

Prepared Statement

of

Justine S. Hastings

Before

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Select Committee on Gasoline Competition, Marketing, and Pricing

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Introduction

Chair and members of the committee, my name is Justine Hastings. I am an Assistant Professor of Economics at Yale University and a Faculty Research Fellow at the National Bureau of Economic Research. I have a Ph.D. in Economics from the University of California at Berkeley. Firm conduct, competition and consumer preferences are the focus of much of my research. In particular, my empirical research in these areas has been applied to the gasoline industry. I have analyzed extensive data on retail and wholesale gasoline market structure and prices for a diverse group of US metropolitan areas covering the 1990's. I have used this data to conduct independent, academic research into the relationships between horizontal and vertical market structure and competition in gasoline refining and marketing. Two of my current research projects are an empirical assessment of the impacts of wholesale price discrimination on retail and wholesale gasoline prices and an empirical analysis of the affects of gasoline content regulation on market concentration, conduct and arbitrage. Through this research, I have gained substantial knowledge about the market structure of gasoline refining and marketing. My independent research and my acquired knowledge of the gasoline industry form the basis of my comments before this committee.

The theme of these hearings is to discuss the extent of competition in California motor fuels markets. I will start by reviewing some simple statistics that provide background information on levels and trends in gasoline prices and the market structure of retail and wholesale gasoline markets in California. Next, I will discuss several legislative proposals and how they do or do not act to increase competition in California's gasoline markets.

Background Statistics on Relative Prices and Margins in California

- ❖ **In California, gasoline prices are higher now than they have been historically and higher than they currently are in other regions of the country. The price levels cannot be explained simply by an additional marginal cost of producing CARB gasoline.**

California retail gasoline prices are on average higher than they are in other regions of the country. In addition, crude oil price variation does not explain as much of the variation in retail gasoline prices in California as it does in other parts of the country. Table 1 shows very simple figures illustrating the fraction of variation in monthly averaged retail gasoline prices (excluding taxes) that can be explained by monthly average crude oil spot price within each state. It is clear that crude oil price variation explains much more of the variation in retail gasoline prices in South Carolina, for example, than it does in California.

In addition, the margin between retail prices and crude oil prices has increased substantially in California, a trend that has not occurred in most other regions of the country. Table 2 gives statistics on the margin between average retail gasoline prices and crude oil prices for San Diego, San Antonio, and Salt Lake City during the crude oil price

spikes of October 1990 and March 2003. During both time periods, crude oil prices were near \$40 per barrel. As is evident, the 2003 margins in San Diego are more than twice what they were in 1990. However, margins are almost the same today as they were in 1990 in the other metropolitan areas listed in the table.¹

Between 1990 and 2003, there have been substantial changes in the California gasoline market. The market has become more horizontally and vertically concentrated, and has adopted its own unique reformulation of gasoline known as CARB. It is unlikely that the changes in the price of gasoline relative to crude oil illustrated in Table 2 can be explained by the marginal cost of producing CARB gasoline.² We now turn to discussing market structure in California refining and marketing.

Market Structure in California:

- ❖ **In refining, California has a fairly concentrated oligopoly of seven firms: BPAmoco (includes ARCO), ChevronTexaco, ConocoPhillips (formerly Tosco), ExxonMobil, Shell, Tesoro, and UDSValero.**

Gasoline refining is fairly concentrated, but not to the degree that would cause excessive concern over the exercise of market power. There are other markets in the country with similar supplier concentration levels to those in California, however they do not display the same price patterns that California markets do.³

Given the fairly concentrated refining market in California, there are two factors that might exacerbate the risk of non-competitive behavior above what would be indicated by a simple horizontal index of refining concentration. First, the seven firms engage in “swaps”, or exchanges of gasoline between them in order to meet local needs of their retail outlets. For example, Shell might swap gasoline with ARCO. ARCO might provide refined product for Shell in Southern California, and Shell does so for ARCO in Northern California in return. Since gasoline is a fungible commodity until the brand additive is added into the tanker truck just before it leaves for delivery, swaps serve to minimize refiner’s cost of supply and increase efficiency, which is good. However, these exchanges also make firms more interdependent. Interdependence can dampen

¹ These metropolitan areas were chosen because they were the metro areas for which I had readily available prices from October of 1990 and March of 2003. Changes in taxes over this time period are not accounted for, since there was no readily available source for state tax information for Texas and Utah. However, it is not possible that increases in taxes are the cause of increased San Diego margins.

