoco	5,196	8.2	0	0	8.2	0	90.2	8.2
Totals	80,168	4.9	14.7	0.1	19.7	4.2	74.8	23.9

* Figures include only Texaco stations reported with type and supply details. Total Texaco/Star stations amounted to nearly 14,000.

Source: National Petroleum News, Market Facts 1997, Mid-July, 1997.

The 80,000 retail outlets shown for the top 10 marketers amount to just over 40% of all retail outlets reported for 1996 by the National Petroleum News survey. The companies owned collectively just under 20% of the 80,000 branded stations, with only 5% operated directly using salaried employees and nearly 15% through lessees (and 0.1% through commission agents). For some companies, notably Shell and Mobil, the share of company-owned stations was well above the average, 45% and 37% respectively, with the differences mainly showing up in the share of stations operated by lessees. In none of the cases did the share of stations operated directly with employees reach 10%.

Of the 80% of the branded stations not owned by the companies, about 4% were open dealers who had supply arrangements with the marketers. Most stations did not have direct relationships with the companies but were supplied instead through jobbers and commission agents.

Because of changes in reporting, even among the same sampled companies, it is difficult to detect any trends with confidence. At best, there appears to have been little change in recent years in the collective percentages shown for the largest companies, with perhaps a slight increase in the share being supplied indirectly through jobbers and commission agents.

The data above do not address volumes, or national totals. Unfortunately, such information is not available in the necessary detail. The Department of Energy publishes some information on US. refiner motor gasoline volumes by type of sale that is suggestive. As shown in the insert on the right, About 62% of volumes in 1997 were “rack” or “bulk” sales, where both are on a wholesale basis with title transferred at the terminal. Branded sales to jobbers would fall into these categories, as would, particularly for bulk sales, outright spot sales. About 21% of volumes were sold on a “dealer tank wagon” basis or price delivered to the service station. The DTW volumes would tend to approximate deliveries to lessees. The balance, 17% of total volumes, was reported as sales to end-users.

% of US Refiner Gasoline Volumes by Type of Sale – 1997*

Sales to End-Users	-----Sales for Resale-----		
	<u>DTW</u>	<u>Rack</u>	<u>Bulk</u>
17%	21%	51%	11%

End-users include mainly directly operated retail outlets but also industrial, commercial and other sales. DTW, or “dealer tank wagon” sales are at a price delivered to the service station. Rack or Bulk sales are on a wholesale basis with title transferred at the terminal. A Rack sale is a wholesale truckload or smaller sale while a bulk sale is larger than a truckload.
*Source: US Department of Energy, Energy Information Administration, Petroleum Marketing Monthly, June 1998.

The Department of Energy data are broadly consistent with the sample data shown before, although they imply that the share of volumes going to company-owned stations is larger than the share of stations owned by companies. In effect, company-owned stations appear to be, on average, higher-volume outlets.

Pros and Cons of the Different Supply Arrangements

Each of the choices open to a refiner has its advantages and disadvantages. Direct ownership with salaried employees offers in principle the most control over operations, including service levels, but with the least incentives for those working at the station to provide service or to market the company’s product. Of course where service requirements are minimal, such as high-volume, self-service stations, with little or no auxiliary services, such an approach might seem appropriate. Under a lease arrangement, a station operator pays for gasoline and, in some cases, for a variety of supplies from the refiner, as well as rent on the station itself. Because the station operator keeps (at the margin) all the revenue he taken in, the operator has strong incentives to provide service. Unfortunately, for the refiner, the franchisee may also desire to “free-ride” off the refiner’s brand name by offering fewer hours and less attractive facilities than the refiner would like.

The refiner may, however, have an important incentive to operate its own service stations. If both refiners and retail outlets have some ability to adjust price unilaterally without losing a substantial share of their customers, vertical integration may be necessary to alleviate the

problem of double marginalization. With “power over price” at both levels, and both refiner and retailing making pricing decisions, the final retail price can rise above the level that would maximize joint retailer-wholesaler profits. Vertical integration can solve this problem, and both increase industry profits and reduce the final sales price to consumers. (See Kaserman and Mayo (1995, 302-307).) Proponents of divorcement argue that refiners see a different advantage---the opportunity to use their vertically-operated stations to engage in predation against independent owners. The predation argument is discussed in detail in the next section.

