Brand Loyalty and Gasoline Pricing in Sacramento

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Retail gasoline prices are known to vary substantially among retail stations. Evidence from gasoline markets in Sacramento suggests that these price differences exist and persist because the marketing of supposed differences in branded gasoline is enough to split the "retail gasoline" market into two submarkets, each supporting a different price.

A brand-loyal consumer may not even be buying gasoline produced by that brand's refiner.

Photo by Jennifer Thompson

One interesting feature of retail gasoline prices is that they can vary at different stations on the same day. The retail station is the last link of a long marketing chain. Once produced at a refinery, gasoline is transported throughout the United States in pipelines and waterborne barges to wholesale terminals found along the network of pipelines and marine ports. Sometimes unfinished gasoline is transported this way to a refinery for completion and then transported a second time through the network.

California consists of four wholesale marketing areas: Eureka, Northern California, Bakersfield, and Southern California. Sacramento is in the Northern California wholesale marketing area. Once at the wholesale terminals (called "racks"), gasoline is stored until the distributors, whose trucks carry 7,500–10,000 gallons, buy gasoline for delivery to retail stations.

In Sacramento during June 2007, differences between retail prices on the same day averaged 11.5 cents per gallon and reached as high as 18.2 cents per gallon. Such price differences can persist for long periods. In Sacramento, the largest daily spatial price spread—the difference between prices at two different retail stations on the same day—never fell below 10 cents per gallon during June.

According to the law of one price, prices at different retail stations should not differ by more than the cost to the consumer of traveling between the two stations. With retail stations clustering on city streets, the consumers' travel cost is negligible. Consequently, the prices among retail stations ought not to differ by much. Therefore, some other force must contribute to the persistent difference in spatial prices. Two possibilities are influences from the marketing chain, price pass-through and consumer preferences, namely as brand loyalty.

Price Pass-through

In 2003 the Energy Information Administration (EIA) conducted a study about gasoline pricing through the marketing chain in the United States. Specifically, the EIA quantified the effect on retail prices of a price-changing shock in the gasoline spot market. The EIA concluded that 100 percent of spot market price changes are transmitted to retail prices. This is the so-called price pass-through effect.

The wholesale market is the marketing level between the spot and retail markets. While the EIA only examined the spot-to-retail effect, implicit in their hypothesis is that prices pass from spot through wholesale to retail. Thus, there should be a visible pass-through effect from wholesale to retail.

Where there is a one-to-one pass-through of a price change from one price series to another, the price series should move together. In a case like gasoline, where the price series represent different marketing levels, there might be a mark-up from, say, wholesale to retail. Such a mark-up will affect the averages of the two series, but the direction, magnitude, and duration of the changes in each series should be comparable regardless.

Figure 1 shows the daily wholesale and retail prices in Sacramento during June 2007. These two price series do not move together. Several explanations might apply. With only twenty-six observations, this could be an anomaly in the data. In addition, the pass-through effect can take up to eight weeks, rendering a single month of data insufficient to capture complete pass-through.

Another explanation is there is more going on in the Sacramento gasoline markets than the simple transmission of price changes from one marketing level to the next. Moreover, price pass-through is a concept about aggregate market prices over time, not about individual company prices at different locations within the same marketing level at the same time. Whether price pass-through applies to Sacramento does not address why there are idiosyncrasies among retail-station prices on a daily basis.

Brand Loyalty

Although consumers are free to buy gasoline from any retail station at any location at any time, many consumers develop preferences for a specific brand of gasoline. Brand loyalty describes consumers' decisions to only buy gasoline affiliated with their preferred brand regardless of the prices at other stations. When many consumers exercise brand loyalty, the competitive force that would keep the prices at neighboring stations in line lessens. A consumer loyal to Brand A may not act on an opportunity to buy Brand B gasoline at a lower price. The result is persistently large differences in retail prices at different locations on a daily basis.