² Estimates of the marginal cost of CARB gasoline production vary. A reasonable estimate is probably somewhere between 5 to 10 cents per gallon. It is possible that CARB caused increases in horizontal and vertical concentration by causing smaller refineries and subsequently independent retailers to exit. However, it does not follow that replacing CARB with RFG will reverse these market structure effects now that they have already taken place.

³ In addition, the large majority of retail gasoline stations are branded by these refiners. This is also the case in other markets, such as San Antonio. One difference between California and other regions is that the large majority of these branded stations are owned by the refiners (either vertically integrated or lessee-dealer operated where the refiner can set station-specific wholesale prices). In other regions, the majority of these branded stations are dealer owned, and can switch brands/refiners if economically profitable to do so. This makes California effectively more horizontally concentrated at the retail level and more vertically integrated relative to other markets.

competition, leading to prices above competitive levels without the need for explicit collusive agreements.⁴

Second, California retail markets are more vertically integrated than other markets, either through complete corporate vertical integration or through contractual vertical integration at direct delivery stations. The combination of horizontal and vertical concentration considerably increases barriers to entry, and thus the risk of market power exercise. For example, vertical integration and horizontal concentration imply that independent retail chains that would like to enter the market (such as Costco or RaceTrac) do not have the ability to contact an independent refiner as a source of supply. Unlike integrated refiners with large downstream market share, independent refiners do not have the same incentive to raise input costs to independent retailers that integrated refiners may have. This is because independent refiners do not own a retail component that would face competition from this independent chain on the street.⁵ Likewise, it is more difficult for independent refiners to enter the market in order to arbitrage high wholesale prices if they cannot secure enough independent retail outlets to sell their product to. Hence vertical concentration in the presence of horizontal concentration may increase barriers to entry at the wholesale and retail levels, which may increase the ability of incumbent firms to exercise market power.⁶

- ❖ **Vertical Market Structure: California has vertically concentrated market structure where the oligopolist refiners are highly integrated into the retail market.**
 - **Vertical integration in the presence of concentration in refining can raise barriers to entry, dampening competition.**
 - **Vertical integration in the presence of concentration in refining and retailing can lead to less competitive pricing because retail demand is inelastic, and refiners set prices to maximize total profits across all their retail outlets.**

California retail markets are more vertically integrated than other US markets. Table 3 gives the percent of stations that fall under each category of contractual agreement. Company operated stations are owned and operated by the refiner. Lessee-dealer stations are owned by the refiner and leased to a residual claimant called a lessee-dealer. Both of these types of stations are vertically integrated in the sense that they cannot change brands of gasoline unless the station is divested to another refiner. This fact allows refiners to set wholesale prices at the station level for lessee-dealers, potentially allowing

⁴ See Hendricks, Kenneth and R. Preston McAfee, "A Theory of Bilateral Oligopoly with Applications to Vertical Mergers" University of Texas at Austin Working Paper and R. Preston McAfee's Statement before the US Senate Committee on Governmental Affairs, Permanent Subcommittee on Investigations hearings in to "Gasoline Prices: How are they Set?" at page 4.

⁵ See Gilbert, Richard J. and Hastings, Justine, "Vertical Integration in Gasoline Supply: An Empirical Test of Raising Rivals' Costs" (June 2001). UC Berkeley Competition Policy Center Working Paper No. CPC01-21.