Whatever the theoretical and alleged advantages of refiner ownership, as shown earlier, among the larger companies at least, most stations are not owned by the refiners and, nationally, most gasoline is not sold directly by refiners to retail outlets. Sales through jobbers to branded stations, or even to open dealers, offer their own advantages. The refiner need not worry about contractual issues with lessees, or supervision of employees. The capital investments in the retail stations, and investment risks, are largely borne by others. Moreover, by relying on specialized companies to manage the final distribution of gasoline to retail stations, refiners can reduce still further their capital requirements and possibly share benefits from lower distribution costs. The advantages of lower capital investment and potentially lower distribution costs could be enhanced for refiners coping with very low returns on their downstream investments. For the large companies subject to the Federal Reporting System, (25 reporting 1996 data) profit rates for US refining and marketing operations for 1990 through 1996 ranged between -0.4% and 5.1% , suggesting strong interest in reducing costs and freeing up capital invested in this sector for redeployment elsewhere.

For and Against Divorcement: The Predation Argument

Advocates of divorcement have argued that divorcement will lead to lower gasoline prices for consumers. Historically, the argument has been that divorcement is necessary because refiners are using their vertically-operated stations to engage in predation against independent owners. Specifically, the argument is made that refiners use the stations they operate directly to sell at very low prices, at the expense of profits, in order to drive independent dealers, including their own lessees, out of business, and then, ultimately, raise prices.

It is very easy to see how predation could be a highly unprofitable strategy. (See Bork, (1978).) A hypothesized predator must face several difficulties. First, in lowering its own price it lowers its revenues and profits on its pre-predation volume. Lowering price also increases the demand by consumers in the market. Since selling below cost is a usual precondition for predation, increasing demand increases the predator's losses. In addition, lowering price will cause the intended victim to reduce its output, increasing demand (and therefore losses) for the predator's product. Putting these three elements together imply that the predator's losses through a predator strategy are likely to be far in excess of the victim's losses.

The predator faces an additional problem. The fewer barriers to exit there are for the victim, the easier it will be for the predator to induce the victim to leave the market. Exit barriers are usually considered to be “sunk costs,” costs of investment that cannot be recouped upon exit. But for predation to be profitable, the predator must be able to make supra-competitive profits

after the predatory period is over. This in turn implies that no new firms will enter in response to the post-predation high prices, which in turn implies significant barriers to entry. However, barriers to entry are generally thought of as sunk costs, which make them identical to barriers to exit. What this implies is that a successful predator desires an industry with significant barriers to entry, but insignificant barriers to exit. Such a situation may occur only rarely and is clearly not present in gasoline retail marketing.

In addition, a necessary condition for predation is market power in an appropriately defined antitrust market. A prerequisite for market power is a high market share.³ Generally, however, the market share of service stations owned and operated by refiners has been below this threshold. Indeed, given the necessary conditions required for the existence of predation, actual occurrences of predation in the general economy are considered to be very rare.

The claims of predation against refiners may be out of place given the existing structure of the industry for two reasons. First, if in the long-run refiners truly wanted to drive franchisees out of business, they could, over time, reduce (or eliminate) the number of contractual arrangements they enter into, and increase the number of vertically integrated stations they operate directly.⁴ Second, any alleged predation in this industry would be not carried out by a single firm since no one firm appears to have a dominant position in the industry. Rather, they would be carried out by a group of refiners acting collusively. A requirement of collusion makes predation even more difficult to carry out. The reason is that, because predation is expensive (as discussed above) each of the colluding firms will have incentives to “free ride” each other by reducing their output in the market. Unless these firms can somehow solve the free rider problem, they will be unable to profit from a strategy of collusive predation.

Competitive Concerns and their Resolution: The Federal Trade Commission Settlement with Shell and Texaco⁵

In April of this year, the Federal Trade Commission gave final approval to a consent agreement with Shell Oil Company and Texaco Inc., regarding charges that their proposed joint venture could raise gasoline prices and violate antitrust laws. The original complaint and the terms of the consent agreement offer insights into the priorities of the government agency empowered to prevent unfair methods of competition, as they relate to gasoline markets.

In March, 1997, Shell and Texaco entered into a memorandum of understanding regarding the formation of a joint venture, “Westco,” into which the companies would contribute, in particular, their refining and marketing assets located in the midwest and western sections of the country.

