

Regulation and Competition in Rural Gasoline Markets:  
A Northern California Case Study

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Shortened title: The Rural Gasoline Market in Northern California

Abstract:

Gasoline prices affect households and businesses and are derived from oil, an important resource. We exam the retail and wholesale gasoline market in Eureka, California, a remote rural market. During 1998-2004, retail prices rose then fell relative to the nearest major urban market, San Francisco, while wholesale prices rose. We test competing explanations for the relative price movements by examining the timing of changes in gasoline prices and other factors. The data suggest that this rural market faced increased costs, relative to urban markets, of the mandatory adoption of Ethanol. At the same time, relative retailer markup fell in San Francisco, perhaps due to integrated retailer competition. Finally, retail competition in Eureka was increased by the arrival of a large hypermarket gasoline retailer.

Keywords: gasoline, rural, environmental regulation, hypermarket

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## I. Introduction to the Eureka gasoline market

Changes to gasoline prices have a large impact on households and businesses. This is particularly true in rural communities where there are few substitutes for automobile travel. Persistently high gasoline prices leave fewer resources for other important spending, and for this reason gasoline markets are under constant scrutiny from state and federal government agencies.<sup>1</sup>

In the spring of 2000 Eureka, California had the highest gasoline prices of any mid-sized city in the U.S.<sup>2</sup> For the next few years, prices remained higher than the California average and higher than surrounding cities. In August, 2001 a local radio station staged protests at various city gasoline stations. Many people claimed that gasoline station owners were engaged in anti-competitive behavior.<sup>3</sup> Occasionally, oil refineries were blamed for the high prices, but since residents usually compared Eureka prices with other California cities, the retail stations were mostly held responsible.<sup>4</sup> Figure 1 shows the retail price of gasoline in Eureka from 1998 until 2004.<sup>5</sup> Eureka is a remote rural town with a population of twenty-six thousand and is 270 miles north of San Francisco (U.S. Census Bureau, 2004). It is located on the coast in Humboldt County with a county-wide population of one hundred twenty-seven thousand. The nearest major town is Redding, California, a three-hour drive away with a population of eighty-eight thousand (U.S. Census Bureau, 2004). In June 2002, Eureka had the most expensive gasoline in the state while Redding had the least expensive. The price difference was forty-three cents (CAAA 2002).<sup>6</sup>

[Figure 1 about here]

Gasoline retailers argued that California has the highest gasoline prices in the nation because state taxes are among the highest and California requires a unique blend of gasoline.<sup>7</sup> Additionally, Eureka retailer stations must pay to transport gasoline via barge shipments from refineries in the San Francisco Bay Area.<sup>8</sup> Given these factors, it is no surprise that gasoline often costs more in Eureka than other areas in the nation or other areas in Northern California.<sup>9</sup> However, this was not always the case, and the price difference between the two regions has both risen and fallen since 1998. Figure 2 shows the relative monthly price of gasoline in Eureka compared to San Francisco.<sup>10</sup> Table 1 shows the average annual price of gasoline in Eureka and San Francisco.<sup>11</sup> From 1998 until 2001, gasoline in Eureka was no more expensive compared to San Francisco. In 2002, Eureka prices rose to about nine cents higher compared to San Francisco. Compared to the previous year, this was a ten cent increase in the relative price. In January 2003, relative prices fell rapidly and Eureka averaged about seven cents per gallon less than San Francisco. This difference is below the pre-2002 levels.

[Figure 2 about here]

[Table 1 about here]

What explains the rise and fall of relative retail gasoline prices in Eureka compared to San Francisco? The answer to this question will be of interest to other rural locations. While petroleum is a particularly important resource to both households and businesses, previous studies have focused on urban, state, or national data.<sup>12</sup> It should be easy to test competing explanations for price movements since Eureka is a small, isolated market with relatively few wholesalers and retailers. Because of this, studying the Eureka gasoline market may provide implications, for the impact of state-mandated environmental regulation such as a change in the gasoline formulation, among others.

This paper attempts to explain relative price movements in Eureka compared to San Francisco rather than explain the high level of gasoline prices in Eureka.<sup>13</sup> Our strategy is to compare the timing of gasoline price changes to changes in other factors. We obtain retail and rack gasoline price data. In summer 2004 we interviewed a large branded local gasoline retailer, a large local jobber (transporter), a local representative from the Chevron terminal, and a representative from Costco, Inc. We also had informal conversations with other industry experts.

