Consumer Federation of America

FUELING PROFITS:

Industry Consolidation, Excess Profits & Federal Neglect

Domestic Causes of Recent Gasoline and Natural Gas Price Shocks

Dr. Mark N. Cooper

May 2004

Contents

EXECUTIVE SUMMARY

RECORD HIGH PRICES; RECORD HIGH PROFITS

With energy prices making front-page headlines and taking center stage in election year debates, policymakers are arguing over whom to blame and scrambling for explanations. This paper analyzes the record gasoline and natural gas prices in the period from January 2000 to March 2004 by decomposing the increases into three components – shifts in the domestic market structure, price increases paid to foreign energy producers when the international price of crude increases, and price increases paid to domestic energy resource producers when domestic prices follow international prices upward.

- Total price increases for gasoline at the pump and natural gas at the wellhead have been over $300 billion over the past four years, resulting in record profits for the industry.

Domestic petroleum companies account for about $250 billion. Changes in domestic market structure accounted for the largest part of this total.

- The gasoline refining and marketing segments of the domestic industry have increased pump prices by $55 billion, exclusive of crude oil price increases.
- Similar changes in the domestic market structure added another $5 billion to the cost of other domestic petroleum products that are used by residential consumers, such as heating oil and propane.
- Natural gas wellhead prices increased by almost $100 billion, separate and apart from anything that OPEC has done, wit $90 billion going to domestic sellers of natural gas.

Another $100 billion went to domestic producers by simply following the global price of energy up. About $60 billion went to foreign producers of energy resources.

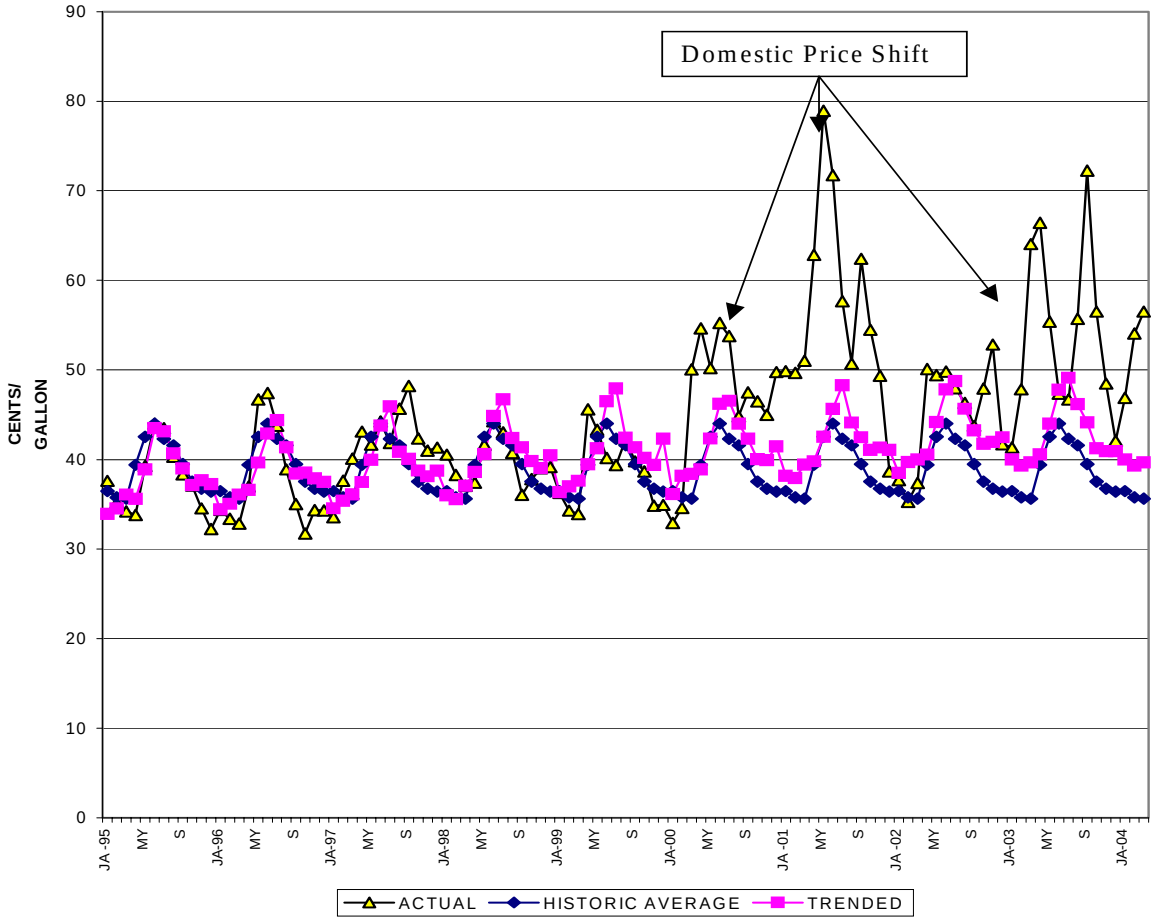
Taken together, in 1999, averaged across all households, expenditures for gasoline, heating oil and natural gas accounted for about $1400 per year of total household expenditures.