⁶ See R. Preston McAfee's Statement before the US Senate Committee on Governmental Affairs, Permanent Subcommittee on Investigations hearings in to "Gasoline Prices: How are they Set?" in May 2002 at page 3, and Justine Hastings' Statement before the same committee.

them to exert much more control over retail prices.⁷ These station-specific prices are referred to as Dealer Tankwagon prices (DTW), and they are not publicly posted or available for review. Branded open-dealer stations are owned by an individual instead of a refiner. These stations face a cost to switch between brands, however they can hypothetically switch suppliers and brands. These stations typically pay the rack price for the brand that they sell and take delivery from a distributor called a jobber.⁸ Every jobber pays the same rack price, so that refiners cannot price discriminate between stations. In California, however, most branded open-dealer stations are “direct delivery”. This means that they have gasoline delivered directly from their branded refiner. In California, these stations also pay a DTW, just like a lessee-dealer, that can vary from station to station even within the same brand. Independent unbranded stations are dealer-owned and unbranded, and are the only type of station that can switch refiner/suppliers without cost. They can purchase gasoline from any refiner posting the cheapest price at the rack. They cannot however post a brand name for gasoline.

Notice that the majority of stations in the Salt Lake City and San Antonio metropolitan areas are dealer-owned stations: either branded open-dealers or independent unbranded dealers. The branded open-dealers are the type that can switch brands or refiners, or switch to unbranded if it is profitable to do so. In contrast, the majority of stations in California metropolitan areas are vertically integrated company-operated or lessee-operated stations. These stations cannot switch refiner-suppliers. Their price is directly set at retail or at the DTW by the refiner to maximize refiner’s profits jointly across all stations. In addition, there is a much larger fraction of independent unbranded stations (the stations that can purchase from any refiner) in the other metropolitan areas than there are in California metro areas. These are the only stations that can switch refiner/suppliers without cost.

Because California does not have i) a sufficiently competitive unbranded wholesale and retail market, and ii) a large fraction of open-dealer stations that could potentially switch refiners, wholesale prices may not follow input costs very closely. Refiners are able to maximize profits by setting wholesale prices based on the retail demand elasticity for their multi-product firm. This may result in higher prices than a market with competitive wholesale prices driven by i) perfectly competitive unbranded wholesale market, and ii) dealers who can switch refiner/suppliers and who set retail prices independently, without considering the effect of their pricing decision on other retailers of the same brand. To put it simply: Independent retailers purchase from the refiner with the lowest price. If there is a thick enough (not a monopoly) supply of unbranded wholesale gasoline, this will result in highly competitive unbranded prices for wholesale gasoline. If branded open dealers can switch to be unbranded stations if branded wholesale prices get too large

⁷ This contractual arrangement may also decrease the effective elasticity of retail and wholesale gasoline demand increasing the equilibrium price level as long as retail pass through elasticity is slightly less than one. See Katz, Michael “Game-playing Agents and Unobservable Contrats,” *Rand Journal of Economics*, 1991 and Rey, Patrick and Joseph Stiglitz, “The Role of Exclusive Territories in Producer’s Competition” *Rand Journal of Economics*, 1995.

⁸ The rack price is the posted price for wholesale gasoline from a particular refiner/supplier for a given day at a given distribution rack. The distribution rack is the terminal from which gasoline is delivered into tanker trucks from pipelines or from ships. The rack price is posted, unlike DTW prices, and is the same for all rack customers purchasing that type of gasoline.

(larger than the brand premium consumers are willing to pay at the pump), then this ability to switch coupled with the perfectly competitive unbranded wholesale market keeps branded wholesale prices at very competitive levels. Retail prices will also be lower, since each dealer sets their retail prices to maximize his or her own station's profits given the competitive wholesale price he or she is paying.