Distributors are similar to consumers in that a distributor will drive into a local rack, see the list of prices on a sign at the pump, and fill the delivery truck. Distributors differ from consumers, however, in that most cannot choose where they buy gasoline. Some 85 percent of distributors buy gasoline under a long-term supply contract. Specified in supplier contracts are branding arrangements and required purchase locations. Whereas consumers exercise brand loyalty, distributors have obligatory purchase points with specific brands.

To examine the differences among gasoline prices at different locations, spatial price relationships (SPR) were calculated for wholesale and retail markets. The SPR examined here is the simple law of one price, adjusted for transportation. For simplicity, assume transportation costs are the only costs of moving product between terminals. The SPR is:

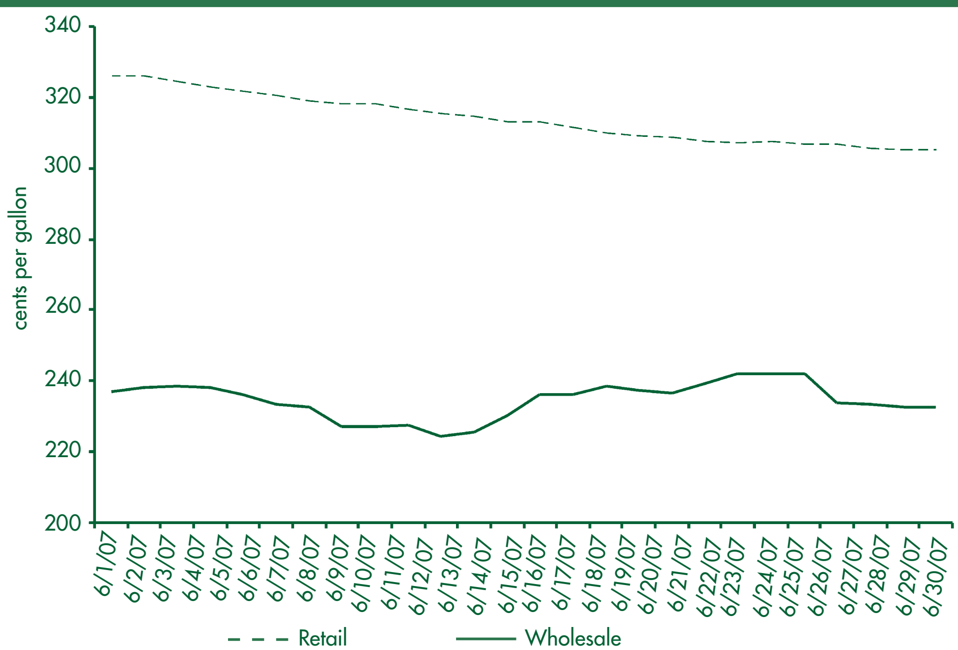
|Price of supplier i – Price of supplier j| - Transportation cost between i and j = 0

The wholesale supplier prices are the prices at which wholesale distributors buy gasoline for resale to retail stations. The gasoline sold under a branding agreement is classified as "branded" while the gasoline not sold under contract is classified as "unbranded." This information is gathered by the Oil Price Information Service and was provided with the price data. Wholesale branded gasoline is sold only under contract with the right to sell the brand as much a part of the contract as the product itself.

Figure 2 shows SPRs for three pairs of wholesale supplier prices. The first, the "branded spread," is the SPR between two branded suppliers in Sacramento. The second, the "unbranded spread," is the SPR between two unbranded suppliers in Sacramento. The third, the "branded-unbranded spread," is the SPR between a branded and an unbranded supplier in Sacramento.

