

Prepared Statement of R. Preston McAfee
U.S. Gasoline Prices

Before the
COMMITTEE ON GOVERNMENTAL AFFAIRS
PERMANENT SUBCOMMITTEE ON INVESTIGATIONS
UNITED STATES SENATE

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Introduction

Mr. Chairman and members of the Committee, my name is R. Preston McAfee. I am Murray S. Johnson Professor of Economics and former Chair of the Department of Economics at the University of Texas at Austin.¹ In 1999 and 2000, I was retained by the Federal Trade Commission (“FTC”) to provide expert economic analysis and potential testimony in connection with the FTC’s investigations of the mergers of Exxon Corporation and Mobil Corporation and of British Petroleum PLC and the Atlantic Richfield Company. In addition, I provided assistance to the FTC in its investigation of the summer 2000 gasoline price increase in the Midwest, and have been retained by the FTC in an on-going investigation. Finally, I have been actively involved in research on the effects of vertical integration on cooperative pricing behavior. I am pleased to be here today to discuss the economic issues that I researched, as they pertain to your examination of gasoline prices in the United States.

As part of my studies of the two mergers, I had access to and studied a substantial amount of information, including the documents that the FTC had gathered in the course of its investigations. I am advised that much of this information was provided to the FTC under statutory authority that generally requires the FTC to keep the information submitted to it confidential,² and, except to the extent that information has independently been made public, I am not at liberty to disclose today information submitted to the FTC pursuant to confidentiality restrictions.

However, the U.S. District Court for the Northern District of California has ordered the release of some of the documents filed under seal in *FTC v. BP Amoco*, and I am at liberty to discuss those documents. In addition, some of the information I examined as part of my analysis was obtained from public sources.

I would make the following points before this subcommittee.

The Competitive Performance of U.S. Gasoline Markets

- *West Coast wholesale gasoline markets are not integrated with the rest of the United States and must be analyzed separately from the east.*

West Coast wholesale gasoline markets are separate markets from the rest of the United States. Not only do those markets use different gasoline specifications (e.g., California Air Resources Board, or CARB, specifications), but there is no economical means of transporting gasoline from the major refining center of the U.S. Gulf Coast to California. Currently there is no pipeline moving gasoline from the Gulf Coast to the West Coast, although the plan to reverse the flow of the Longhorn Pipeline, which connects Houston and El Paso, might permit creating such a pipeline link. Sending gasoline by ship is relatively expensive. The Panama Canal cannot accommodate very large tankers and is expensive. Large tankers could go around South America, but this is a very long trip. Either way, it is expensive to ship gasoline from the Gulf Coast to the West Coast. Moreover, when the West Coast prices are sufficiently high to justify such shipments, the likely origin is the Caribbean rather than the US Gulf Coast. Although shipments from the Caribbean arrive in California from time to time, these tend to be purchased by West Coast refiners to replace gasoline lost to planned refinery shutdowns, and not as a consequence of an attempt to arbitrage high West Coast prices.

¹ I attach a copy of my *curriculum vita* for the Committee’s reference.

² I was authorized to receive FTC confidential information as a consultant to the FTC, and I gave the FTC written assurances that I would not disclose confidential information that I received from the FTC.

- *The combination of inelastic demand and inelastic supply of gasoline magnifies the price effects of supply disruptions.*

An unusual feature of wholesale gasoline markets is the short-term unresponsiveness of both demand and supply to price changes, a characteristic that economists call “inelasticity.” When prices rise substantially, consumers do not cut back their driving very much, so that the quantity of gasoline demanded falls very little. Put another way, it takes a large price increase to induce significant conservation in the short term, so that a fifty cent per gallon price increase might induce only 10% less consumption. Moreover, refineries run near capacity most of the time and cannot produce a great deal more gasoline without the installation of major capital equipment. Thus, in the short term, a refinery might be able to produce ½ percent more gasoline if the price justified it, but it takes a large price increase to reconfigure the inputs to produce even that much more gasoline.

- *Short run price changes can be three to five times the quantity changes.*

Because of the inelasticity of supply and demand, relatively small quantity effects are magnified into large price effects. A 10% shortfall in quantity, which might arise due to a fire in a refinery or a pipeline break, might require a 40% increase in price to clear the market – because consumers continue to drive almost as much, and the refineries cannot produce much more gasoline than they already do. The inelasticity of demand and supply imply that large price swings are normal – small supply disruptions create large price swings. The oil companies do *not* create such price changes – they are primarily a consequence of factors outside the control of the industry. These factors include the nature of consumer demand and the technology of refining capacity. The one factor that matters which the industry can control is storage, but storage is expensive, so it takes frequent, wide swings in price to make investments in increased storage capacity profitable.

- *Government-operated storage facilities, including a strategic gasoline inventory, serve no useful purpose.*

There is no market failure associated with storage of gasoline. As a result, the firms in the industry acquire a socially appropriate level of storage, the level at which the benefits of added storage equal the costs. Attempting to artificially inflate the level of storage will have a temporary effect at best, because the creation of government storage facilities will reduce the returns to privately held facilities and tend to eliminate private storage. This is a bad tradeoff for society.

If the costs of creating new storage have been artificially inflated by government regulation, government could act to reduce the costs by streamlining environmental regulations and eliminating redundant or useless regulation. However, real costs should be born by the firms and not subsidized by the government.

- *Minimum inventory laws are impractical and may serve to increase volatility.*

Minimum inventory requirements have major drawbacks. First, firms will tend to minimize the costs of meeting the law, and thus tend to inventory the products that are less expensive to inventory rather than the products that are most useful to inventory. Since reformulated gasoline tends to be more difficult to inventory, firms will tend to avoid inventories of RFG. Moreover, minimum inventory requirements prevent the market from running storage

efficiently, because the firms that operate storage most efficiently should be the main storage companies, not necessarily producers or consumers.