California does not have a sufficiently competitive unbranded market. There is not a thick supply of unbranded gasoline, nor is there a large number of independent unbranded or branded open-dealer stations when compared to other metropolitan areas around the country. The implications of these market structure characteristics for prices and competition outlined above can be seen clearly in some simple graphs of crude oil prices, wholesale prices, and retail prices across metropolitan areas.

Figure 1a plots average retail prices excluding taxes, wholesale prices (branded and unbranded rack prices) for Salt Lake City, Utah for 12 weeks in the spring of 2003. Notice that the wholesale prices for branded and unbranded gasoline track each other very closely, and they track crude oil prices very closely. This is consistent with the discussion of the effects of a thick unbranded market and retail station's ability to switch refiner/suppliers outlined above. Notice also, that there is a moderate retailer margin that is fairly constant over this period – i.e., retail prices follow the wholesale prices closely. These facts are consistent with the discussion of market structure and competition put forth in the previous paragraph. Figure 1c presents the same statistics for San Antonio, TX. Figure 1c looks roughly the same as Figure 1a.⁹

However, Figure 1b, for San Diego, California looks much different. This graph presents average retail prices excluding taxes, average DTW prices (instead of the branded rack price, since this is the appropriate measure of branded wholesale prices given San Diego's vertical market structure), the unbranded rack price, and the price of crude oil. Comparing this graph with the other two, we notice the following facts:

- i) Retail prices are much higher in San Diego than in the other metro areas.
- ii) Almost all of this retail price level can be explained by the high level of DTW prices. The average DTW is high relative to crude oil prices and relative to the cost of branded gasoline in the other metropolitan areas (the branded rack price).
- iii) Unbranded rack prices are very volatile, indicating that the supply to the unbranded wholesale market is not as thick as it is in the other metropolitan areas. This fact discourages entry by independent retailers such as Costco, RaceTrac, and others.¹⁰
- iv) Average DTW prices do not follow the unbranded rack price closely since lessee dealers cannot ever switch brands or refiner/suppliers.

⁹ Retail prices and rack prices were obtained from OPIS. Crude oil prices were taken from spot prices available at the EIA's website. DTW prices were obtained from data collected for my current study of the determinants of wholesale gasoline price discrimination and its effects on retail and wholesale prices and competition. This study is funded through a grant from the National Science Foundation.

¹⁰ For example, one of the major concerns of the independent unbranded distributors outlined by the California Independent Oil Marketer Association (CIOMA) to the Federal Trade Commission during the merger of UDS and Valero was access to unbranded gasoline.

- v) Retail margins are moderate in San Diego and similar to those in the other two metropolitan areas, once retail prices are compared appropriately to the effective cost of wholesale branded gasoline to most stations – the dealer tankwagon price.

To summarize the preceding discussion and figures: California commodities market for wholesale gasoline is not highly competitive. By incorporating the mechanisms that facilitate competition as discussed in the previous section, is there a way to increase the level of competition in California's gasoline markets? Dr. Richard Gilbert and I propose that unbundling brand additives from gasoline will lower barriers to entry and create a competitive market for fungible wholesale gasoline. Our proposal is outlined below. We will refer to this idea as Unbundled Supply.

Discussion of Policy Proposals:

- ❖ **Unbundled Supply: Unbundled Supply requires unbundling of the brand additive from the fungible commodity gasoline at the point of wholesale sale.**

Unbundled Supply requires the complete unbundling of commodity gasoline from the brand additive. Every refiner will be required to sell their additive that is required for their brand of gasoline separately from the commodity gasoline to which the additive is added as the gasoline is being loaded into the tanker truck.¹¹ Hence any gasoline station can purchase fungible commodity gasoline from any refiner. If the station is branded, it will then purchase the additive separately (no matter what the contractual form; lessee or branded open dealer). Our proposal does not allow the gasoline and the additive to be sold together in a bundle in addition to their independent sale.