³ See the Supreme Court decisions in *Brooke Group Ltd v. Brown & Williamson Tobacco Corp.*, 113 S. Ct. 2578 (1993) and *Spectrum Sports, Inc. v. McQuillan*, 113 S. Ct. 884 (1993).

⁴ Refiners are not free simply to terminate dealer contracts. Federal law, the Petroleum Marketing Practices Act, governs terminations and renewals of service station franchises. As amended in 1993, the law explicitly prohibits a refiner from terminating a dealer relationship for the purpose of converting the station to a company operation.

⁵ The discussion in this section is based on the following Federal Trade Commission Documents: (1) Press Release Dated 12/19/97 entitled, “Shell, Texaco to Divest Assets to Settle FTC Charges,” (2) “*In the Matter of Shell Oil Company, a corporation; - and - Texaco Inc., a corporation.*” Docket No. C-3803, COMPLAINT and DECISION AND ORDER, both issued April 21, 1998.

Later that year, Shell, Texaco, and Saudi Refining entered into a memorandum of understanding for another joint venture, "Eastco," into which Shell and Star (the Texaco-Saudi joint venture) would contribute their refining and marketing assets located in the Gulf Coast and eastern U.S.. Sections of the Federal Trade Commission complaint included charges that the proposed joint venture would lessen competition in certain gasoline markets: parts of Washington and Oregon, the market for special CARB gasoline in California, the wholesale and retail markets for CARB gasoline in San Diego County, and the market for gasoline on the island of Oahu.

The Commission viewed the refining of gasoline for Puget Sound and the Pacific Northwest as highly concentrated, a condition they charged would be made worse by the merging of two competitors in that market. To settle this charge, Shell agreed to divest its Anacortes refinery and to allow its dealers and jobbers in these markets to affiliate with the new owner of the refinery if they choose to do so. The consent order requires Shell to identify each of its branded sellers (wholesalers and retailers) to prospective acquirers of the refinery. *In effect, the order attempts to preserve competition by maintaining the ties between the refinery and its outlets after the divestiture.* Shell's Anacortes refinery is also one of the few sources of CARB gasoline apart from refineries within California. Divestiture was required to preserve the refinery as an independent source of supply of this particular fuel.

In the San Diego market, the Commission stated that Shell and Texaco were two of the six oil companies that account for about 90% of the market in the county. The Commission characterized the market as "moderately concentrated" and stated that the proposed joint venture would result in a "highly concentrated" market. As part of the settlement, Shell and Texaco would be required to divest a sufficient number of gasoline stations to a single new entrant to create a viable new competitor. The agreement specifies minimum average volumes of the stations to be divested (85 thousand gallons a month in 1996) and minimum aggregate retail sales (at least 43.2 million gallons in 1996). In the case of Oahu, the agreement requires either Shell or Texaco to divest their terminal and retail assets.

The Commission's clear objective in the agreement was to preserve competition and the method chosen was to promote the creation of new, strong, competitors. To do so, the agreement supported vertically integrated relationships between the prospective acquirer of the Anacortes refinery and its outlets and, in San Diego, the sale of assets to a single acquirer---who could in turn be a refining company.

Divorcement: The Maryland Experience

Given this background, where, if at all, does divorcement fit in? Does it ultimately lower prices for consumers by curbing alleged predatory actions, raise prices by reducing the ability of strong companies to compete directly in the market place or does it have no discernable impact at all? The most carefully studied experience of divorcement relates to Maryland, where divorcement legislation prohibiting refiners from directly operating retail gasoline stations was enacted in 1974 and has been in force since 1979. About 200 stations (less than 10% of the Maryland market) were affected at the time. This section reviews the empirical evidence from the

Maryland experience with divorcement. While this research has been in the public record for some time, it has largely gone unnoticed.

The best available empirical evidence on the effects of divorcement comes from a study by Barron and Umbeck (1984).⁶ The authors obtained a data set consisting of periodic surveys of prices charged and hours open for 178 of the 210 stations subject to divorcement under Maryland's divorcement law. The surveys covered the period from January, 1977 to January, 1982, extending, therefore, from before to after divorcement. The data set also included surveys of prices and hours of operation of nearby competitor stations. In all, about 600 stations were in the original sample.