Generally, if markets are well integrated, then prices will move up and down together. Therefore, changes in relative prices indicate a change in market structure, technology, regulation, or some other factor. We find that the data are consistent with the view that wholesale, or rack, prices rose once Ethanol replaced methyl tertiary butyl ether (MTBE) as a mandated additive to gasoline.<sup>14</sup> These costs were passed along to consumers by retailers who now paid about two to three cents more per gallon. Additionally, it seems

that retailers in the rest of the state, including San Francisco, faced increased competition from integrated retailers in 2002, which lowered retailer markups relative to Eureka. In 2003, the higher wholesale costs remained, but retailers lowered their price once competition increased with the arrival of a hypermarket retailer. If other retail markets are similar to gasoline, then rural locations may pay higher costs of government regulation, such as required Ethanol blending, since rural locations often do not develop the economies of scale that retailers in more populated urban areas enjoy.<sup>15</sup> And, since rural locations have fewer retailers and perhaps less competitive markets, the arrival of a hypermarket retailer may provide relief through increased competition.

The paper is organized as follows. The next section reviews the possible explanations for relative retail gasoline price changes and identifies the four factors that are most likely responsible. The following section presents the empirical evidence on these four factors and finds that three of the four are supported by the data. The last section concludes.

## II. Possible explanations for price changes

### *Demand Changes*

In a competitive gasoline retail market, prices are set by the forces of demand and supply. The price in Eureka relative to San Francisco will rise if either demand rises or supply falls in Eureka relative to San Francisco, and conversely, the relative price will fall if

either relative demand falls or relative supply rises. Consider demand first. Demand depends largely on population, the fuel efficiency of cars, income, and the number of miles driven. If demand changes are largely responsible for the relative price changes, then demand in Eureka must have risen during 2002 and fallen during 2003 relative to San Francisco. It is unlikely that changes in population and average fuel efficiency were large enough over this short period to account for relative demand changes. Relative incomes may have changed over the period, since the 2001 national recession hit San Francisco harder than Humboldt County. The unemployment rate rose by 2.4 percentage points in San Francisco from 2000 to 2001 while it actually fell by 0.3 percentage points in Eureka (California Employment Development Department, 2004). This may have led to a relative fall in income and demand, and fall in price, in San Francisco in 2001. However, the rise in incomes during 1998-2000 was greater in San Francisco, and we did not observe large changes in relative gasoline prices. We therefore conclude that income effects are mild.

Miles driven by commuters may have fallen during the recession in 2001, since the number of jobs in both Eureka and San Francisco fell. Since San Francisco was more adversely affected by the recession, the drop in commuter miles may have been relatively less in Eureka and this may have contributed to the increased relative demand and price in Eureka in 2002. Additionally, tourist-driven miles were reduced in both Eureka and San Francisco in the wake of the September 2001 terrorist attacks, although we cannot say where tourist miles were reduced the most. However, there is no evidence that these two effects were reversed quickly in the spring of 2003 to yield the great drop in Eureka

relative prices. We therefore conclude that demand considerations changed too slowly to be the main source of the relative price changes from 2001-2003.

### *Supply Changes*

Gasoline is supplied at the marginal cost to retailers of delivering an extra gallon in a competitive market. These retail costs include wages, rent, taxes, and the wholesale price of refined gasoline, which includes transportation and regulatory costs. While wages and rents are typically higher in San Francisco, relative wages and rents are unlikely to have changed quickly from 2001-2003. Eureka and San Francisco face the same state and federal taxes and local taxes are very similar, so tax changes cannot be responsible for the relative price movements.<sup>16</sup> Transportation costs do not seem to have changed greatly from 2001-2003. Gasoline is a good such that when its price rises, the cost to transport gasoline automatically rises. However, the average price of gasoline in Eureka fell by thirteen cents per gallon 2001-2002 and rose by fourteen cents 2002-2003. Thus, the rise in relative prices in 2002 and the fall in relative prices in 2003 run counter to the changes in fuel costs. Instead, other retailer costs must have changed. One important regulatory change was the mandatory switch by refineries from MTBE to Ethanol as an oxygenate. This change was originally scheduled to be completed by January 2003, but refineries were eventually given until January 2004 to make modifications.

If the retail gasoline market is perfectly competitive, then the price is set equal to producer marginal costs, which includes a normal rate of return for retail owners. If one

retailer attempts to charge a higher price and earn a profit above normal levels, then customers will no longer purchase gasoline from that retailer and will instead buy gasoline from a competitor with a lower price. The presence of competitors, and even potential competitors, will keep the price low. On the other hand if the price is too low in the long run and costs are not recovered, then the retailer will go out of business. In the next section we show that some refinery-owned retailers lowered prices in 2002 and statewide retailer markups fell.

If firms enjoy market power, however, then they can consistently charge a price above marginal costs. The amount of market power enjoyed by firms is related to the number of firms in the market, and the threat of litigation and regulation by the government under anti-trust legislation.<sup>17</sup> One way firms may wield market power is if they collude and all agree to charge higher prices. This collusion can be either overt or hidden (tacit). Firms also agree not to lower prices in order to take customers away from their rivals. In effect, the firms agree not to engage in price competition.