- ❖ **Benefits of Unbundled Supply:**
 - **Minimal intrusion on the marketplace – it does not significantly change the current distribution system or change the ability of refiners to have branded gasoline.**
 - **“Do no harm” – because of its minimal intrusion into supply distribution and branding ability, at worst, this approach will leave the market place unaffected.**
 - **This proposal should increase competition in the market for fungible commodity gasoline within the current market structure, in other words, even without *de novo* entry by outside refiner/suppliers.**
 - **This proposal will lower barriers to entry at the wholesale and retail levels, allowing for increased competition at both levels of the gasoline market.**

¹¹ The refiners will not be permitted to sell a bundled product as well as the separate additive product and fungible gasoline. In addition we require that refiners continue to produce a fungible commodity. They would not be allowed respond to this regulation by formulating branded gasoline at the refinery that is no longer fungible as it is in the current state of gasoline production.

Notice first that this approach does not change the current distribution system. Currently all gasoline is a fungible commodity that is often commingled in common storage tanks, swapped between refiners, and shipped commingled in common carrier pipelines. Any particular gallon of gasoline can eventually be sold at the pump as any brand, or as unbranded gasoline. A gallon of gasoline does not become branded gasoline until it is loaded into the truck at the distribution rack, and the refiner's additive is injected into the tanker truck. Hence, the distribution of gasoline and additives is already unbundled in the supply chain up until the point of loading into the tanker truck. Our proposal merely requires that this *unbundled* delivery system have an *unbundled* price.

Unbundled supply restores a competitive commodities market for gasoline, and it does so in two very important ways:

- i) It makes demand for wholesale gasoline very elastic – pressuring prices towards perfectly competitive levels. This is because all stations can purchase gasoline from any refiner or supplier who is posting the cheapest price. All stations can switch refiner/suppliers of commodity gasoline without cost.
- ii) It removes barriers to entry that were due to vertical integration into gasoline retailing at both the wholesale and retail levels. Entering refiner/suppliers have full access to sell product to any dealer-operated station in California: lessee-dealer, open-dealer, or independent. In addition, independent unbranded retailers, current or entering, can secure gasoline supply from any refiner supplier – integrated or unintegrated, incumbent or entrant.

Unbundled Supply makes demand for wholesale gasoline very elastic; leading to increased competitive pressure on price levels in wholesale gasoline markets. Any station can purchase gasoline from any refiner. Hence, each station has the competitive behavior of an independent station for the purposes of commodity gasoline purchases. The separate purchasing of the additive preserves the current feature of branded gasoline to satisfy consumer preferences for branded gasoline.

In addition, Unbundled Supply lowers barriers to entry since any supplier can sell commodity gasoline to any station (including out of state suppliers), and any station can purchase commodity gasoline from any supplier (including integrated incumbents). This increases competition by increasing i) the credible threat of entry by outside suppliers into wholesale market to arbitrage large price increases, ii) securing supply for independent retailers currently in the market, and those considering entering into the market, since refiners must now sell commodity gasoline to any station. These retailers may then increase competition at the retail level.¹²

In the short run, refiners may act to preserve the current prices on wholesale gasoline by transferring the current markup on the bundled gasoline and additive to the price of the

¹² See for example, Margaret Slade (*International Journal of Industrial Organization*, December 1986), Janet Netz and Beck Taylor (*Review of Economics and Statistics*, February 2002) and Justine Hastings (*American Economic Review* March 2004).

additive alone. However, we believe that this simple Unbundled Supply approach is minimally intrusive, relatively simple to implement, and will increase competitive forces and decrease entry barriers, making this transfer of markup to the additive price less feasible in the long run.