The authors found that divorcement caused full service gasoline prices to rise between five and seven cents a gallon at the stations subject to forced divestiture, and about one cent a gallon at the competitor stations. They also found that hours of operation fell about eight to nine hours per week at the stations subject to divorcement. Thus, this study indicates that while the competitors of integrated stations benefited, it was the consumers who were harmed by Maryland's divorcement law.

The study, by relying on direct observations of stations subject to divorcement and nearby competitors, avoided the limitations affecting studies that relied on average price comparisons with other areas and on only post-divorcement data. Cross-sectional studies face problems of controlling for differences between sample jurisdictions in transport costs, zoning and construction codes, etc., all of which can influence retail prices. Failure to do so limits the credibility of estimated differences in prices ascribed to divorcement. Studies focusing only on post-divorcement data may be able to show that prices are lower in the divorcement location than other areas, but not that the differences are due to divorcement since the same relationships could have prevailed before divorcement took effect.⁷

The original Barron and Umbeck study was criticized because of the source of the data, the oil companies directly affected by the divorcement law. It was argued that the companies would have an interest in the outcome of the study, namely a desire for the study to show divorcement harms consumers, and this interest could have led to biased data. The study itself was financed by a consortium of midwestern oil companies who did no business in Maryland.

Despite the fact that there were some checks against bias in the original study, an independent entity, the Lundberg Survey, Inc., was employed to resurvey the sample from the original survey. Funding for the resurvey was provided by Atlantic-Ritchfield. The effort involved the purchase of a 1978 census of Maryland service stations and 10 Baltimore price surveys. The analysis by

⁶ John M. Barron and John R. Umbeck are both professors of economics at the Krannert Graduate School of Management, Purdue University.

⁷ These criticisms apply to the study by Putnam, Hayes and Bartlett, Inc., Gasoline Prices in Maryland Following Divorcement, March 13, 1987, commissioned by the Maryland Attorney General and Comptroller of the currency. That study concluded that Maryland consumers had saved \$117 million through September, 1986. Critics have also highlighted certain mathematical errors. Using the same data, with the same limitations, the critics found that divorcement cost consumers between about \$150 million and \$300 million over the same period. See, Philip E. Sorenson, The Cost to Consumers in Maryland of the Divorcement of Refiners From Retail Gasoline Marketing, 1979-86, January, 1988.

Barron and Umbeck (1983) of the new price data showed in the great majority of cases, perfect matches with their earlier data. Where there were differences, they appeared to be randomly distributed, ruling out the possibility of bias. The new data allowed them to extend the study through another year, 1982. They found their conclusions still valid; divorcement led to higher prices for consumers and reduced hours of service.

It should be noted that comprehensive service-station pricing data in local markets are expensive to collect and only those with a strong proprietary interest in such data would do so. These would be the companies actively engaged in the market or organizations like Lundberg that conduct detailed surveys to sell to such companies. In effect, any study attempting to deal in detail with retail station pricing in a given market would almost inevitably have to rely on oil companies. The issue then becomes the professional quality and transparency of the methodology employed. The Barron-Umbeck studies have been widely accepted as meeting these criteria.

In November, 1988, the Department of Fiscal Services of the Maryland General Assembly issued its review of studies and reports regarding the economic impact of the state's divorcement law.⁸ The report concluded that the Barron-Umbeck studies were correct in the finding that divorcement led to higher prices and shorter hours of operation. The report added however "the magnitude of the increase cannot be quantified. Furthermore, changes in the marketing of gasoline make it difficult to compute a dollar impact in today's marketing climate."

A finding that prices rose after divorcement is consistent with two opposite views of the pre-divorcement gasoline market in the state. If the market had been competitive, the handicapping of one set of strong competitors, refiners with directly operated stations, would have caused prices to move up, both in the short and long run. If there had been predation, prices would also go up in the short term as downward price pressures from below-cost sales were removed. How then can one tell the difference?

As discussed in the Department of Fiscal Services report, a further study by Barron, Lowenstein and Umbeck pointed out that once the final appeal of the Maryland law was rejected, the companies involved lost whatever incentive they may have had to charge below-cost prices. Therefore, if indeed they were engaged in predation, their prices should have moved up in the interval between the final court decision and divorcement.⁹ The authors found that this was not the case. The company-operated stations charged lower prices than their nearby competitors both before and after the court decision.