- *The foremost problems in storage are boutique fuels and regulatory burdens.*

Boutique fuels increase the problem of storage by eliminating pooling. By proliferating fuel types, the amount of storage needed to prevent significant price spikes rises. Storage works like insurance: it reduces costs to be large. By dividing the nation into many smaller, separate fuel types, we increase the costs of storage and reduce its effectiveness.

The regulatory hurdles facing storage creation are high. Gasoline is dangerous and spills are damaging to the environment. The danger to life and health necessitate government intervention in the form of safety and environment regulation, and these regulations exist for good social purpose. However, regulations can be misused. Where regulations can be made more efficient, it is worthwhile doing so, and a side benefit will be a reduced volatility of gasoline prices. Regulations – not economic incentives – prevent building refineries on the West Coast. The inability to build a new refinery suggests the regulatory burden is too high.

- *Oil companies can have at most a very modest effect on the price of oil. BP's attempt to manipulate the spot price of oil on the West Coast resulted in month-to-month changes of less than three cents per gallon.*

Blaming the oil companies for the high price of oil and gasoline is a common American pastime, but is not consistent with the facts. Oil companies control a small fraction of world oil, and have little ability to change the price of oil. In the one recent documented attempt to manipulate the spot price of oil, BP shipped a small fraction of its production to the Far East to boost the West Coast price. This resulted in modest changes in the spot price for oil, which translate into even more modest changes in the spot price for gasoline.³ The scale of oil company operations, even for a giant like BP, is simply too small to make a large difference in the world price of oil.

- *OPEC can have a significant effect on world oil prices, but historically OPEC has not been a very successful cartel.*

Americans tend to fear OPEC, but the history of OPEC suggests that our fears have been substantially overblown. OPEC is not a very successful cartel. Cartels operate by restricting supply in order to boost the price. The only members of OPEC to significantly restrict supply are Saudi Arabia and Kuwait. OPEC's successes, especially in 1973 and 1981, have been more of a consequence of the joint exercise of market power by these two nations than of the collective or collusive exercise of market power by the remaining members. Of course, our alliance with these two producing countries takes on greater significance in light of their importance to OPEC's ability to exercise market power.

- *The tendency to reduce taxes when supply is temporarily disrupted is bad policy. The price must rise to ration demand to the available supply; removing the taxes does not change the price that consumers must pay to ration available supply, but transfers the taxes to the firms.*

³ Across-the-board increases in oil prices pass increase gasoline prices in approximate a one-for-one manner. The rate at which oil price increases that are not across-the-board pass through to consumers has not been quantified, and could range from zero to 100%. BP's increases were not across-the-board.

Illinois suspended collection of its sales tax during the price spike of summer, 2000. This is good politics but bad policy. The price increase was caused by a shortage, and the price charged to consumers had to rise to a point that equated supply and demand. Because of inelastic supply, few new supplies are induced by the removal of the taxes, which means the price consumers pay doesn't change very much in response to the tax removal. Consequently, the removal of the tax mostly results in increased revenue to existing sellers and does not lower the retail price very much if at all. (Illinois also made it illegal for sellers not to pass on the tax cut to consumers, a law that neglects the rationing role of prices entirely and has the effect of making market economics illegal.)

I like seeing taxes removed, but gasoline taxes are one of the most sensible taxes in the country. Gasoline taxes are mostly user fees designed to pay for roads used by gasoline consumers. It doesn't make sense to suspend them in the event of a supply disruption.

West Coast Gasoline

- *West Coast gasoline refining and retailing is controlled by an oligopoly of seven firms: Chevron, Shell-Saudi Aramco,⁴ BP-Amoco-Arco, Tosco⁵, Valero,⁶ Exxon-Mobil, and (likely) Tesoro.⁷ These firms are interdependent and aware of each other's responses, which reduces the likelihood of fully competitive behavior. Vertical integration exacerbates the risk of non-competitive behavior.*

Concentration in any industry creates a concern that market power may be exercised, to the detriment of consumers. Gasoline refining and retailing on the West Coast are fairly concentrated, but not extraordinarily concentrated. At either level in the production chain, the concentration is high enough to create concern about new mergers. Moreover, those seven firms, along an eighth firm (Kinder Morgan) control the terminaling facilities and pipelines, which permit the importation and transportation of gasoline in the market. The combination of control at all levels significantly exacerbates the risk of market power, and does so by two distinct means.

First, the control of refining and retailing creates an entry barrier, for any potential entrant must enter at two levels of production, rather than one. For example, if a grocery store decides it would like to enter gasoline retailing (a nationwide phenomenon), the grocery store would ordinarily contact an independent refiner to assure a source of supply. In the West Coast, however, there are no significant independent refiners; the grocer is forced to buy gasoline from a competitor in the retail market. In principle, the grocer could build a refinery to supply its needs, but in practice environmental concerns make a new refinery uneconomical, and in any case, grocers are unlikely entrants to the refining business. Similarly, an attempt to build a new refinery or expand an existing small refinery runs into the roadblock of finding adequate retail

⁴ The FTC required Texaco to drop out of the Equilon joint venture in order to merge with Chevron.

⁵ Tosco was purchased by Phillips.

⁶ Tesoro has been proposed as the purchaser of Valero assets to comply with the FTC consent decree to satisfy the antitrust laws in the purchase of Ultramar-Diamond Shamrock.

⁷ These seven firms account for 96.3% of refining. In addition, Paramount and Kern together account for 3.6% of total refining.

capacity. Alternatively, a retailer could try to bring tankers of gasoline to the market, but then faces one independent supplier of terminaling facilities.

