Testimony of

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Introduction
Mr. Chairman 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, Program on Industrial Organization. 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 vertical market structure and competition in gasoline refining and marketing. Two of my current research projects include 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 a wealth of 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 identify the factors that lead to increased gasoline prices, including but not limited to increases in crude oil prices, environmental regulation, and changes in market structure. I would like to make the following points to the Subcommittee.
The Contribution of Crude Oil Prices to Retail Gasoline Prices
Rises in crude oil prices certainly contribute to increases in gasoline prices. Although crude oil prices are an important determinant of gasoline prices, they are not the only determinant. For a given crude oil price, the wholesale and retail prices of gasoline can be significantly different across regions of the country.
Crude Oil is the major input to gasoline production, and therefore it is not surprising that variation in crude oil prices explains a significant amount of the variation in gasoline prices. The following simple table illustrates this point. Although a significant amount of variation in monthly average retail prices (excluding taxes) is explained by monthly average crude oil prices over time within a state, it is clear that crude oil price variation explains much more of the variation in retail prices in South Carolina, than it does in California.
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Table I: Fraction of Variation in Average Retail Prices Attributable to Variation in Average Crude Oil Price 1
State
Fraction of Retail Price Variation
Explained by Variation in Crude Oil Price
Alabama 0.892

Arizona 0.714
California 0.696
Delaware 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
Pennsylvania 0.900
South Carolina 0.910
Texas 0.886

The following sections discuss other factors that contribute to gasoline prices levels and volatility.

The Effects of Market Concentration on Gasoline Prices

Fewer competitors may lead to increased market power

Higher concentration in most industries leads to the concern over an increase or enhancement market power, which leads to higher-than-competitive price levels. Markets across the country vary considerably in the number of companies supplying or producing wholesale gasoline at the distribution rack. The number of competitors also has changed over the past decade as refiners and marketers have merged, and as various forms of environmental regulation over gasoline formulation and content have come into effect.2

Antitrust merger policy is based on the principle that price-cost margins are increasing in the market concentration level, and market concentration is and has been a primary consideration in merger analysis - shaping the challenges to and divestiture requirements for mergers in the petroleum industry.

1 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.

2 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.

Not only number of competitors, but the identity of competitors is important for competition. Independent refiners are uniquely important for competition.

Independent refiners do not have an incentive to raise rival's input cost to increase retail profits.

Independent wholesalers compete intensely on price in a homogeneous goods market with highly elastic demand.3

Because of these factors, unbranded refiners ensure sufficient unbranded gasoline supply at competitive prices - this is necessary for the entry and survival of independent retailers, including new chains such as KMart, Walmart, Costco, and RaceTrac.

Unbranded wholesale markets are truly competitive. They are the only market where gasoline is gasoline, and retailers are free to purchase from lowest price supplier. Unintegrated refiners compete on price, and unlike integrated refiners, have no integrated retail component that might benefit from increases in unbranded wholesale prices. Purchasers of unbranded wholesale gasoline are free to purchase from any supplier - enforcing intense price competition at the wholesale level.

In addition, a thick and competitive unbranded wholesale market leads to lower branded wholesale prices in markets with many dealer-owned stations. Branded retailers who own their own stations can choose to switch to the unbranded market (and drop their retail brand) if their branded refiner's wholesale price is excessively higher than the unbranded wholesale price. In this way, dealer-owned stations link competition in unbranded markets to competition in branded markets. Vertically integrated stations (whether lesseedealer

or company-operated) do not provide this competitive link, since the stations cannot switch between refiners over any period of time.

Independent retailers are important for competition:

They increase competition at retail level.

They allow entry into concentrated wholesale markets.

In addition, because independent retailers typically do not sell brand-differentiated gasoline, they tend to increase local retail competition, lowering retail prices.4 In fact, in vertically concentrated markets where refiners are able to price discriminate in wholesale prices (charge different wholesale prices to their lessee or contract dealers), station level wholesale prices as well as retail prices are significantly lower in the presence of unbranded competitors.5

3 Demand is elastic since demanders (retailers) have zero switching costs only in the unbranded market. Branded stations have positive switching costs, lowering demand elasticity of branded refiners.

4 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).

5 From preliminary analysis of wholesale price discrimination in gasoline market. National Science Foundation Grant for 2003-2005 "Estimating Demand with Consumer Heterogeneity: an Application to Wholesale Price Regulation in Retail Gasoline Markets"

In addition, in markets with concentrated refining capacity, producers can increase prices above competitive levels only if there are barriers to entry. Market power at refinery level depends on the number of refiners - but it also depends on the ability of outside wholesalers to enter market when prices rise. Outside gasoline producers can only enter a market if they have access to transportation, terminal and storage facilities, and a significant number of non-captive, independent retail stations through which to sell their product.6 It is important to note that large volume independent chains, such as RaceTrac, amplify the ability for outside entry into wholesale markets. Because they purchase to supply many stations (instead of a single station), they increase the ability for outside refiners to enter the market and supply their stations.7 Antitrust and merger policy currently considers the effects of vertical structure on market conduct and the exercise of market power. Many of the aforementioned issues relating vertical market structure to wholesale and retail market conduct and performance were considered in the evaluation of the potential anticompetitive effects of recent petroleum industry mergers and in the design of divestiture requirements associated with those mergers.