The predation argument assumes that prices will be lower in the long term if predatory behavior is curbed but this begs the question as to what is the "long-term" in a local gasoline market. The

⁸ Department of Fiscal Services, Gasoline Station Divorcement: A Review of Studies Concerning the Economic Impact of Maryland's Gasoline Station Divorcement Law, Annapolis, Maryland, November, 1988

⁹ As discussed on page 7 of the report. The report cites the study by John Barron, Mark Lowenstein, and John Umbeck, "Predatory Pricing: The Case of the Retail Gasoline Market," Contemporary Policy Issues, Spring, 1985, pp. 131-139.

Department of Fiscal Services report considers the long term in this case to be rather short. It notes:

Since it is relatively inexpensive and does not take much time to construct a retail service station, and there are no legal barrier to entry in this industry in Maryland except for refiner operators, the Barron-Umbeck findings can be accepted as showing that, in both the short run and long run, divorcement leads to higher retail gasoline prices.¹⁰

Current Arguments in San Diego

Currently, actions are being considered for divorcement in San Diego County and San Francisco, California.

In San Diego, the Utility Consumers' Action Network (of San Diego) (UCAN) posits a slightly different rationale for divorcement than the argument discussed above. According to UCAN, gasoline prices in San Diego are not determined by competitive forces, but rather by some type of collusion. A number of factors are alleged to have caused this, including a limited number of refiners who serve the area, and an increase in the number of service stations owned by such refiners.

While UCAN does not precisely spell out its economic theory of why collusion is generated by vertical integration, such an explanation may go something like this: Assume a market where only a small number of refiners serve the market. These refiners would like to collude (perhaps tacitly). Unfortunately for the refiners, they cannot observe prices between their rival refiners and service stations, making the collusive scheme unstable. With vertical integration, however, the relevant price upon which refiners are colluding is the price at the pump, which can be obtained readily. Thus, according to this theory, vertical integration eases the difficulties of collusion. An obvious problem with this theory, however, as it relates to San Diego, is that according to UCAN, only 17 percent of stations in San Diego County are owned and operated by refiners. This would appear to be well below the threshold required for a finding of market power. It may be that any competitive problem that exists in San Diego County is simply the result of a shortage of refiners serving the area, rather than the contractual relationships between refiners and service station operators. As discussed earlier, the Federal Trade Commission specifically addressed the San Diego market in its action regarding the Shell-Texaco merger. Its remedy to prevent an alleged lessening of competition was to require divestiture of a specified group of retail sites to a single acquirer, not divorcement.

It should be noted, however, that prices in San Diego are often much higher than they are in nearby Los Angeles. This price differential would seem difficult to explain based on merely differences in transport costs. However, some of this differential may be the result of higher station average volumes in Los Angeles, and higher land costs in parts of San Diego. There can also be differences in retail price responses to certain oil market developments between the two areas. The San Francisco experience may be relevant on this point.

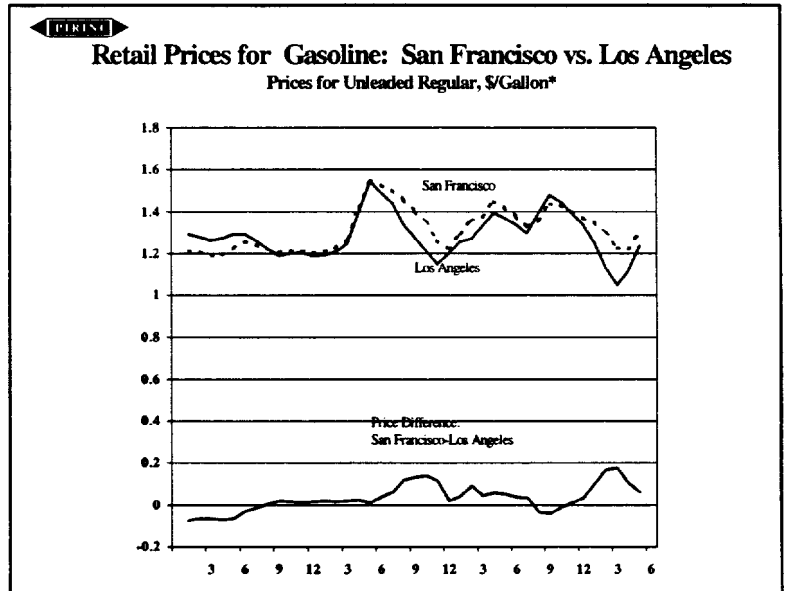
¹⁰ From page 17 of the report.