In theory, the increase in the relative price of Eureka gasoline in 2002 may be the result of greater applications of market power by Eureka retailers, while the drop in relative prices in 2003 may be the result of a loss of market power. However, there were no significant changes to the number of retail gasoline stations in 2002.<sup>18</sup> Additionally, the year 2002 was an election year for the Humboldt County District Attorney, and it seems unlikely that retailers would have engaged in blatant market abuse for fear of attracting the attention of the incumbent District Attorney or his challenger.<sup>19</sup> This is especially

true given the heightened attention to gasoline prices in the wake of the high gasoline prices of 2000, which averaged \$1.91 per gallon compared to \$1.55 in 1999.

While increased market power may not explain the rise in relative prices in 2002, there were two significant changes at the beginning of 2003 that may have led to a decrease in market power and a decrease in relative prices compared to San Francisco. First, a new District Attorney took office in December 2002. Second, a hypermarket retailer, Costco, began selling gasoline in May, 2003.

In the next section, we examine more closely the factors that are most likely responsible for the ten cent increase in relative gasoline prices in Eureka compared to San Francisco in 2002 and the decrease in relative prices in 2003. Those factors are 1) the mandated switch to Ethanol, 2) the increased price competition by integrated retailers in San Francisco, 3) the election of a new Eureka District Attorney, and 4) the selling of gasoline by a hypermarket retailer in Eureka.

### III. Empirical Evidence

#### *New Regulation*

Eureka has one terminal operated by Chevron that services all local wholesalers and retailers. The San Francisco Bay Area, however, has many local refineries, terminals and

connections to pipelines.<sup>20</sup> In the Bay Area, if one wholesaler raises their price there are several options for retailers. In Eureka, local retailers do not have other sources for supply and only have previous contract agreements to act as a stabilizer of rack prices. If the rack price climbs too high, retailers will find it profitable to bring gasoline into Eureka via trucks from San Francisco. The cost of shipping gasoline by truck is approximately eight to ten cents a gallon, so the Eureka rack price can never be more than about eight to ten cents a gallon greater than the San Francisco rack price.

Beginning January 2004, California refineries were required to oxygenate their gasoline with Ethanol and discontinue the use of MTBE. The industry was aware of the new regulations as early as March, 1999; however, the original switchover date of January 1, 2003 was postponed until January 1, 2004.<sup>21</sup> This particular switch in oxygenates imposes large fixed costs on the refineries that are reflected in higher rack prices for retailers and wholesalers. Ethanol must be blended with the refined gasoline at the terminal while MTBE was added at the refinery. Therefore, each terminal must be equipped with the proper holding tanks and blending machinery for Ethanol. One industry expert quoted this cost at \$4.5 million for upgrading the Eureka terminal and all those interviewed agreed that cost was into the millions of dollars. While terminals in both Eureka and San Francisco needed to upgrade their equipment, these fixed costs could be spread out over more gallons of gasoline in San Francisco. Additionally, Ethanol is trucked to Eureka from San Francisco, which adds costs to the Eureka terminal. In fact, Chevron considered selling their Eureka terminal in 2002 because they were not sure that they could raise rack prices sufficiently without causing retailers to

import gasoline from San Francisco via truck. In the end, industry experts tell us that about two or three cents per gallon were added to the Eureka rack price in order to recover the Ethanol conversion costs.<sup>22</sup> Figure 3 shows relative rack prices in Eureka compared to San Francisco.<sup>23</sup> The relative price rose in 2002 and has remained about eight to ten cents higher.<sup>24</sup>

[Figure 3 about here]

The increase in relative gasoline prices in Eureka compared to San Francisco in 2002 is in part due to costs associated with the state mandated switch to Ethanol from MTBE. The Eureka retailers responded to the higher rack prices by raising the retail price. But this appears to explain only two to three cents of the ten cent price difference increase. What accounts for the remainder? Other retail costs such as wages, rents, and taxes, as discussed in the previous section, are unlikely to have an impact on relative retail prices. Also, we are not aware of regulatory costs that have been imposed or planned for in the short-term future. Instead, it appears that the competitive environment changed in San Francisco which lowered relative retailer markups in that area.

### *Vertically Integrated Retailers*

According to industry experts we interviewed, during 2002 some integrated retailers in California experimented with more competitive retail pricing in order to gain market share.<sup>25</sup> Integrated retailers are retail stores that are owned and operated by refineries.

Thus, the same company refines, distributes, and sells gasoline. This push to establish more market share was accompanied by Temporary Volume Allowances (TVAs) whereby the integrated retailer would “pay” its refiner division the same rack price as other branded and unbranded dealers and then later receive a “subsidy” from their refiner division. This kept wholesale prices high for the non-integrated retailers, while effectively providing lower wholesale prices for the integrated retailer. The industry experts we talked to said that the effect was a reduced retail gasoline price in many areas, including San Francisco. Eureka, however, is the largest market without an integrated retailer in California, according to the industry experts we interviewed. Thus, if integrated retailer competition reduced gasoline prices statewide, we would not expect to see price reductions in Eureka.<sup>26</sup>

Figure 4 shows the retail markups, defined as the retail price minus the rack price, for Eureka and San Francisco 2001-2004.<sup>27</sup> There is evidence that something unique was happening in the gasoline retail market in 2002, since retailer markup series is surprisingly consistent over 2002, while the markups are more volatile in 2001 and 2003. Table 1 calculates the average annual retail markups. In 2001, the San Francisco markup was about six cents greater than in Eureka. In 2002, markups fell in both regions, but the San Francisco markup fell much more, so that the Eureka markup was two cents greater. This is an increase of eight cents in the Eureka relative markup. By 2003 and 2004, San Francisco markups were about fifteen cents greater than in Eureka. Over 2001-2004, Eureka markups consistently fell, while San Francisco experienced a pronounced drop, then a large increase, followed by a minor reduction in markups.