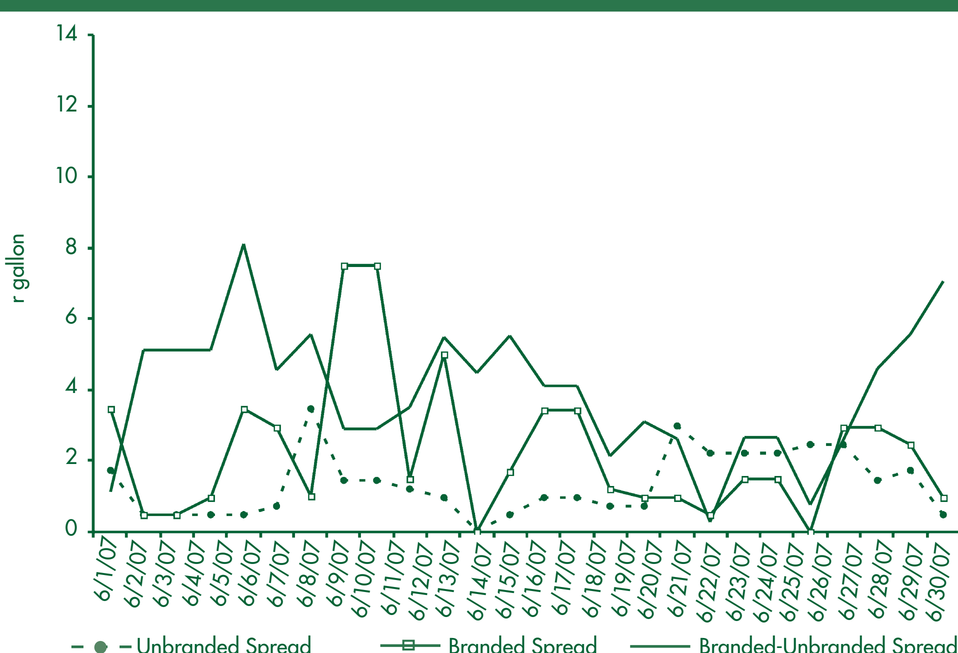
Because branded gasoline is only sold under contract, distributors cannot

Figure 1. Retail and Wholesale Gasoline Prices in Sacramento



Source: Oil Price Information Service

Figure 2. Wholesale Spatial Price Relationships in Sacramento



Source: Oil Price Information Service

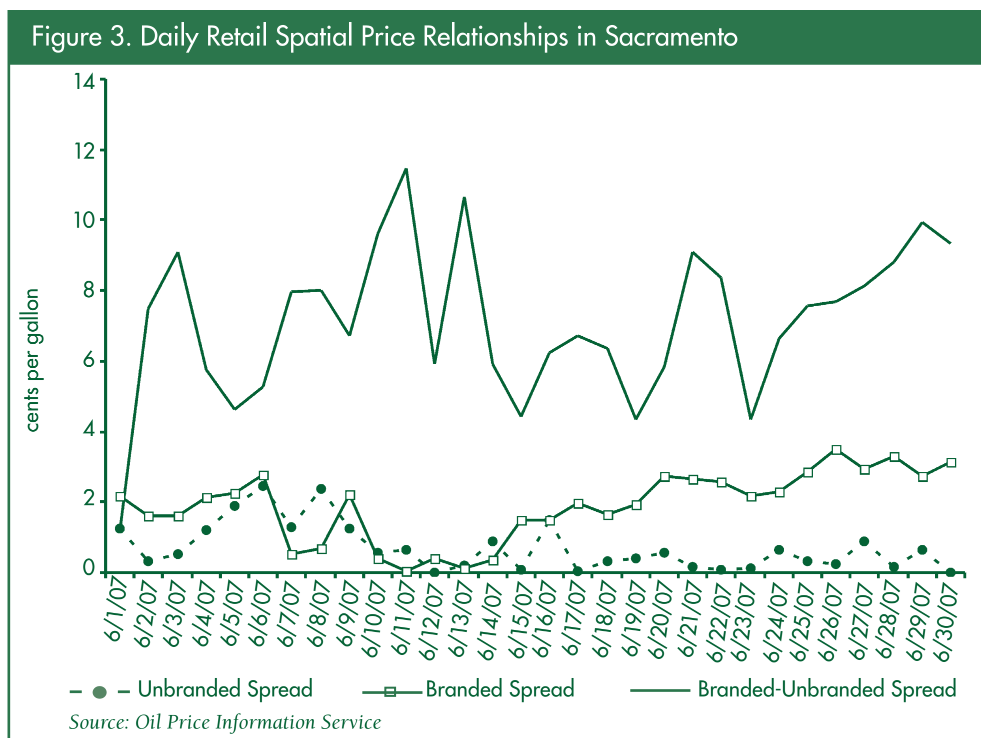
exercise spatial arbitrage across these suppliers. That is, a distributor under contract to buy gasoline from Brand A cannot buy gasoline from Brand B even if the price is lower. Therefore, there ought to be more unexploited spatial arbitrage opportunities, represented by nonzero values of the spatial price relationship, involving branded gasoline prices. On the other hand, distributors do not need contracts to buy unbranded gasoline and are free to arbitrage across these suppliers. Thus, there ought to be fewer unexploited arbitrage opportunities among unbranded suppliers. Figure 2 shows just that. The unbranded SPR is lower on average and less volatile than the SPRs involving branded prices.