Second, the interconnection of the seven firms on the West Coast induces a more cooperative attitude than might arise otherwise, and a cooperative attitude by firms generally results in less price competition than is desirable. Several of the firms engage in “swaps,” in which gasoline is exchanged to meet local needs. These firms buy from each other in the intermediate, bulk gasoline market. Such interdependence tends to mute competition. A firm that undercuts its rivals in one market faces a reaction by the rivals in other markets. For example, a firm that sells more at retail than it refines is hesitant to cut its retail price, for fear that its suppliers, who also compete at the retail level, will react by curtailing their bulk gasoline sales. Such interdependence may lead to prices above competitive levels without any illegal meetings or communications. In such a situation, the firms independently recognize their joint interest, which is called “tacit collusion” by economists.

- *The Federal Trade Commission is aware of the threat created by increasing vertical integration and interdependence.*

In my opinion, the FTC is very concerned that the West Coast market is less competitive than the market concentration would suggest. Its analyses have incorporated vertical integration issues and the public has been protected from increasing concentration.

- *There is no evidence of explicit collusion, and explicit collusion is unlikely.*

I have personally read a very large number of documents produced by oil companies as part of confidential investigations, and I have seen no evidence of explicit collusion, illegal meetings among executives, or other indications of conspiracy. I have personally examined sufficiently many documents that I believe I would have seen evidence if such evidence existed. I am confident that the oil companies are not engaged in an explicit conspiracy against the public.

It would be surprising if the oil companies were engaged in a “smoke-filled room” kind of conspiracy. These companies are among the world’s most savvy about the antitrust laws, being one of the first major targets of the antitrust laws. Because of this history, the oil companies receive greater scrutiny than some industries, increasing the risks associated with a violation of the antitrust laws.

Moreover, it is difficult to motivate a manager in a large organization to engage in a price-fixing conspiracy (although management at ADM seems to have solved this problem!). The manager personally risks jail by such actions, but the benefits most flow to the shareholders. Consequently, it is rare for large corporations to engage in explicit price-fixing.

- *A single refinery outage can create a major price spike in the West Coast.*

In recent years, California has had a rash of refinery fires that disrupted supply and have sent short-run retail prices up by as much as fifty cents per gallon. Tosco’s Bay Area refinery, now owned by Ultramar-Diamond Shamrock, had a rash of fires. From an industry perspective, these fires were profitable, sending prices up significantly with only a modest quantity disruption. The isolation of the West Coast market, combined with inelastic demand, creates a situation where volatility of prices is normal.

- *The Longhorn Pipeline, which connects Houston to El Paso, may help integrate the West Coast into the rest of the country's supply pool.*

When events are random, pooling can reduce risk. This is the basis of insurance – by pooling the risks we face, we obtain the relatively steady average loss. The isolation of the West Coast prevents it from being pooled with the rest of the nation's wholesale gasoline markets. It is possible to increase the extent to which the nation is integrated through the creation of a pipeline connecting the Gulf Coast with the West Coast. The Longhorn Pipeline will not accomplish this connection by itself, but requires an additional pipeline from El Paso to Phoenix. The Longhorn Pipeline is incredibly unpopular in my hometown of Austin due to environmental concerns.

Eastern Gasoline

- *The eastern U.S. (east of the continental divide) has sufficiently many refiners and retailers to be very competitive. However, the "boutique fuels" problem slows competitive responses. Boutique fuels reduce and even prevent substitution across markets.*

The rest of the country is blessed with a large number of refiners and retailers, many of whom are independent or mostly independent. Thus, large discount retailers like RaceTrac have a steady source of supply. The vertical control concerns raised for the West Coast do not arise elsewhere in the U.S.

However, the U.S. is in danger of becoming a patchwork of separate geographic areas, due to what is called the "boutique fuels" problem. The ethanol-based reformulated gasoline used in Chicago and Milwaukee is used nowhere else, so when there was a supply disruption in the summer of 2000, gasoline could not be diverted from other parts of the Midwest to mitigate the short-run price increases. By some counts, there are more than forty gasoline types being produced in the U.S. to meet regulations established for local areas. While such a patchwork of fuel grades may alleviate local environmental concerns, boutique fuels separate our competitive marketplace into many less-competitive marketplaces. The proliferation of types of RFGs (reformulated gasoline) increases our vulnerability to small supply disruptions.

- *Some wholesale gasoline markets are served by one or two pipelines.*

Pipeline economics exacerbate the problem of boutique fuels. Pipeline economics are summarized by the familiar formula πr^2 , or "pi r squared," which defines the area of a circle. Double the radius of a pipeline, and you quadruple the volume of the pipeline. This simple fact makes one pipeline more efficient than two smaller pipelines. Consequently, many places are served by only one or two pipelines. Pipeline economics exacerbate the effects of disruptions – there may be few alternate routes.

Moreover, boutique fuels create a further problem when combined with the nature of pipelines. Boutique fuels are transported by sending a large volume of one fuel, followed by a large volume of the next. The transition from one fuel to another creates a low value mixed fuel. (The mixture of MTBE-based and ethanol-based RFG produces a mix that is not environmentally sound, for example.) Thus, it is uneconomical to switch frequently from product to product and the loss associated with transportation grows the more types of fuels that are transported on a given pipeline. This makes geographic areas even more vulnerable to supply disruptions.

- *Long-distance transportation requires about four weeks, and refining plus transport takes around eight weeks, so a two-month response to an unexpected shortage is to be expected even in a competitive marketplace.*

Consider the retail gasoline price increase that occurred in Chicago in summer, 2000. How quickly could the market react? If a Gulf Coast refiner had a stock of Chicago-certified gasoline (ethanol-based RFG II), and the supplier could buy (or already had) pipeline space, the supplier could inject the gasoline into the pipeline. Three to four weeks later, the gasoline would arrive in Chicago. Thus, in the best circumstances, this kind of market reaction to a disruption requires a month. In practice, if the refinery is producing something other than the Chicago fuel and has to shut down and reorganize to produce the Chicago fuel, and the pipeline has to juggle its scheduled deliveries, at least an additional month is required for the fuel to arrive. Thus, realistically, a two-month lag to supply disruptions is reasonable, given the economics of refineries and pipelines.