[Figure 4 about here]

While it is impossible to determine the causes of these markup changes without additional evidence, the data are consistent with the view that the increase in relative Eureka retail prices in 2002 is due partly to an abnormally low retail markup in San Francisco during that year.<sup>28</sup> Thus, the (short-lived) statewide benefit of price reductions by integrated retailers was not felt as strongly in Eureka.<sup>29</sup>

Figure 5 shows the difference between retail and crude oil prices for Eureka and San Francisco. Since the integrated retailer both sets the rack price and its own retail price, the retail minus crude price is a better indicator of markup for the integrated retailer. Consistent with the view of increased price competition by integrated retailers, the difference between retail and crude oil prices was lower on average during 2002, especially for San Francisco.<sup>30</sup>

[Figure 5 about here]

To summarize, we believe that the ten cent increase in Eureka retail gasoline prices relative to San Francisco in 2002 has two sources. First, Eureka rack prices rose relatively by two to three cents. Second, Eureka retail markups increased relative to San Francisco by about eight cents on account of the large drop in San Francisco markups.

### *Increased Threat of Regulation*

In January 2003, relative retail prices in Eureka compared to San Francisco took a sharp decline. Two events which occurred in the Eureka area during 2003 are the most likely explanations: the election of a new District Attorney and a hypermarket retailer entering the local gasoline market.<sup>31</sup> High gasoline prices have been a concern of local residents for years and many have made complaints to local congressmen and councilmen.<sup>32</sup> The election of a new District Attorney in November 2002 opened up the possibility of the starting of an investigation into gasoline retail market power. In fact, the newly elected District Attorney contacted a local economist and discussed the likelihood of retail market abuse at about the time when he took office in January, 2003.

During the spring of 2003 the new District Attorney began an investigation into a large timber company rather than the petroleum industry. Very soon thereafter, a petition was passed to hold a special recall election of the District Attorney. The election was held in November 2003, but the ability of the District Attorney to start a concurrent investigation of gasoline retailers was undermined. As of September 2004, no investigation has begun. Therefore by March 2003, the threat posed by the new District Attorney likely passed, and we believe that there must be another explanation for the drop in relative retail markups.

### *New Hypermarket Retailer*

According to industry experts, a hypermarket retailer had been trying to penetrate the Eureka gasoline market for years. Costco Inc. was successful and began selling gasoline in May 2003. Industry representatives state that the hypermarket's retail station price is consistently eight to twelve cents per gallon lower than competing stations which may be due in part to discounts Costco received at the terminal or subsidies from Costco's annual membership fee of \$45 per couple.<sup>33</sup> It can be seen in Figure 2 that the relative retail price in Eureka compared to San Francisco dropped in May 2003. In fact, the drop in relative prices began sharply in January, 2003 and have never returned to average levels before 2002. According to a representative from Costco, the permitting process was largely completed by February 2003. As existing retailers became convinced of Costco's inevitable entry, they would begin lowering prices in anticipation of that date. Thus, the fact that relative prices fell before Costco opened is not surprising, and is consistent with what Costco's representative said had happened in other locations where they began selling gasoline.

Note that in 2003, the relative Eureka rack price continues to increase and became three cents. Thus, the drop in the relative retail gas price is due entirely to reductions in the relative Eureka retail markup rather than reduction in the relative rack price.

#### IV. Conclusion

This paper analyzes changes in the wholesale and retail gasoline market in Eureka, California from 1998 until 2004. Gasoline is an important resource, especially in rural

markets that have few alternatives to automobile travel. This was a period of changes in prices, regulation, and market structure. In 2002, the price of gasoline in Eureka relative to San Francisco rose while the relative price fell dramatically starting in 2003. We find that there are two likely sources of the ten cent relative price increase. First, the costs of complying with new state regulations were larger in the rural market because of the lack of economies of scale and the large transportation costs. This raised the relative Eureka price two to three cents. Second, and contributing about eight cents to the relative price increase, it seems that this rural market did not enjoy the full (short-lived) benefits from the statewide increase in competition. The relative price decrease in 2003 is due to a Eureka retail hypermarket beginning to sell gasoline.