❖ **Additional Policies that will facilitate competition when coupled with Unbundled Supply:**

- **Streamline permitting process and decrease permitting costs of building and expanding marine terminal storage tanks and other storage tanks along pipelines to facilitate wholesale entry.**
- **Streamline permitting process and decrease permitting costs for entry of new gasoline stations.**
- **Consider changing CARB standards to be compatible with RFG (Federal Reformulated Gasoline) standards.**

It is important to facilitate entry by decreasing entry barriers at all levels. These three points suggest ways to decrease entry barriers to complement the reduction of entry barriers resulting from Unbundled Supply. The first point is important for allowing access of entry by out-of-state firms. Entrants into the wholesale gasoline market must have access to marine terminal facilities and other storage tank facilities along the distribution network in order to bring product to market. Facilitating the expansion of the few independent terminal facilities currently in California, facilitating the construction of new independent terminal facilities and streamlining the cumbersome and slow permitting process will help increase access to critical facilities for new entrants.

The third point will also lower barriers to entry, but it will be most effective with the lowering of entry barriers due to vertical integration through Unbundled Supply. It has often been stated that supply shortages that lead to price spikes in California are profitable for incumbent refiners. In order for the wholesalers to enter the market to arbitrage these price spikes, they must have a critical mass, or minimum efficient scale, of independent retailers to sell the product to.¹³ Otherwise, the same incumbent firms who benefit from the decrease in supply are the only ones who can import supply from out of state and distribute it to the retail market. Unbundled Supply will provide the minimum efficient scale of demand for wholesale gasoline since every dealer operated station will be able to purchase gasoline from new wholesale entrants. Making CARB standards uniform with RFG standards will simply increase the number of potential firms who would enter the wholesale gasoline market in California in response to a supply shock.

¹³ An interesting anecdote is that a Finnish company used to consistently import CARB gasoline from Finland to Los Angeles when it had a large enough market of independent retailers to sell to. It often sold this gasoline to the Thrifty chain. Once Thrifty was purchased by ARCO, the Finnish company no longer had sufficient volume demanded to justify the same import schedule. Sources for this anecdote are various parties involved in California gasoline markets.

❖ **Brief comments on other proposed pieces of legislation:**

- **Branded open supply will not increase competition, and may have the undesired consequence of resulting in both higher average DTW and rack prices.**

Branded Open Supply does not create a fungible market for commodities gasoline. It does not decrease barriers to entry at wholesale or retail levels. Therefore it is not a solution for the competitive problems in California. Branded Open Supply will only serve to force refiners to pick one effective wholesale price for all of their stations. This elimination of price discrimination will not decrease the demand elasticity facing the refiner. In addition, as in most markets, when price discrimination is banned, average prices may in fact increase. Moreover, based on the volume of business at the rack verses through direct delivery, it could be the case that the refiner's profit maximizing response to Branded Open Supply is to raise rack prices. This could lead to very negative consequences for dealer owned jobber-supplied stations.

- **Divorcement legislation does not increase competition, and could increase inefficiency and decrease competition between refiners at the wholesale level.**

Divorcement legislation does not create a fungible market for commodities gasoline. It does not decrease barriers to entry at wholesale or retail levels. Divorcement may lead to greater inefficiencies in the marketplace. It may also result in further softening competition through strategic delegation of pricing decisions to dealers.¹⁴

- **FTC watch zones are simply price caps with no exogenous predetermined cap level. This policy does not increase competition and creates all of the distortions and inefficiencies associated with price caps. These distortions are worsened by the endogenously determined price cap enforcement.**

¹⁴ . See Katz, Michael "Game-playing Agents and Unobservable Contrats," *Rand Journal of Economics*, 1991 and Rey, Patrick and Joseph Stiglitz, "The Role of Exclusive Territories in Producer's Competition" *Rand Journal of Economics*, 1995.