- *The possibility of EPA waivers may slow supply responses.*

Some gasoline suppliers thought the EPA might issue waivers for Chicago and Milwaukee, and waited to see what the EPA would do. Such a concern on the part of oil companies is justified, because the EPA does issue waivers in some circumstances, and indeed did so in St. Louis. A company that races to bring RFG II to Chicago, only to have the EPA issue a waiver permitting ordinary fuel to be used, finds itself holding expensive gasoline that can only be sold at the price of inexpensive gasoline.

It is difficult to formulate policy to deal with the unpredictability of the EPA. There are going to be circumstances where the EPA should issue waivers, and others that don't merit waivers. Moreover, it is going to be difficult or impossible to specify in advance all the circumstances where the EPA should issue waivers. It is important, however, to understand the unpredictability of government can exacerbate supply disruptions by muting the responses of markets. Early, definitive announcements help markets perform.

- *The need to clean storage tanks between summer and winter creates a window of severe vulnerability to supply disruptions.*

Often summer fuels cannot be mixed with winter fuels and still meet EPA standards. The effect of the inability to mix means that the storage tank has to be emptied and cleaned before being refilled with summer fuel. Moreover, firms will generally wait until the very last week before summer fuel is mandated to switch, because cleaner summer fuel is more expensive to produce. This means that all of the storage tanks are empty the same week, which creates a week of severe vulnerability to a supply disruption.

Antitrust

Recent oil company mergers have raised concerns that "big oil" will soon be in a position to increase prices freely. However, these mergers receive exacting scrutiny from federal antitrust agencies and antitrust concerns are eliminated by divestitures. Big mergers have positive aspects – Exxon-Mobil is using the best of both companies, in particular applying Exxon's overseas development skills to Mobil assets, and Mobil's operations and technology know-how to heritage-Exxon domestic operations. Developing the oil resources of foreign nations often requires a very large firm, one that can weather large-scale adversity and develop great resource pools.

- *Boutique fuels balkanize the large integrated eastern market, increasing short-term market power concerns.*

The proliferation of fuels encourages refineries to specialize and, thereby, reduces the intensity of their competition. At a minimum, the increase in the number of fuels creates short-term market power, because it takes rivals some time to respond to a reduction in supply by any one firm, and there are fewer rivals in a position to respond quickly.

- *There is some concern about concentration of retail outlets, primarily in the downtown areas of larger cities where building a new gasoline station is very difficult. Retail concentration is less of a concern in suburban or rural areas, where new stations are entering.*

Generally, retail gasoline margins are thin – about seven cents per gallon – and there is little or no antitrust concern about the level of concentration in retail gasoline. Margins are just sufficient to cover the fixed costs of operating the retail station. There is some antitrust concern in the larger cities, where there are few gasoline stations and it is difficult or impossible to obtain zoning permission to open a new station. Elsewhere, new stations are opening up, with the modern multiple-bay convenience store design. Entry prevents the exercise of market power, so areas with retail entry present no significant antitrust concerns.

- *The Federal Trade Commission does a thorough job investigating oil company mergers. Big mergers have generally required divestitures to preserve competition.*

I have been impressed with the overall quality of the analysis coming from the Federal Trade Commission. The FTC must identify the areas of potential antitrust concern and develop sufficient data and information sources to permit evaluation of the likely competitive effects of mergers involving oil firms. The Exxon-Mobil merger, with over one hundred million pages of document production, resulted in the hallways of the FTC being lined with boxes everywhere one went. The document *index* ran thousands of pages. Such a document production is daunting, and the FTC has done an impressive job identifying competitive issues and developing a case to take to court to protect competition. The issues in oil mergers range from owning shares in transportation pipelines to three-dimensional mapping technology. While consumers focus on gasoline, the FTC must evaluate the likely effects of the merger on many other products, such as jet fuel, diesel, asphalt, natural gas, lubricants and even candle wax. I can tell this committee that the FTC is very thorough and careful in its approach, and protects competition to the fullest extent of the law.

- *Exxon and Mobil sold thousands of retail stations and one of their two California refineries, along with shares in pipelines and various other assets.*

The divestitures obtained in the Exxon-Mobil merger could produce a sizeable oil company. This agreement serves as a model agreement. The combined company is a better company than its component parts, not because of any increase in market power, but because it has leveraged the best of both companies. This improved performance enhances competition, and benefits the American consumer. At the same time, where competition was threatened because of significant competitive overlaps, divestitures preserved competition.

- *BP sold all of Arco's Alaska assets to ensure competition in the search for North Slope oil. This divestiture actually increases competition, since BP's incentive to increase West Coast oil prices was eliminated by the purchase of Arco's retail outlets. BP stopped shipments of oil to the Far East after purchasing Arco's West Coast refineries.*

BP Amoco's takeover of Arco shows the insistence of the FTC to preserve competition. BP was initially unwilling to divest significant Alaskan assets, calling such a divestiture a deal-breaker. In spite of BP's tough posturing, the FTC sued to block the merger, which is the largest merger ever challenged by the FTC. After the lawsuit was filed, BP agreed to divest Arco's Alaskan assets, which were acquired by Phillips Petroleum for almost \$7 billion, the largest divestiture ever obtained by the FTC. This divestiture not only eliminates any competitive concerns, but in fact makes the merger pro-competitive. Because BP now owns West Coast refineries, its incentive to increase the spot price of oil on the West Coast is eliminated. The settlement represents a great victory for the antitrust laws, which have preserved competition on Alaska's North Slope, and a great victory for American consumers.