San Francisco

In early June of this year, San Francisco's Board of Supervisors voted to send a proposed divorcement ordinance back to committee, postponing action on the measure for at least the time being. The proposed ordinance would, in addition to divorcement, allow gas station dealers, most of whom are franchisees, to buy wholesale gasoline from the oil company they are affiliated with or from an independent wholesaler of the same brand from any geographic location if cheaper. As in San Diego, the focus is on high gasoline prices, especially relative to the acknowledged, intensely competitive Los Angeles market.

The Bureau of Labor Statistics collects monthly gasoline price data for both the Los Angeles and San Francisco areas which can be used to examine differences in price trends between the two areas. Retail prices for unleaded regular gasoline are shown in the chart on the right for the period January, 1995 through May, 1998.

The data do not show a consistently higher price for gasoline in San Francisco. Indeed, there were periods when prices were lower than in Los Angeles; namely, January through July of 1995 and August through October of 1997. At other times, the differentials have been minimal. There were, however, two specific intervals within the time frame shown where the price differentials between the two areas reached substantial levels, nearly 14 cents/gallon in October 1996, and nearly 18 cents/gallon in March of this year, before receding. These intervals of rising differentials have a common feature. They developed during periods of significant declines in gasoline prices following prior price run-ups.



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As noted by the Department of Energy in a special report, the scale of the run-up in gasoline prices in the spring of 1996 was unique to California.¹¹ California had introduced its own more stringent reformulated gasoline at that time which had few supply sources outside of state. At the beginning of April, a fire and shutdown of a major refinery caused the immediate loss of capacity equivalent to about 12% of the state's spring gasoline demand. Other refineries experienced problems as well. As shown in the chart, prices jumped in both Los Angeles and San Francisco by about 30 cents/gallon with no significant differences between the two areas. Over the summer, supplies improved, inventories grew to above normal levels and prices moved

¹¹ See: U.S. Department of Energy, Energy Information Administration, *Motor Gasoline Assessment, Spring, 1997*, chapter 4, "California - A Unique Situation," DOE/EIA-0613, July, 1997

down. The same Department of Energy report indicated that refiners began dumping product on the market, partly to dispose of inventories of summer specification gasoline, and that a price war in the Southern California market brought retail prices down in some areas to below \$1 a gallon. In November and December, prices for the California reformulated gasoline dropped below U.S. average prices for cheaper-to-produce conventional regular gasoline. San Francisco's participation in the extraordinary (and almost certainly unsustainable) price decline was more muted, opening up a price differential with Los Angeles that reached nearly 14 cents/gallon in October. But in December, the differential was only 2 cents.

In late 1997, as world oil markets softened, gasoline prices began to decline. On a national basis, retail prices fell by about 23 cents a gallon between October, 1997 and March 1998. As the chart illustrates, prices in Los Angeles fell by nearly 40 cents/gallon over the same period. As in November-December 1996, the Los Angeles retail price at its March low-point was below the U.S. average. In its analysis of the Los Angeles "price crash," the Lundberg Letter of April 6, 1998 showed estimates of apparent retail margins for self-service unleaded regular (retail price less taxes and wholesale price) for 1997 through March, 1998.¹² In October, apparent margins were in the 4-5 cent a gallon range. For March, the apparent margin was 2.7 cents for the survey taken early in the month and negative 1.4 cents for the survey taken later.

For the San Francisco area, the price decline over the same period was about 21 cents/gallon, close to the national average but not as spectacular as the decline in Los Angeles, leading once again to a wide differential in price between the two locations. Since March the price gap between the two cities has narrowed---to 6 cents a gallon for May, the latest month available from the Bureau of Labor Statistics. The narrowing took place as gasoline prices rose sharply in Los Angeles, up nearly 19 cents/gallon from March, and more moderately in San Francisco, up about 7 cents.