Consumers do not face the constraint on buying gasoline that wholesale distributors face. Consumers are free to buy gasoline from any retail supplier, regardless of brand and location, at any time. Moreover, studies have shown that retail gasoline is the same across the board. Although proprietary, brand-specific additives are mixed into the gasoline, no substantial differences exist in the performance or emissions across gasoline brands. The only differentiating factor in retail gasoline is marketing.

Interestingly, the consumer does not know which gasoline is supplied to which retail station. A retailer may be supplied with branded or unbranded gasoline regardless of the retailer's affiliation. It all depends upon the contracts and relationships between the refiner, wholesaler, and retailer. The branding designation only signifies whether the gasoline was sold under a branded contract at the wholesale level. Therefore, a brand-loyal consumer may not even be buying gasoline produced by that brand's refiner. This reinforces that retail branding is about marketing.

Figure 3 shows the same SPRs for retail gasoline as Figure 2 shows for wholesale gasoline. The pattern among the retail SPRs mimics the pattern among the wholesale SPRs and is more pronounced. Like its wholesale counterpart, the retail unbranded SPR is the lowest on average and has the least variability of the three SPRs. The retail branded SPR is similar in magnitude and variability to the unbranded SPR. The branded-unbranded SPR stands out as much higher and more volatile than the other two SPRs. Taken together, these SPRs show that consumers do not have a preference for a particular brand so much as a preference for the general designation as branded or unbranded. That is, if a consumer prefers unbranded gasoline, he will arbitrage among unbranded stations. If a consumer prefers branded gasoline, he will arbitrage among branded stations. However, a consumer who prefers branded gasoline will not arbitrage unbranded gasoline, and vice versa.

Figure 3. Daily Retail Spatial Price Relationships in Sacramento



Source: Oil Price Information Service

Conclusion

Retail prices typically vary among retail stations on a daily basis. Evidence from gasoline markets in Sacramento supports the concept of brand loyalty among consumers. Specifically, consumers associate themselves with a general branding designation, either "branded" or "unbranded." The resulting effects on retail prices are comparable to wholesale prices, for which distributors are associated with both general branding designations and specific brands.

Consumers' association with some preferred branding designation introduces a split in the population that suppliers might use as a guide for price discrimination. Indeed, many suppliers offer both branded and unbranded gasoline from the same refiner at different prices. Whether retail gasoline is characterized by brand loyalty of consumers or price discrimination by suppliers, or some combination of both, the effect on prices is similar. The variation among retail gasoline prices on a daily basis persists because retail gasoline is sufficiently differentiated by brand to support two pricing schemes.

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