- *Vertical integration of West Coast firms magnifies the risk of non-competitive outcomes.*

Vertical integration by the seven major refiners decreases market competitiveness by several distinct means. First, entry is more difficult because a firm must enter at several levels (terminaling, refining and retailing) to produce and get the product to market. Second, the wholesale market and swaps (usually geographically-based exchanges) create an interconnection between the firms – they need each other. If BP-Arco buys wholesale gasoline from Chevron, BP-Arco is hesitant to take actions that might injure Chevron at the retail level. Similarly, actions by Chevron that would injure BP at the retail level harm Chevron at the wholesale level. Without any explicit conspiracy, such interdependence impedes pro-competitive behavior.

My assessment is that mergers of firms with West Coast gasoline assets require heightened scrutiny. Over the past five years or more, such mergers have received heightened scrutiny, with an increasing awareness that interdependence of the firms requires an analysis beyond the standard approach, because the standard approach does not recognize the significance of vertical integration in creating non-competitive outcomes.⁸ The formulation of appropriate antitrust standards for vertical mergers is a subject in its infancy, but one of growing importance.⁹

- *Forced divestiture of retail outlets will likely interfere with efficient delivery of gasoline and is bad government policy.*

While mergers of firms operating on the West Coast are of greater concern because of the small number of refiners and retailers and the absence of independent operators at all levels of the production chain, a policy to artificially eliminate vertical integration is likely to do much harm

⁸ The standard approach does recognize the extreme of foreclosure, where a firm might shut down a rival through a denial of access to inputs. Vertical interdependence is related to foreclosure, for it considers the ability of firms to influence the behavior of rivals via pressure in other markets.

⁹ See, for example, Kenneth Hendricks, Joshua Fried, Preston McAfee, Melanie Williams and Michael Williams, "Measuring Anticompetitive Effects of Mergers When Buyer Power is Concentrated," *Texas Law Review*, vol 79, no.1, 2001, 48-74.

and no good. Moreover, the vertical control issue arises only on the West Coast – for the rest of the country, there are independent refiners that can supply entering or growing retailers (such as grocery stores or RaceTrac), and independent retailers for the independent refiners to supply. Concentration levels are not so high as to create a concern.

There is not a great deal of competition for gasoline retailing in the center of many of the older large cities, such as Boston, New York and Detroit. The problem in these locations is NOT a problem of vertical integration but the simpler problem that there are few stations (due to high land value) and entry is very difficult. Entry is difficult primarily because land is expensive, but also because the existing stations (whether vertically integrated or not) lobby local zoning boards to prevent entry, using environmental threats as a reason.

There are many pro-competitive reasons for firms to be vertically integrated (operate at multiple levels of the production chain). In particular, vertical integration reduces risk by pooling, as with insurance, and it permits more complex contracting to solve a variety of incentive problems. Incentive effects are very important when various aspects of gasoline delivery that are difficult to monitor matter. Mobil has established a reputation for nicer stations, which serves the company and consumers well. Mobil's incentive and ability to create such a reputation requires a large scale of operation (to make it worthwhile) and the ability to tie its gasoline brand to its retail performance. Elimination of vertical integration would harm or even destroy the ability of a firm like Mobil (now Exxon-Mobil) to create such value for consumers.

A ban on vertical integration, or divorcement of retailing from other stages of operation, may do a great deal of harm. It is analogous to telling Starbucks to stick to coffee roasting and get out of the retail business.

- *Elimination of zone pricing may cause average retail prices to rise.*

Zone pricing refers to the policy of wholesale suppliers charging retail gasoline stations in different geographic zones different prices based on the nature of customers in that zone. Charging demand-based prices is common in gasoline markets and in many other industries as well. Economists call this price discrimination, while marketers use the softer term “value based pricing.” Frequent flyer miles, Saturday night stayover fares, buy one get a second at half price, and senior citizen or student discounts are all examples of the same phenomenon. Even free delivery, in which different customers are charged the same prices in spite of different costs of service, is a form of price discrimination.

One man's surcharge is another man's discount. Relative to uniform pricing, zone pricing increases prices in the areas with little competition and/or rich consumers and reduces prices in the areas with the most competition and/or the poorest consumers. Elimination of zone pricing by statute will tend to force an average markup to all. This amounts to a transfer from poorer areas and/or areas with lots of competition to richer areas and/or areas with little competition. Overall, a ban on zone pricing will likely hurt the neediest segment of society.

Moreover, there is no economic prediction that average prices will fall. Refinery margins won't fall because refinery margins are determined by supply conditions at terminals rather than retail stations. Retail gasoline is quite competitive with very low profit margins in most areas. There is little scope for a significant price decrease.

Conclusion

What can the government do to improve the reliability of delivery and price of gasoline to the U.S. consumer? The main points I would make before this committee are:

- There is only a limited role for government in reducing price volatility. Some level of fluctuations in price is unavoidable, caused by large-scale phenomena like demand increases, and short-term phenomena like pipeline breaks.
- Price volatility is not unambiguously bad. Gasoline prices are volatile because the value of gasoline varies over time. Stabilizing prices at a high level is much worse for consumers than volatile prices.
- Price controls are not a fix for price volatility. We lived through the gasoline lines of the 1970s, and I hope never to see those again. Preventing the establishment of market prices through price controls does not change the underlying conditions, but instead often creates severe shortages and eliminates investment. Price controls do severe damage, as anyone who has driven through the Bronx can verify, because rent controls destroyed the Bronx.
- Tax holidays during price spikes do not decrease the price to consumers but create transfers to oil companies.
- Volatility is increased by the proliferation of boutique fuels. As a nation, we should be aware that every time an area is assigned its own fuel specifications, the rest of us lose a bit of insurance. We should attempt to minimize the total number of distinct gasoline types used.
- The greater the extent to which the nation is interconnected, the less will be the volatility of gasoline prices. Promoting the construction of pipelines can reduce volatility by linking geographic areas more tightly. This may be an expensive fix with limited effects, however.
- Storage reduces volatility. Promoting the expansion of storage tanks is probably the least cost means of reducing volatility. However, such promotion should involve improvements in the regulatory environment, tax breaks or other inducements to the creation of storage facilities, rather than direct rewards to storage of gasoline itself, in order to minimize regulatory costs. It is important that the cure not be worse than the disease.
- Government-run storage will tend to crowd out private storage, which increases the overall cost of gasoline supply without increasing actual supplies.
- Industry executives are justifiably pessimistic about the ability of the nation to produce new refineries, especially in California. Even in their private documents, they say that there will never be a new West Coast refinery built. There is a role for the government to moderate the “Not in My Backyard” (NIMBY) mentality that prevents us from building adequate refineries, adequate electric power generation facilities, pipelines, electric transmission lines, and even cellular phone towers. Fortunately, my home state of Texas has relatively few NIMBY problems and we aren’t in danger of losing our power. NIMBYism is approaching a crisis problem in some parts of our country.
- Forcing oil companies out of retail operations by legislation is likely to eliminate many of the benefits of vertical integration without encouraging competition.
- Elimination of zone pricing will not tend to reduce average gasoline prices, but instead increase prices in competitive and/or poor areas, while decreasing prices in less competitive and/or richer areas.
- Finally, let me end with a “big picture” remark. Over the past thirty years, this country has deregulated trucking, airlines, rail, gasoline, oil, natural gas, and long-distance

telephony. It is in the process of deregulating electricity and local telephony for business customers. Overall, the deregulation of the U.S. economy has produced huge gains for American consumers. We should not let a few problems – most notably the California electricity crisis and price spikes in gasoline – deflect us from our market economy or send us back to regulation. In almost all instances, competitive industries deliver more, higher quality goods to consumers than regulated industries. Regulation produced gasoline lines, which are worse in the long run than volatile prices.

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B.A. (Economics) University of Florida, 1976 (Highest Honors, Phi Beta Kappa)

ACADEMIC EXPERIENCE

Murray S. Johnson Chair, University of Texas at Austin, 1997-
Visiting Professor of Business Strategy, University of Chicago GSB, 2000-2001
Chair, Department of Economics, University of Texas at Austin, 1997-8
Rex G. Baker, Jr., Professor of Political Economy, University of Texas at Austin, 1990-7
Visiting Professor of Economics, Massachusetts Institute of Technology, 1994-5
Professor of Economics, University of Western Ontario, 1989-1990
Visiting Professor of Economics, California Institute of Technology, 1989-90
Visiting Associate Professor of Economics, California Institute of Technology, 1988-9
Associate Professor of Economics, University of Western Ontario, 1987-9
Assistant Professor of Economics, University of Western Ontario, 1981-7
Visiting Assistant Professor of Economics, Purdue University, 1980-1

PROFESSIONAL ACTIVITIES

AEA Nominating Committee, 2002
U.S. Senate Testimony, April 25, 2001, Committee on Commerce, Science and Transportation,
Subcommittee on Consumer Affairs, Foreign Commerce, and Tourism
Colin Clark Lecture, Australasian Econometric Society Meetings, 1998
John S. Day Distinguished Alumni Award, Purdue's Krannert School of Management, 1997
Fellow (1995) and Member of the Econometric Society
Co-Editor, *American Economic Review*, 1993-
Organized AEA session in honor of William Vickrey, 1992.
Associate Editor, *American Economic Review*, 1992-3
Associate Editor, *Journal of Economic Theory*, 1992-6
Member of AEA, Society for the Promotion of Economic Theory, and Associate of American Bar Association

Referee for *AER*, *Econometrica*, *JET*, *JPE*, *REStud*, *JEL*, *QJE*, *J Math E*, *J Monetary E*, *EJ*, *IER*, *CJE*, *J. F.*, *JOLE*, *JEBO*, *Rand*, *J Pub E*, *IJIO*, *J Econometrics*, *Economica*, *REStat*, *J E Ed.*, *J Law E&O*, *European E Review*, *Scandinavian J E*, *SEPS*, *Math Soc. Sciences*, *ORSA J of Computing*, *J E Bus*, *Energy J*, *J Real Estate F&E*, *Contemporary Acc. Res.*, *NSF*

CONSULTING EXPERIENCE

Major Clients: Airtouch, BMC Software, US Department of Defense, Duke Energy, Enron, Federal Trade Commission (BP-Arco and Exxon-Mobil mergers and Midwest Gasoline Price Investigation, Monster-Hot Jobs, others), Government of Mexico, Government of Peru, Great Northern Nekoosa, Lockheed-Martin, Pacific Telesys, Picker, PCS Primeco, Realty One, SBC, Telecom New Zealand.

Consulting Arrangements: PM-Keypoint and Market Design Inc.