Even when market concentration as measured by firm market share is low, each firm may exercise market power if demand is very inelastic, and overall industry supply is at capacity.

As demand increases to consume available supply at existing refining capacity, each firm may find itself with market power, even when the market is fairly unconcentrated. When demand is very inelastic and supply is also very inelastic, as would be the case in electricity markets and gasoline markets when demand is near the total production capacity of all firms, a small decrease in supply can result in a substantial increase in price. Hence every firm is able to affect market prices, even if every firm constitutes a relatively small fraction of total possible output. Factors such as market segmentation due to the environmental regulation of gasoline content may exacerbate the tightness of supply in many regulated markets.8

The Effects of "Boutique Fuels" on Market Performance

Boutique Fuels segment markets, decreasing effective number of competitors

Reformulated Fuels Requirements change the identities of competitors and the competitive structure of the market place.

Boutique fuels segment markets and increase refiner concentration in the following two ways. First, if there is a supply disruption, supply cannot be imported from other regions of the country to meet demand if other refiners in other regions of the country do not

6 See also Statement of R. Preston McAfee before the U.S. Senate, April 25, 2001, Committee on Commerce, Science and Transportation, Subcommittee on Consumer Affairs, Foreign Commerce, and Tourism.

7 See also Statement of R Preston McAfee before the U.S. Senate, May 2, 2002, Committee on Governmental Affairs, Permanent Subcommittee on Investigations.
8 See the Federal Trade Commission Report on Midwest Gasoline Price Investigation, March 2001.

produce fuel that meets local emissions requirements. In addition, reformulated gasoline requirements may change the identity of competitors supplying the market by decreasing the number of unintegrated refiners competing in the unbranded gasoline market. Often large integrated refiners choose to upgrade to supply reformulated gasoline markets, but unintegrated refiners choose not to upgrade but to supply only conventional gasoline markets, effectively changing the composition of competitors in the reformulated gasoline market. The boutique fuels market will have a few, large integrated suppliers, and few to no unintegrated suppliers. This may lead to less wholesale market competition and higher wholesale prices for independent retailers.

Given the fact environmental regulation of gasoline content and formulation often causes unintegrated refiners to exit the market, it is not at all clear that bringing the whole nation under the most stringent gasoline standards will reduce price volatility. The secondary impact of such a regulation on market structure could substantially adversely affect market performance. It is possible that the adverse affects to market concentration could outweigh the gains from geographic integration.9

Comments on Various Regulatory Proposals in Retail Gasoline

Wholesale price regulations such as "Fair Wholesale Pricing", "Branded-Open-Supply", and "Zone Price Elimination" will not increase competition.

They may lead to higher average wholesale and retail prices as well.

There are several proposals that require refiners to charge the same wholesale price to their Lessee-Dealer stations. Common names of these proposals are "Fair Wholesale Pricing", "Branded Open Supply" or "Zone Price Elimination." I will refer to these legislations as "Fair Wholesale Pricing" (FWP). FWP legislation would effectively force integrated refiners to charge the same wholesale price to all of their stations.

Currently refiners charge different wholesale prices to different franchised station. Preliminary statistical analysis suggests that refiners price discriminate based on factors that affect local demand elasticity. Economic theory suggests that competition between refiners is softened in markets where retailers have a small degree of market power if refiners can price through retailers instead of directly at the pump. FWP does not change this fact, since refiners will still set a wholesale price, which is transmitted through retailer's pricing decisions to the final customer, thereby muting competition between refiners. FWP will only change the profit maximizing price the refiner charges to its stations. Economic theory predicts that wholesale prices could actually increase if refiners are forced to charge one wholesale price. The profit maximizing single price to all stations may actually be higher than the average of the wholesale prices under price
9 This is the topic of current research that I am conducting with colleagues at Yale and UC Berkeley into the price effects and market structure effects of gasoline content regulation.

discrimination. FWP may actually raise gasoline prices - making consumers worse off than they were before.10

Divorcement will not lead to lower prices, and may increase inefficiency.

Divorcement prohibits refiners from directly operating the stations they own, forcing them to have the station operated instead by a dealer. Several academic studies have presented evidence that divorcement will not lead to lower gasoline prices.11

Divorcement does not decrease entry barriers into wholesale markets, and it does not increase competition in retail markets. Stations owned by a refiner are still integrated - regardless of whether a refiner or a lessee-dealer sets the retail price. In addition, if refiners have chosen company-operation at certain stations in order to minimize costs, forcing them to convert these stations to lessee dealers may lead to higher, less efficient, operating costs. In general, to maximize the benefit to consumers, we want to encourage firms to lower costs and lower prices - divorcement will accomplish neither of these goals.