- Price increases over the past four years associated with the price shock for these residential items added about $350 per household per year (including all factors). Thus, domestic energy price shocks have increased household energy bills by 25 percent.

- A comparison between 1999 and 2003 is even more dramatic, a $500 increase in average annual household expenditures for these petroleum products, which represents a jump of over 35 percent.

Since these price increases were not caused by cost increases, petroleum industry profits have risen to record highs over the period.

Exhibit ES-1: Domestic Gasoline Spread, Actual and Projected



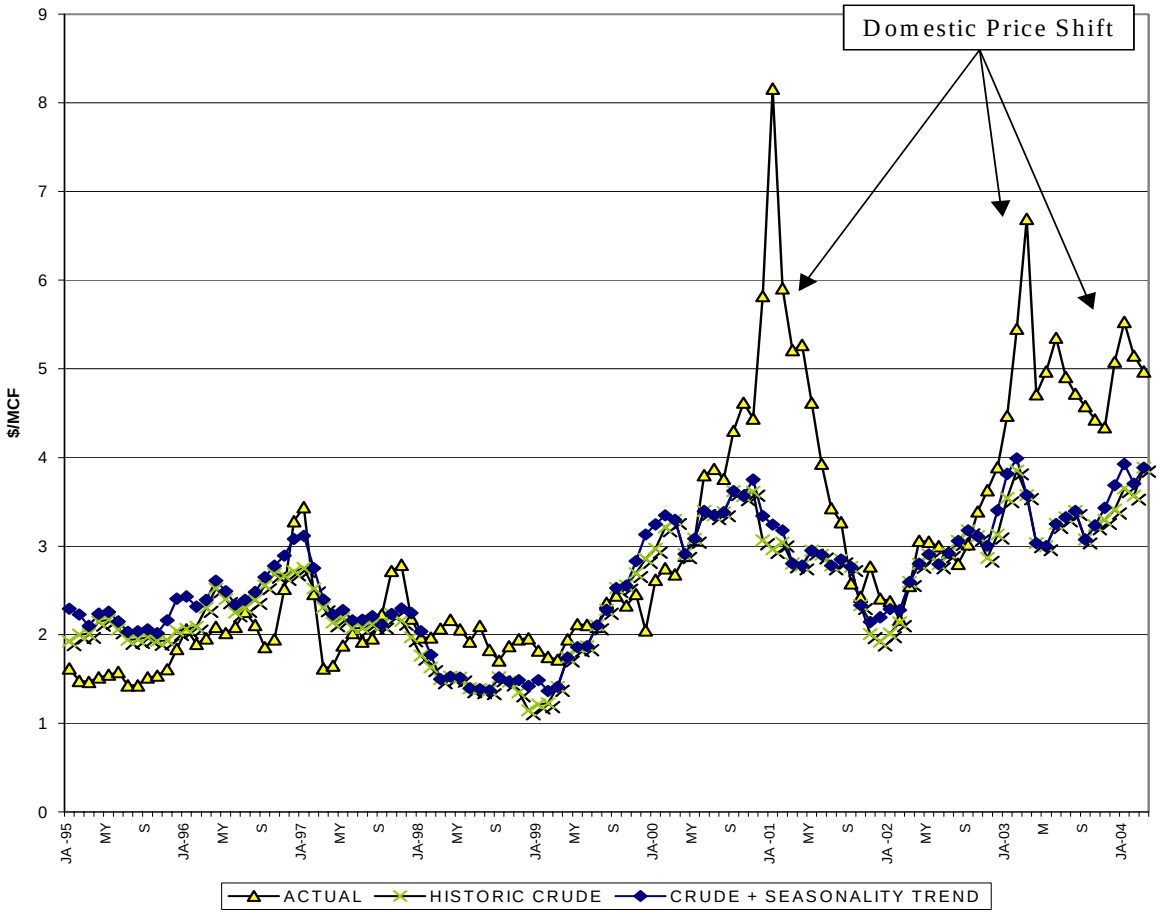
Source: See text for methodology, U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Weekly Petroleum Status Report*, various issues and database.