PUBLICATIONS: ARTICLES

1. How to Set Minimum Acceptable Bids, with Application to Real Estate Auctions, *Journal of Industrial Economics*, forthcoming (with Daniel Quan and Daniel Vincent).
2. Coarse Matching, *Econometrica*, forthcoming.
3. Equilibrium Price Dispersion with Consumer Inventories, *Journal of Economic Theory*, forthcoming (with Pilky Hong and Ashish Nayyar).
4. Measuring Anticompetitive Effects of Mergers When Buyer Power is Concentrated, *Texas Law Review*, (2001) vol. 79, no. 6, pp. 1621-1639 (with Kenneth Hendricks, Joshua M. Fried, Melanie Stallings Williams and Michael Williams).
5. Collusive Bidding in the Market for Corporate Control,” *Nebraska Law Review*, (2000) vol. 79, no. 1, pp. 48-74 (with Joshua M. Fried, Melanie Stallings Williams and Michael Williams).
6. The Effects of Vertical Integration on Competing Input Suppliers, *Federal Reserve Bank of Cleveland Economic Review* 35, no. 1, Quarter 1, 1999.
7. Auctioning Entry into Tournaments, *Journal of Political Economy*, 107, no. 3, June, 1999, 573-605 (with Richard Fullerton).
8. Tarrifying Auctions, *Rand Journal of Economics*, 30, no. 1, Spring, 1999 (with Daniel Vincent and Wendy Takacs).
9. Pretrial Negotiation, Litigation, and Procedural Rules, forthcoming in *Economic Inquiry*, (with Jiong Gong).
10. Four Issues in Market Design, *Revista Analisis Economico* 13, no. 1, Junio de 1998, 7-24.
11. Synergies in Wireless Telephony: Evidence from the MTA Auction, *Journal of Economics and Management Strategy*, 6, no. 10, Fall 1997, 497-527 (with Lawrence Ausubel, Peter Cramton, and John McMillan).
12. Sequentially Optimal Auctions, *Games and Economic Behavior* 18, 246-76 (with Daniel Vincent).
13. Competition and Game Theory, *Journal of Marketing Research* 33, August 1996, 263-7 (with John McMillan).
14. Analyzing the Airwaves Auction, *Journal of Economic Perspectives* 10, no.1, Winter 1996, 159-75 (with John McMillan).
15. The Evolutionary Stability of Auctions over Bargaining, *Games and Economic Behavior*, 15, 1996, 228-254 (with Xiaohua Lu).
16. Damaged Goods, *Journal of Economics and Management Strategy* 5, no. 2, Summer, 1996, 149-74 (with Ray Deneckere).
17. Organizational Diseconomies of Scale, *Journal of Economics and Management Strategy* 4, no. 3, Fall 1995, 399-26. (with John McMillan).
18. Multiproduct Equilibrium Price Dispersion, *Journal of Economic Theory* 67, no. 1, October, 1995, 83-105.
19. The Non-existence of Pairwise Proof Equilibrium, *Economics Letters* 49, 1995, 251-9 (with Marius Schwartz).
20. Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity and Uniformity, *American Economic Review* 84, no. 1, March 1994, 210-30 (with Marius Schwartz).

21. Endogenous Availability, Cartels and Merger in an Equilibrium Price Dispersion, *Journal of Economic Theory* 62, no. 1, February 1994, 24-47.
22. Mechanism Design by Competing Sellers, *Econometrica* 61, no. 6, November 1993, 1281-1312.
23. Collusive Bidding in Hostile Takeovers, *Journal of Economics and Management Strategy*, Winter 1993, 449-482, (with Daniel Vincent, Michael Williams, and Melanie Havens).
24. The Price Decline Anomaly, *Journal of Economic Theory* 60, June, 1993, 191-212 (with Daniel Vincent).
25. Horizontal Mergers in Spatially Differentiated Noncooperative Markets *Journal of Industrial Economics* XL, December 1992, 349-57 (with Joseph Simons and Michael Williams).
26. Updating the Reserve Price in Common Value Auctions, *American Economic Review Papers and Proceedings*, May 1992, 512-8 (with Daniel Vincent).
27. The Competitive Effects Section, *International Merger Law Events and Commentary* 21, May 1992, 6-9 (with Joseph Simons and Michael Williams).
28. Industrial Blackmail: Dynamic Tax Competition and Public Investment, *Canadian Journal of Economics* XXVI, no. 3, August 1993, 590-608 (with Ian King and Linda Welling).
29. Investment Decisions under First and Second Price Auctions, *Economics Letters*, 1992, 289-93 (with Ian King and Linda Welling).
30. Animal Spirits *American Economic Review* 82, no.3, June 1992, 493-507 (with Peter Howitt).
31. Bidding Rings, *American Economic Review* 82, no.3, June 1992, 579-99 (with John McMillan).
32. Amicable Divorce: Dissolving a Partnership with Simple Mechanisms, *Journal of Economic Theory* 56, no.2, April 1992, 266-93.
33. A Dominant Strategy Double Auction, *Journal of Economic Theory* 56, no.2, April 1992, 434-50.
34. Horizontal Mergers and Antitrust Policy, *Journal of Industrial Economics* XL, June 1992, 181-7 (with Michael Williams).
35. Correlated Information and Mechanism Design, *Econometrica* 60, No. 2, March 1992, 395-421 (with Philip Reny).
36. A Stone-Weierstrass Theorem without Closure under Suprema, *Proceedings of the American Mathematical Society* 114, Number 1, January 1992, 61-67 (with Philip Reny).
37. On What Economic Grounds should Horizontal Mergers be Challenged?, *International Merger Law* (with Michael Williams), no. 7, March 1991.
38. Optimal Contracts for Teams, *International Economic Review* 32, no.3, August 1991: 561-77 (with John McMillan).
39. Efficient Allocation with Continuous Quantities, *Journal of Economic Theory* 53, no. 1, February 1991: 51-74.
40. Externalities and Asymmetric Information, *Quarterly Journal of Economics* CVI, no. 1, February 1991: 103-121 (with Jeremy Greenwood).
41. Extracting the Surplus in Common Value Auctions, *Econometrica* 57, no.6, November, 1989: 1451-9, (with John McMillan and Philip Reny).
42. The Department of Justice Merger Guidelines: A Critique and a Proposed Improvement, *Pepperdine Law Review* 6, no.4, 1989 (with Michael Williams).
43. Government Procurement and International Trade, *Journal of International Economics* 26, 1989: 291-308 (with John McMillan).
44. Commodity Bundling by a Monopolist, *Quarterly Journal of Economics*, May 1989, 371-83 (with John McMillan and Michael Whinston).
45. Multidimensional Incentive Compatibility and Mechanism Design, *Journal of Economic Theory* 46, December 1988: 335-54 (with John McMillan).
46. Stability of Equilibria with Aggregate Externalities, *Quarterly Journal of Economics* 103, May 1988: 261-77 (with Peter Howitt).
47. Search Mechanisms, *Journal of Economic Theory* 44, February 1988: 99-123 (with John McMillan).