There do appear to be significant differences between the two markets. Los Angeles prices seem to decline rapidly in response to eased supply conditions, and indeed, temporarily overshoot. While the San Francisco prices appear to decline more slowly, and consumers miss out on the distress sales, ultimately, prices seem to move toward similar levels. Overall, it's the Los Angeles market that appears to be extraordinary, not the San Francisco market.

The Bureau of Labor Statistics surveys metropolitan areas, not cities per se. Thus Los Angeles in this case means Los Angeles-Riverside-Orange County while San Francisco includes San Francisco-San Jose-Oakland. The Oil & Gas Journal surveys retail gasoline prices within city boundaries and their results for Los Angeles and San Francisco, (and also for San Diego) show larger price differences than the Bureau of Labor Statistics surveys. The very different nature of

¹² Lundberg Letter, "L.A.'s the Place! Part 1, A Los Angeles Price Crash and How it Grew," Volume XXV, Number 6, March 20, 1998 and "L.A.'s the Place! Part 2 - Recipe for a Price Crash," Volume XXV, Number 7, April 6, 1998

the two cities within their political boundaries---in terms of population density, land costs, etc.---would cause their own price differences independent of any oil market considerations.¹³

Arizona

Divorcement is also a current issue in Arizona. Advocates assert that the market share of gasoline retailers "controlled" in one form or another by refiners is more than 90 percent,¹⁴ that there are a limited number of refiners, and that Arizona gasoline prices are significantly above the competitive level. (See Hamilton (1998).)

Isaac, Oaxaca, and Reynolds (1997), in a study commissioned by refiners, present alternative explanations for higher prices in Arizona. They note that Arizona is served by only one pipeline that may be capacity constrained.¹⁵ While the transport fee on that pipeline is set by Federal regulation, in the event of capacity constraints the price of gasoline will reflect a scarcity rent because gasoline supply cannot increase above the capacity constraint. Thus, the price of gasoline in Arizona can rise due to scarcity, rather than anticompetitive behavior. This study also notes that prices in Arizona may be higher due to new state regulation on gasoline in California, where most of the gasoline sold in Arizona is refined.

Isaac et al. also run a regression that uses the wholesale price of gasoline at the end of relevant pipeline to explain retail prices in Arizona. They find that 60 to 70 percent of the variance in Arizona retail prices can be explained by changes in wholesale prices. Because in a competitive market, wholesale costs should affect retail prices, they assert that this result shows that Arizona retail prices are competitive. This assertion goes too far since wholesale costs should affect price in a collusive market as well.

Umbeck and Barron in an undated study (apparently produced in the early Spring of 1998) commissioned by refiners, analyze the data obtained through a survey of gasoline stations in Arizona on October 23, 1997. They find that, on average, company owned stations were neither the highest nor lowest priced stations on that date. One can at a minimum conclude that company owned stations in Arizona at that time were involved in neither low, predatory, nor high, monopolistic pricing.

¹³ For the January 1995 through May 1998 period, the Bureau of Labor Statistics surveys showed an average price for the San Francisco metropolitan area that was 3.2 cents/gallon above the price in the Los Angeles metropolitan area. Over the same period, the Oil & Gas Journal data showed San Francisco city prices for self-service unleaded averaging about 11.7 cents/gallon above Los Angeles city prices (San Diego city prices were, on average, 11.9 cents/gallon above Los Angeles city prices). The two surveys showed virtually identical average prices for Los Angeles, 128.5 cents/gallon for the Bureau of Labor Statistics versus 128.1 for the Oil & Gas Journal, suggesting city and metropolitan area features were fairly similar. But for San Francisco, the Bureau of Labor Statistics average price based on metropolitan area surveys was 131.7 cents/gallon, while the Oil & Gas Journal city surveys resulted in an average price of 139.8 cents/gallon (and a San Diego price of 140.1). There thus appears by implication to be a much bigger difference between gasoline prices in San Francisco proper and the rest of its metropolitan area than exists in Los Angeles. Presumably, differences in the structure of the two cities relative to their surrounding areas would be responsible. Both surveys show the differentials widest when prices are falling rapidly to price war levels in Los Angeles.

¹⁴ This percentage figure is not broken down into company-owned, lessee, and open station categories.

¹⁵ There is another pipeline running from El Paso through Tucson that could, in principle, serve the Phoenix market. However, the special RFG requirements for Phoenix have made the area dependent on California sources of supply.