Minimum Mark-up laws do not increase competition in the short-run or the

long-run. Minimum mark-up laws increase the price of retail gasoline without increasing competition. They may also lead to inefficiencies in gasoline retailing - they encourage an over supply of gasoline stations.

Minimum mark-up laws (or sales-below-costs laws) are currently law in several states.12 These laws typically require that retailers charge a 6 percent mark-up over cost. In the case of gasoline, this is supposed to lead to lower prices. Requiring a minimum mark-up will lead to higher prices in the short term if required mark-up is higher than the freemarket mark-up. However, the goal of the legislation is to foster competition. Proponents of this law claim that major refiners will act to predatory-price (charge price below cost) independent retailers, forcing them out of the market. The refiners will then be able to raise prices and increase profits. So, in the long run, prices will be lower in states with minimum mark-up laws, because independent retailers will still be in the market, preserving competition. So even though there is a mandated mark-up, this mark-up prevents predatory pricing by oil companies, and preserves competition in the long run.

Empirical evidence rejects the hypothesis that these laws have acted to preserve independent marketers. For example, Utah has had a minimum mark-up law in place since 1987. New Mexico has never adopted this law. If the law accomplished its goal, we would expect to see independents exiting in Albuquerque, for example, while remaining (or even entering) in Salt Lake City. Examining the market share of independents in

10 From preliminary analysis of wholesale price discrimination in gasoline market. National Science Foundation Grant for 2003-2005 "Estimating Demand with Consumer Heterogeneity: an Application to Wholesale Price Regulation in Retail Gasoline Markets"

11 See for example John Barron and J. Umbeck (Journal of Law and Economics, October 1984) Justine Hastings (American Economic Review, March 2004)

12 New York has just passed such a regulation under the New York State Motor Fuels Marketing Practices Act, which will take effect at the end of this month.

Albuquerque and Salt Lake City refutes this claim. Both Salt Lake City and Albuquerque have seen an almost identical decline in the market share of independents over the 1990s - both by about 15 percentage points.

Not only is there empirical evidence showing that minimum mark-up laws do not preserve competition in the manner they claim, but they may induce inefficiency in the market. These laws benefit both independent and integrated stations. All stations, regardless of affiliation, are guaranteed a minimum profit. This may lead to an excessive number of gasoline stations - integrated or unintegrated. Consumers are worse off under this legislation. It is also important to note that it is illegal for a company to require a minimum mark-up on its own - that would be resale price maintenance.

A Final Suggestion

I would like to take this opportunity to impress upon you the following two facts: i) there is a need for independent academic research into factors that affect petroleum pricing in all markets and at all levels of the production chain, and ii) it is extremely difficult to acquire data to conduct such research. Private industry data is very expensive, and there is no single federal agency that funds economic research into energy policy, like the National Institute for Health (NIH) does for economic research into health-related policy questions. Perhaps we should introduce such grant programs for economists at the Department of Energy.

In addition, the Energy Information Administration collects data, but does not have a mechanism that allows it to be accessed by carefully screened academics at any meaningful level of aggregation. In comparison, the Census Bureau has worked hard at disseminating data in a range of aggregation levels, with corresponding levels of security to protect confidentiality. They have a model program of data organization and high security research centers that has significantly contributed to the production of high quality research, informing a large range of public policy decisions. The adoption of this program lead to a wealth of academic research into issues related to Labor Economics that have been tremendously informative to policy makers. We should encourage the development of similar programs at the government energy agencies, to increase independent research into industries as important to our economy as petroleum and

electricity.

Summary and Policy Recommendations:

1. Crude oil price increases explain a considerable amount of increases in gasoline prices, however, differences in market structure due to horizontal and vertical concentration, as well as environmental regulations also contribute to increased gasoline prices.

2. Inelasticity of demand for gasoline leads to large price increases in response to small supply decreases. Increasing the number of refineries will expand supply and ease

tension in tight markets, lowering price volatility. Increasing the number of refineries may also decrease market concentration if the new refinery means a new competitor enters the market.

3. Optimal environmental policies should incorporate secondary impacts on market structure and competition as well the impacts on pollution abatement in order to maximize consumer welfare.

4. Wholesale price regulations such as "Fair Wholesale Pricing" or "Zone Price Elimination" do not increase competition in the market place, since retail outlets cannot switch between refiners when their refiner's wholesale price exceeds the price of another refiner. This type of legislation may actually increase gasoline prices

5. Below Cost Pricing legislation is typically aimed at preventing unbranded retailers such as Race-Trac, Costco, or Wawa from entering the market and/or increasing competition. They only serve to dampen price competition, and act to maintain or raise gasoline prices.