Because of its isolation, and the ease with which competing explanations can be assessed, the Eureka gasoline market may provide insights to other markets in other rural areas. The lessons seem to be that competition can have a large effect on relative prices; large hypermarket retailers may bring price relief to rural consumers. Also, state mandated regulation, no matter what the intent, may be more costly to rural regions given their remoteness.

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Figures and Tables

Figure 1. Eureka Retail Gasoline Price ( Source: CSAA )

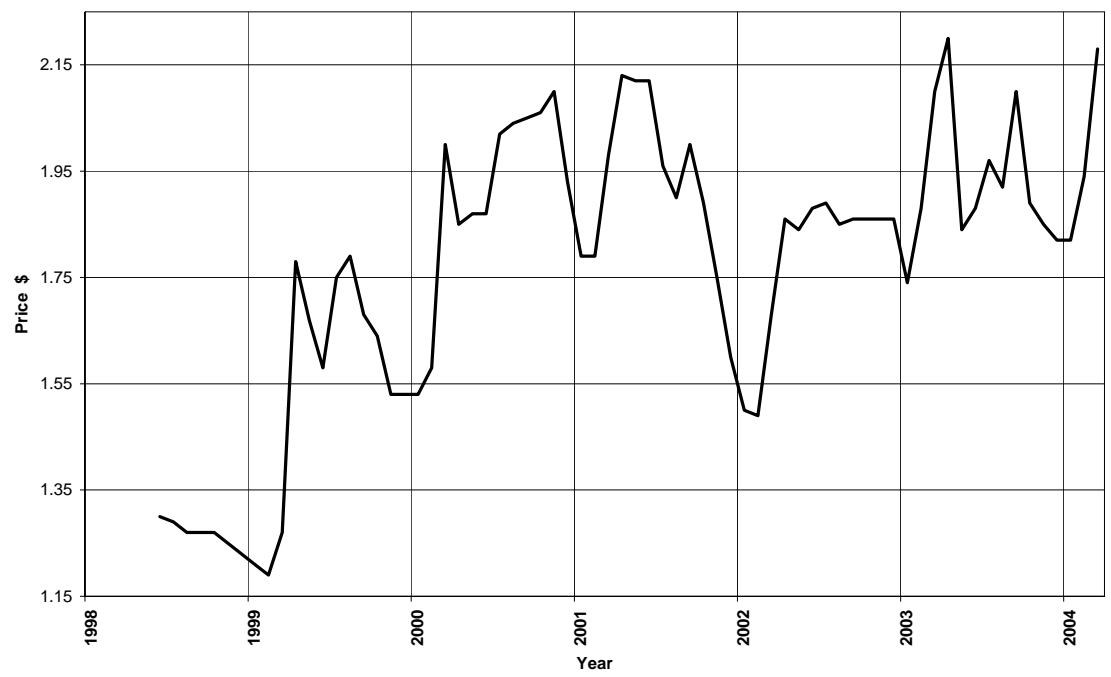
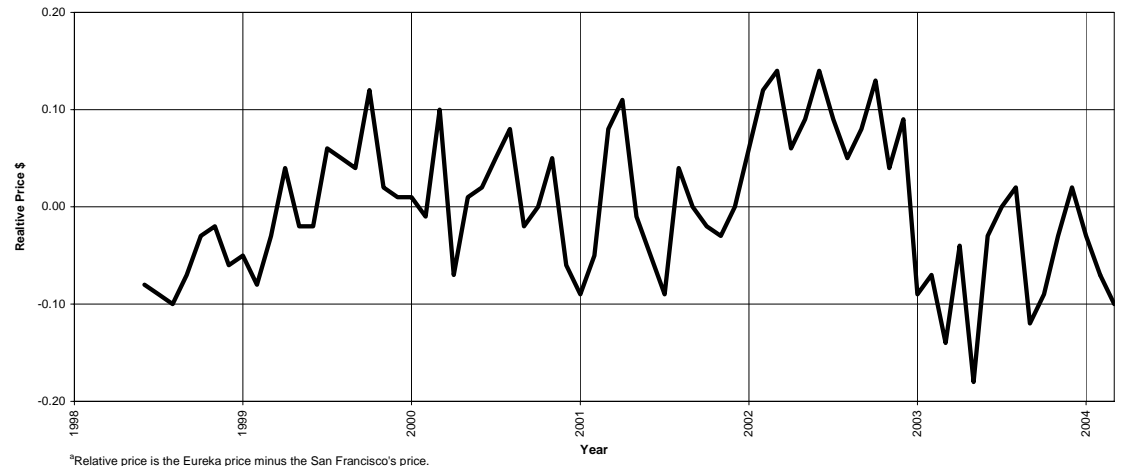
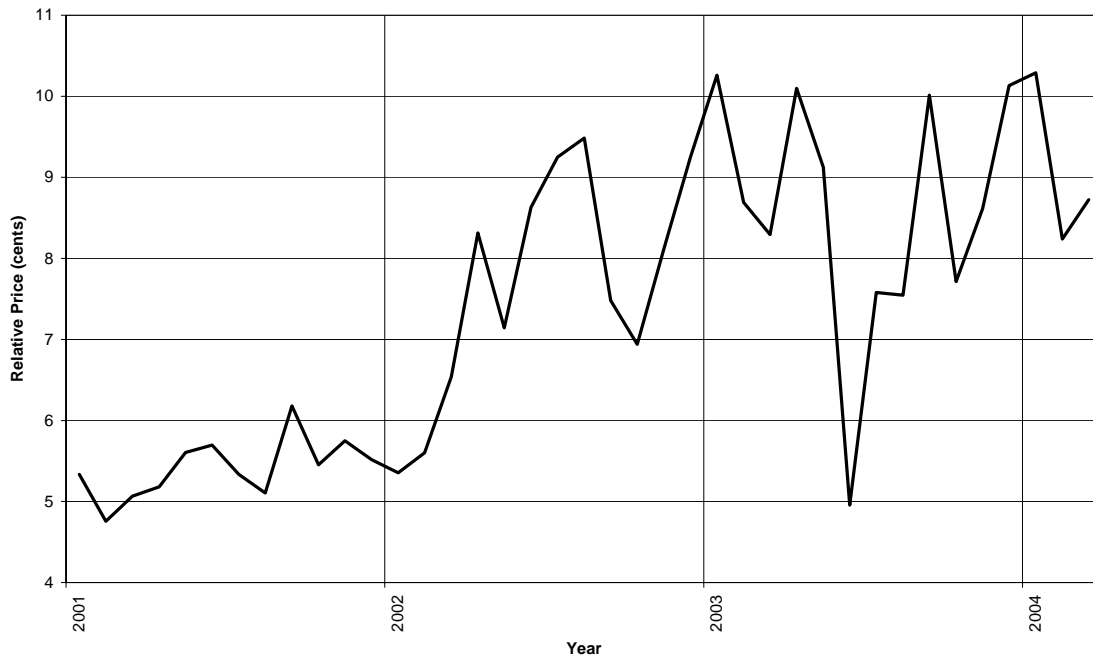