Umbeck and Barron also break station locations and volumes down by brand and type of operation. Their data indicates that the market share (by volume) for company owned and operated stores in Maricopa County (Phoenix) is approximately 46 percent. Combining all types of stations under one brand results in a Herfindahl Index of 1731,¹⁶ which is just below the level which the Department of Justice considers "highly concentrated." Doing this calculation of the Herfindahl Index, however, assumes that the various forms of contracting refiners conduct have the same competitive implications as company-direct operation. Such a calculation, therefore, is contrary to the underlying economic theory behind divorcement. Taking account of the various contractual forms generates a Herfindahl Index of 808 in Maricopa County, which is in the "unconcentrated" range.

In Pima County (Tuscon) company-owned and operated stations comprise approximately 40 percent of the market. The Herfindahl Index, assuming all contractual forms have the same implication, is 2309, which is in the "highly concentrated" range. This larger number appears driven by a 38.5 percent share for Tosco, and not by particular forms of vertical integration. Breaking down service stations into different contractual forms generates a Herfindahl Index of 1177, which is in the "unconcentrated" range.

Data on price differentials between Phoenix and Los Angeles, at least at first glance, do not appear to support a theory of anticompetitive behavior. Data from May 1997 to March 1998 indicate that the price of unleaded self-service gasoline in Phoenix ranged from slightly less than the Los Angeles price to about 8.5 cents a gallon higher. It may be possible to explain these differences based on differences in transport costs, and differences in volume among stations.

Conclusions

Overall, there is no evidence of a need for government to legislate limits on relations between refiners and retail outlets. Indeed, the available evidence suggests government action would not be in the broad public interest. The most careful study of the impact of divorcement indicates that the result is less competition and higher prices for consumers. In any case, among the major companies at least, only a small minority of the branded retail outlets are owned by refining companies, and among them, an even smaller share---about 5%--- are directly operated by them.

Preserving competitive markets is a clear government responsibility. In the recent Federal Trade Commission action in the Shell-Texaco case, the remedy for a perceived threat to competitive markets was the establishment of new, viable competitors. In the case of the Anacortes refinery, the Commission explicitly acted to insure that whoever acquired the refinery could maintain vertical ties to its retail outlets. In effect, divorcement was contrary to the goal of maintaining a competitive market in the region.

¹⁶ The Herfindahl-Hirschmann Index, which is generally used for calculating market structure in antitrust cases, is calculated by summing the squares of the market shares of every firm in the market. For example, if Firm A has a market share of 60 percent, and Firm B a market share of 40 percent, the Herfindahl Index would be $60^2 + 40^2 = 5200$. Markets with Herfindahl Indexes above 1800 are considered "highly concentrated" by the U.S. Justice Department.

The studies of the Maryland divorcement experience, cited as the most definitive, were done a number of years ago. There have been many broad changes in gasoline marketing since the early 1980s in terms of number and types of players, regulations, etc. There could be merit in new empirical studies that capture these new developments, not least to enhance public acceptance of the results.

References Not Footnoted in Text

Barron, John M., and John R. Umbeck, "The Effects of Different Contractual Arrangements: The Case of Retail Gasoline Markets," Journal of Law and Economics, 27 (October 1984) 313-328.

Barron, John M. and John R. Umbeck, An Expanded Study of Retail Gasoline Divorcement Legislation, January 1983.

Bork, Robert H., The Antitrust Paradox: A Policy at War with Itself, Basic Books: Harper (1978) New York.

Hamilton, Tim, "Arizona's High Gasoline Prices and the Benefits of Combining Retail Divorcement with a Prohibition Against Price Discrimination," February 17, 1998.

Isaac, R. Mark, Ronald L. Oaxaca, and Stanley S. Reynolds, "An Analysis of Arizona Gasoline Markets," (October 1997).

Kaserman, David L., and John W. Mayo, Government and Business: The Economics of Antitrust and Regulation, Dryden: New York (1995).

Umbeck, John, and Jack Barron, "A Statistical Analysis of the Lundberg Price Survey of Slection Arizona Retail Petroleum Markets," (Undated).

Utility Consumers Action Network, "UCAN's position on Gasoline Pricing Mechanisms in San Diego," June 20, 1997 www.consumernet.org/ucan/gas_position.html.