Table I: Fraction of Variation in Average Retail Prices Attributable to Variation in Average Crude Oil Price¹⁵

State	Fraction of Retail Price Variation Explained by Variation in Crude Oil Price
Alabama	0.892
Arizona	0.714
California	0.696
Deleware	0.878
Georgia	0.907
Idaho	0.826
Iowa	0.849
Illinois	0.787
Massachusetts	0.875
North Carolina	0.906
New York	0.877
Ohio	0.852
Pensylvania	0.900
South Carolina	0.910
Texas	0.886

Table 2: Retail Prices vs. Crude Oil Prices During 1990 and 2003 Crude Oil Spikes¹⁶

	October 1990, Average Retail Price Regular Grade	March 2003, Average Retail Price Regular Grade	October 1990, Margin over Crude Oil Price in 2003 dollars	March 2003, Margin over Crude Oil Price in 2003 dollars
San Diego, CA	1.445	2.161	0.671	1.304
San Antonio, TX	1.401	1.573	0.614	0.716
Salt Lake City, UT	1.403	1.649	0.617	0.792

¹⁵ Data were taken from the Energy Information Administration's (EIA) website. The retail data are the EIA's monthly average retail prices, excluding taxes, for each state from 1998-2003. The wholesale prices were averaged from the Daily WTI spot price for crude oil posted to the EIA's website.

¹⁶ Crude oil price data were taken from EIA data on crude oil prices. The GDP deflator was taken from Budget of the United States Government, Fiscal Year 2005 Historical Tables. Retail prices come from a sample of stations collected by Oil Price Information Service and Whitney Leigh Corporation.

Table 3: Vertical Market Structure by Market in 2002 to 2003¹⁷

	Los Angeles, CA	San Diego, CA	San Antonio, TX	Salt Lake City, UT
Refiner owned and operated	21%	41%	36%	22%
Refiner owned, Lessee dealer operated	44%	32%	2%	8%
Branded Open Dealer, Direct Delivery	18%	11%	2%	5%
Branded Open Dealer, Jobber	6%	3%	32%	45%
Supplied Independent Unbranded Dealer	11%	13%	28%	20%

¹⁷ Information taken from retail gasoline census data collected by MPSI.