Figure 2. Eureka Retail Gasoline Price Relative to San Francisco<sup>a</sup> ( Source: CSAA )



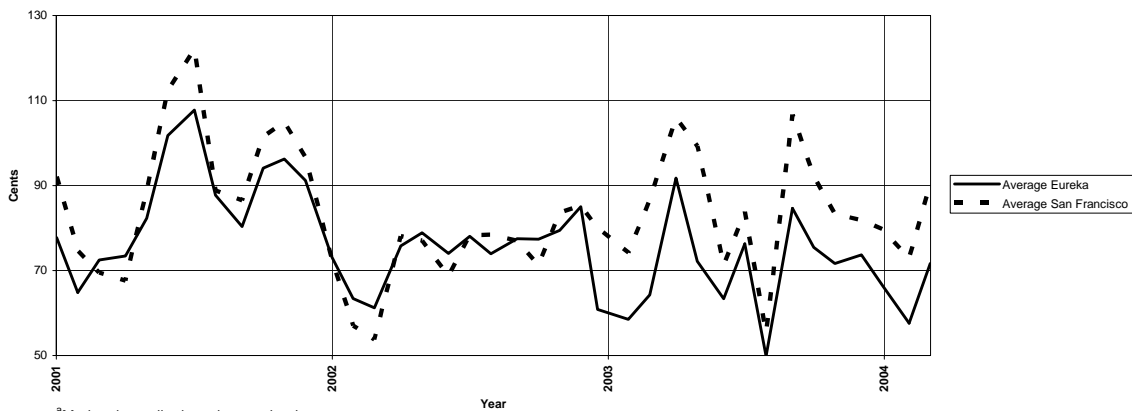
<sup>a</sup>Relative price is the Eureka price minus the San Francisco's price.

Figure 3. Eureka Gasoline Terminal Relative Price<sup>a</sup> ( Source: OPIS)