48. Can Event Studies Detect Anticompetitive Mergers?, *Economic Letters* 28, 1988: 199-203 (with Michael Williams).
49. Auctions with a Stochastic Number of Bidders, *Journal of Economic Theory* 43, October 1987: 1-19 (with John McMillan).
50. Competition For Agency Contracts, *Rand Journal of Economics*, Summer 1987 (with John McMillan).
51. Auctions with Entry, *Economics Letters* 23, 1987: 343-7 (with John McMillan).
52. Auctions and Bidding, *Journal of Economic Literature*, June 1987 (with John McMillan).
53. Nonlinear Contracts, Zero Profits and Moral Hazard, *Economica* 54, February 1987: 97-102 (with Raymond Fishe).
54. Costly Search and Recruiting, *International Economic Review* 28, February 1987: 89-107 (with Peter Howitt).
55. Bidding for Contracts: A Principal-Agent Analysis, *Rand Journal of Economics*, Autumn 1986 (with John McMillan)
56. Sequential Procurement Auctions, *Journal of Public Economics* 31, 1986: 181-95 (with Richard Luton).
57. Optimal Tenure and the Timing of Faculty Meetings, *Studies in Economic Analysis* 10, 1986.
58. Unemployment Insurance and the Entitlement Effect: A Tax Incidence Approach, *International Economic Review* 27, February 1986 (with John Barron and Paul Speaker).
59. Joint Search for Several Goods, *Journal of Economic Theory* 32, April 1984 (with John Carlson).
60. American Economic Growth and the Voyage of Columbus, *American Economic Review*, September 1983.
61. Discrete Equilibrium Price Dispersion, *Journal of Political Economy*, June 1983 (with John Carlson).
62. On the use of Bonus Payments in an Experimental Study of Electricity Demand, *Review of Economics and Statistics* LXV, no.3, August 1983: 506-11 (with Raymond Fishe).
63. Optimal Design of a Decision Support System, *International Journal of Policy Analysis and Information Systems* 6, 1982 (with Andrew Whinston).
64. An OIS Model for Internal Control Evaluation, *ACM Transactions on Office Information Systems*, ACM-SIGOA, November 1982 (with Andrew Bailey, James Gerlach and Andrew Whinston).
65. An Application of Complexity Theory to the Analysis of Internal Control, *Auditing: A Journal of Practice and Theory*, Summer 1981: 38-52 (with Andrew Bailey and Andrew Whinston).
66. Internal Accounting Controls in the Office of the Future, *IEEE Computer Journal*, May 1981 (with Andrew Bailey, James Gerlach and Andrew Whinston).
67. Formal Analysis of Internal Control-An Introduction *The Proceedings of the First European Workshop on Information Systems*, Aix-en-Provence, 1981 (with Andrew Bailey, James Gerlach and Andrew Whinston).
68. A Formal Model of Problem Solving, *International Journal of Policy Analysis and Information Systems* 4, 1980 (with Andrew Whinston).

PUBLICATIONS: BOOK

Incentives in Government Contracting, with John McMillan, Toronto: University of Toronto Press, December, 1988.

Competitive Solutions: A Strategist's Toolkit, forthcoming October 1, 2002, Princeton: Princeton University Press.

PUBLICATIONS: CHAPTERS IN BOOKS

1. Production Capacity for Durable Goods, in *Business Modeling: Multidisciplinary Approaches - Economics, Operational and Information System Perspectives* (in Honor of Andrew Whinston), Ed: Clyde Holsapple, Varghese Jacob and H. Raghav Rao, London: Kluwer Academic Publishers, 2002, 55-76.
2. Matching and Expectations in a Market with Heterogeneous Agents, *Advances in Applied Micro-Economics, Volume 6*, ed: Michael Baye, Greenwich, CT: JAI Press, (with Xiaohua Lu).
3. Convergence to Efficiency in Double Auctions, *Advances in Applied Micro-Economics, Volume 6*, ed: Michael Baye, Greenwich, CT: JAI Press, (with Jiong Gong).
4. Electronic Markets, *Readings on Electronic Commerce*, (with John McMillan).
5. Modelling Transactions under Asymmetric Information, *Recent Developments in Game Theory*, Eds: J. Creddie, J. Eichberger, and J. Borland, London: Edward Elger, 1991 (with John McMillan).
6. Ticom II - The Internal Control Language - An Introduction, *Internal Control and the Impact of the Foreign Corrupt Practices Act*, ed: Abdel-Khalik, Gainesville: University of Florida Press, 1982 (with Andrew Bailey, James Gerlach and Andrew Whinston).
7. Office Automation, *Handbook of Industrial Engineering*, New York: Wiley and Sons, 1982 (with Andrew Bailey, James Gerlach and Andrew Whinston).

PUBLICATIONS: BOOK REVIEW

The Economics of Conformism, by Stephen Jones, reviewed for *The Canadian Journal of Economics*, February 1986.

Reprinted in *The Canadian Journal of Economics*, February, 1987.

UNPUBLISHED MANUSCRIPTS

A Theory of Bilateral Oligopoly (with Ken Hendricks)

Feints (with Ken Hendricks)

The Continuing War of Attrition