Figure 1a: Salt Lake City Average Prices Excluding Taxes

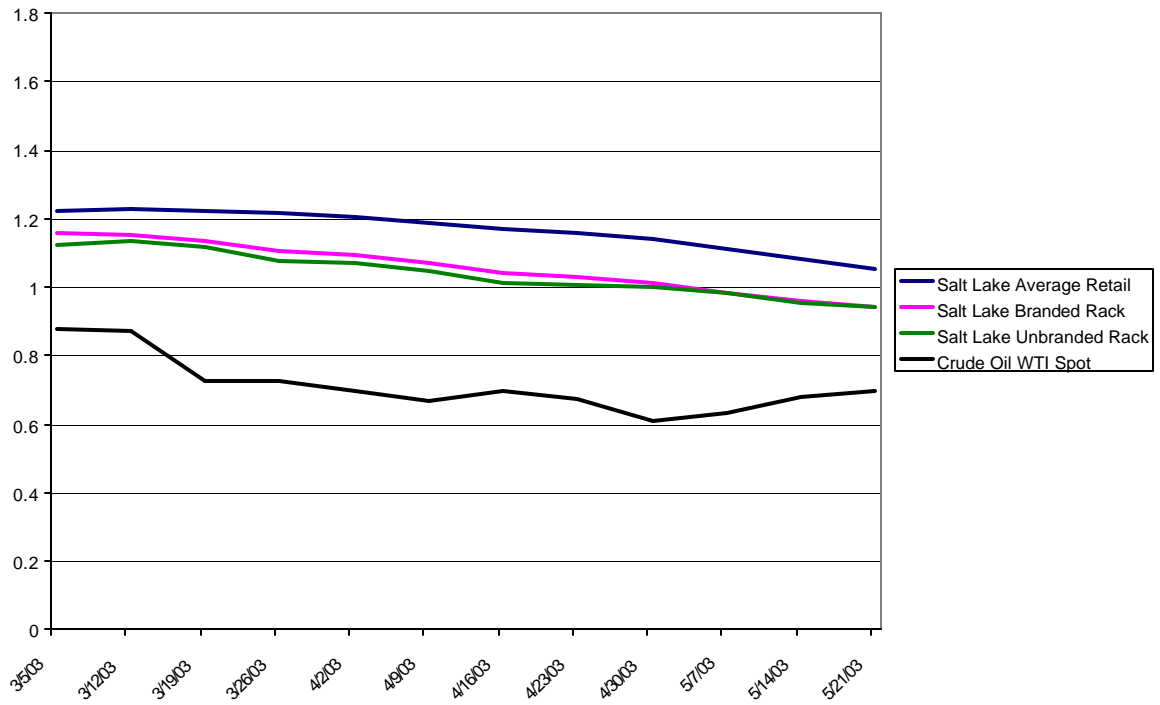


Figure 1b: San Diego Average Prices Excluding Taxes

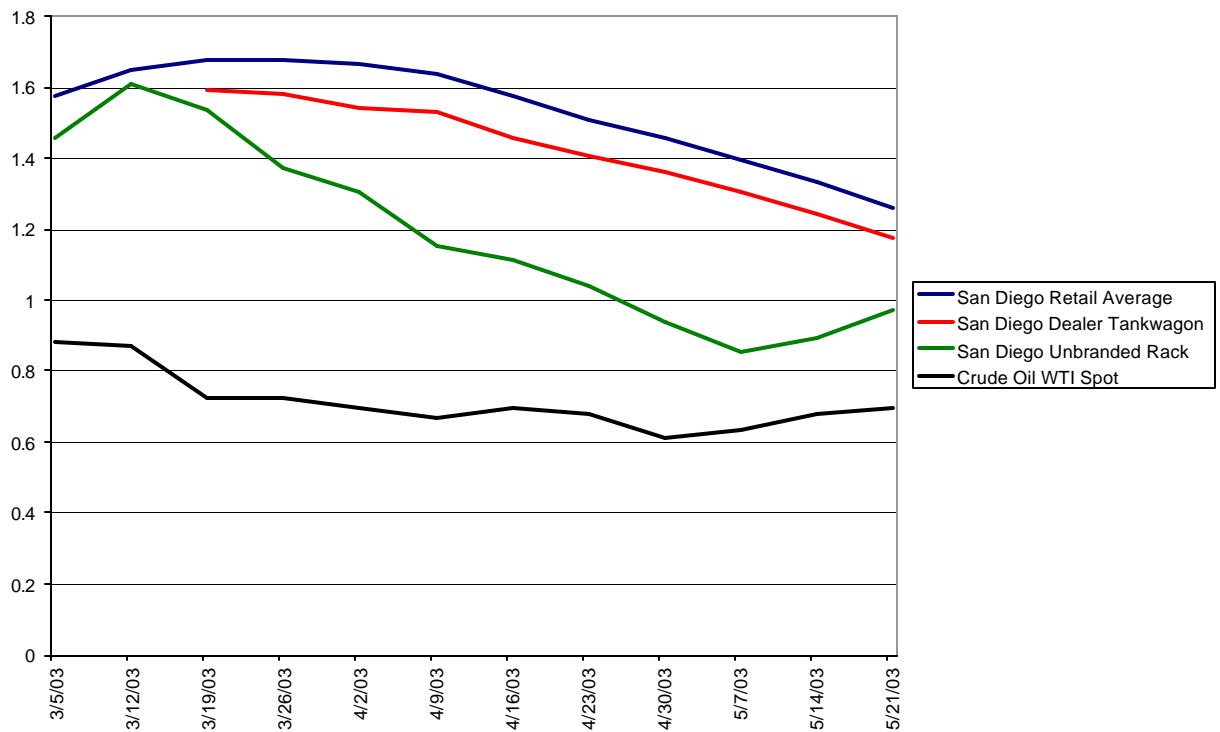


Figure 1c: San Antonio Average Prices Excluding Taxes