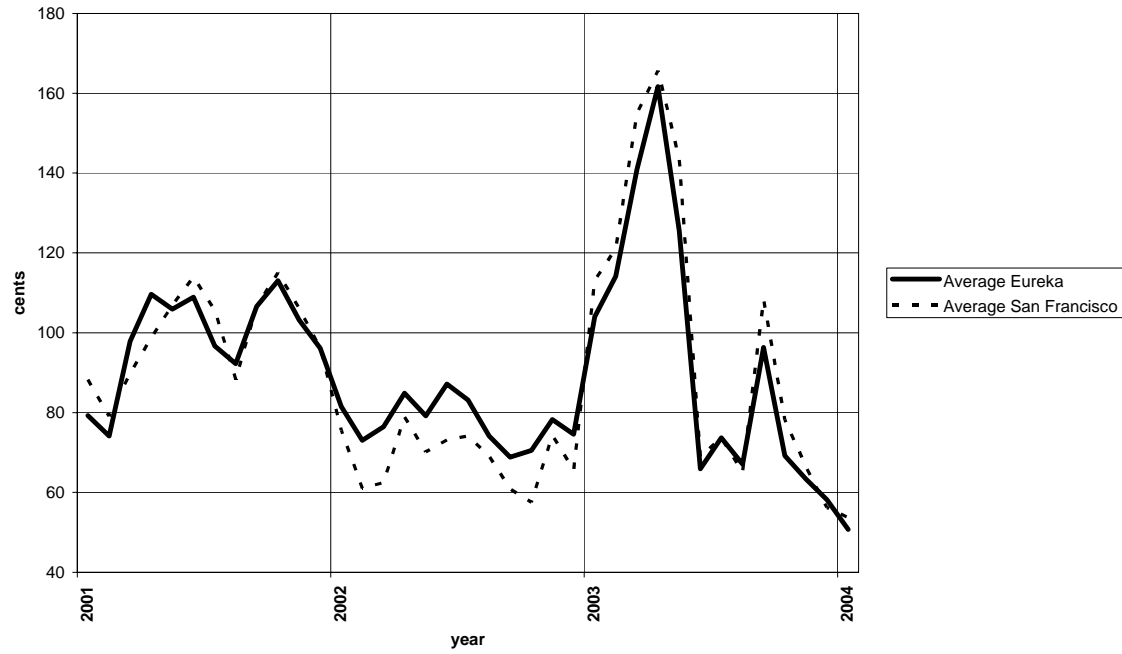
<sup>a</sup>Relative price is the Eureka terminal price minus the San Francisco terminal price.

Figure 4. Retail Markup<sup>a</sup> ( Source: OPIS and CSAA )



<sup>a</sup>Markup is retail price minus rack price.

Figure 5. Retail Price minus Crude Price  
( Source: CSAA and Author's Calculations )



**TABLE 1**Average Annual Retail Gasoline Price and Retailer Markup, dollars, 1998-2004<sup>a</sup>


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<u>Year</u>	Retail Price	
	<u>Eureka</u>	<u>San Francisco</u>
1998	1.27	1.33
1999	1.55	1.54
2000	1.91	1.89
2001	1.92	1.93
2002	1.79	1.70
2003	1.93	2.00
2004	1.98	2.05

	Retail Markup <sup>b</sup>	
	<u>Eureka</u>	<u>San Francisco</u>
2001	0.86	0.92
2002	0.75	0.73
2003	0.70	0.85
2004	0.65	0.81

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<sup>a</sup>Data for 1998 for June through December and for 2004 January through March.

<sup>b</sup>Retail markup is retail price minus rack price. This is not a measure of retailer profit, since it does not subtract retailer costs such as rent, wages, and taxes.

Source: California State Automobile Association and OPIS.

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<sup>1</sup> See Energy Information Administration (2004) for a comprehensive overview of the retail gasoline market.

<sup>2</sup> San Francisco Gate (March, 2002).

<sup>3</sup> Larimer (2001)

<sup>4</sup> Brown and Yucel note that “in rural areas and small towns, regional monopolies could exist.” (Brown and Yucel 2000, page 25).

<sup>5</sup> Data are mid-month prices from the California State Automobile Association (CSAA 2004).

<sup>6</sup> The number of gasoline stations is similar in the two areas. According to MapQuest <<http://www.mapquest.com/maps>> there are 49 gas stations within 25 miles of Eureka and 58 within 50 miles. Companies pay to list their stations with MapQuest. According to The California Energy Commission, 46 stations were in the city of Eureka in 1999. MapQuest reports that Redding has 59 stations within 25 miles and the CA NEG Comm says Redding had 73 stations in 1999.

<sup>7</sup> According to the California Energy Commission, California ranked 9th among the states in total state taxes in 1998 <[http://www.energy.ca.gov/gasoline/statistics/gas\\_taxes\\_by\\_state.html](http://www.energy.ca.gov/gasoline/statistics/gas_taxes_by_state.html)>.

<sup>8</sup> See Taylor and Fischer (2003) for a good discussion of the high West Coast gasoline prices.

<sup>9</sup> Northern California gasoline prices have also been traditionally above prices in Southern California. See U.S. Department of Energy 2003 and California State Attorney General’s Office 2000.

<sup>10</sup> Throughout this analysis, the “relative price” is defined as the Eureka price minus the price in the comparison area.

<sup>11</sup> The same conclusions are reached if one compares Eureka to Northern California or the entire state.

<sup>12</sup> See Borenstein and Shepard (1996), Borenstein, Cameron, and Gilbert (1997), and Johnson (2002).

<sup>13</sup> Other studies have generally not found evidence of illegal price collusion by California retailers. See California Energy Commission (2003), California Attorney General (2000), and U.S. Department of Energy (2003).

<sup>14</sup> The rack price is sometimes referred to as the terminal price.

<sup>15</sup> Taylor and Fischer (2003) note that zoning regulations, such as those that affect the size and location of gasoline retailers, will distort prices.

<sup>16</sup> The local sales tax is 8.5 percent in San Francisco and 7.25 percent in Eureka according to the California State Board of Equalization <<http://www.boe.ca.gov/cgi-bin/rates>>.

<sup>17</sup> If the industry believes that it is more likely to face government regulation which will lower profit, such as a price ceiling, then it will react before lawmakers or enforcement officers act. See Stango 2003 for an application to the credit card industry.

<sup>18</sup> As previously mentioned, the number of Eureka gasoline stations in 1999 was 46 and the number of stations within 25 miles of Eureka in 2004 is 49.

<sup>19</sup> In 1990 the Humboldt County District Attorney’s office filed criminal and civil antitrust charges against Humboldt Petroleum, Inc. and its vice president James Seiler. L&M Renner, Inc. and its owners Lawrence and Michael Renner were also named in the suit. The District Attorney’s investigation began after the Exxon Valdez accident on March 24, 1989, thinking that Humboldt Petroleum’s 15 services stations in Humboldt County fixed prices at least 15 cents higher than anywhere else in California. Seiler claimed that prices were higher due to the lack of supply from the Valdez spill. The charges, however, focused on one Beacon station owned by Humboldt Petroleum and a Cash Oil station whose owners reside in Utah. It was claimed that both companies had a standing agreement that Cash Oil would charge one cent lower than Beacon. This price difference was observed to be constant, yet Humboldt Petroleum and Cash Oil stated that there was no such agreement and that the price difference occurs because Beacon sells branded gasoline where Cash Oil does not. There was a second charge of market allocation filed against Humboldt Petroleum by stating that as part of an agreement between Humboldt Petroleum and Renner, Inc., a Renner owned Texaco station in Fortuna would purchase gasoline from Humboldt Petroleum in exchange for a list of customers. Humboldt Petroleum later bought the Texaco station and sold Renner a list of 200 customers. Both criminal charges of price-fixing and market allocation were dismissed in a preliminary hearing December, 1991 due to lack of evidence. A finding of factual innocence was declared. See Parker 1991 (April 17, June 20, and December 21).

<sup>20</sup> See U.S. Department of Energy (2003) Figures 5.1, 5.4, and 5.5 for a graphical description of petroleum movements within the state of California.

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<sup>21</sup> According to the California Energy Commission, <<http://www.energy.ca.gov/mtbe>>, Governor Gray Davis issued an executive order postponing the implementation date.

<sup>22</sup> There is no data on the exact timing of the conversion for each terminal and refinery.

<sup>23</sup> Data are average monthly prices from Oil Price Information Service (OPIS 2004).

<sup>24</sup> One puzzle is why didn't the Eureka terminal charge a price equal to the San Francisco price plus the transportation costs before 2002?

<sup>25</sup> The increase in the relative Eureka retail markup is, by definition, due to changes in both the Eureka markup and the San Francisco markup. We argue that the more important change, however, is due to changes in San Francisco. The presence of a new District Attorney and the possibility of Costco coming in 2003 make it unlikely that Eureka retailers increased their markups greatly during 2002. In any case, whether or not integrated retailer TVAs were responsible, the reductions in retail markup are very significant for San Francisco.

<sup>26</sup> We are unable to determine exactly where and when integrated retailers changed their pricing strategy. We are unaware of any study that analyzes this episode of integrated retailers and TVAs.

<sup>27</sup> Markup is not a measure of retailer profit, since it does not include other retailer costs such as wages and rents. However, if these other costs do not change, then changes to markup will indicate changes in profit.

<sup>28</sup> Another possible explanation for the rise in relative Eureka retail markups is the fact that Eureka has no integrated retailers. According to EIA 2003 (p. 48), integrated retailers are more at risk from rack price changes. Since 2002 was a year of quickly rising rack prices, it is possible that the San Francisco retailers could not raise their prices as quickly as in Eureka to cover the increased costs. However, rack prices rose during spring 2003, and the Eureka relative retail price did not fall.

<sup>29</sup> Eureka markups fell, but not as greatly as in San Francisco.

<sup>30</sup> Crude oil prices were not unusually high or low during 2002. They averaged 93, 101, and 98 cents in 2001, 2002, and 2003, respectively. Crude oil prices were rising over 2002, however.

<sup>31</sup> As Figure 3 shows, the Eureka rack price relative to San Francisco did not fall in 2003.

<sup>32</sup> Larimer (June 20, 1991) reports "When gas prices go up on the North Coast, they are accompanied by the blood pressure rates of most of its residents." On November 3, 2002, the Eureka Times-Standard reports "Letters to the editor, demanding action by local and state officials as well as the press, continue to urge an investigation to uncover alleged price-fixing and other anti-trust crimes."

<sup>33</sup> A Costco representative said that rack prices are contracted lower for Costco, but the terminal representative could not confirm this.