- Domestic petroleum companies enjoyed an increase in 2000 to 2003 of $50 to $80 billion of after-tax windfall profits compared to the 1995-1999 period. Before tax profits were up $70 to $110 billion.
- Domestic petroleum industry profits are headed for another record. First quarter 2004 filings show domestic refining and marketing profits up about 50 percent compared to the first quarter of 2003, while company-wide profits are up about 17 percent.

Concentration and Market Power After a Wave of Mergers

The story that does not get coverage behind the headlines reporting record prices and profits is the merger wave that swept through the petroleum industry between 1997 and 2002.

Exhibit ES-2: Natural Gas Wellhead Prices, Actual and Projected



Source: See text for methodology, U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Weekly Petroleum Status Report*, various issues and database.

It concentrated the petroleum industry into the hands of a small number of giant, vertically integrated companies that gained market power over prices.

- The Department of Energy identified a total of major 34 oil and gas companies that merged into 13 over this period, and an 15 refining companies that had shrunk to seven.
- Of the 31 companies listed in the oil and gas sector by *Business Week* in 1995, 21 engaged in mergers with other companies between 1997 and 2002. Of the 21 listed by *Business Week* in 2003, 15 had engaged in mergers in the previous five years.

With increasing concentration, long-term strategic decisions by the industry tighten production capacity interacted with short-term (mis)management of stocks to create a tight supply situation that provides ample opportunities to push prices up quickly.

- In the 1990s alone, approximately 50 refineries were closed. Since 1995, over 20 refineries have been shut down.

- Operating stocks to meet demand and cushion price swings have declined to very low levels. They generally are in the range of a couple of days, compared to four or five days in the early 1990s and over a week in the 1980s.

The move of the majors into natural gas production in the 1990s changed the nature of that sector. Decisions about which wells to produce and which wells to cap, how much to inject into storage, how to use pipeline capacity and ultimately, how to report prices are business decisions that affect the price paid at the wellhead.

- Consolidation came hand in hand with the shift to acquisition of resources through merger (rather than exploration) and a shift of drilling away from exploration.

- The trading markets that drive wellhead natural gas price are quite new and lack price transparency. Enron played a large roll in these markets and when it collapsed, so too did much private trading. The evidence is mounting that manipulation and abusive practices have been part of these markets since 2000.
- The long-term trend to much lower stocks relative to demand is clear in natural gas as well. Compared to the decade of 1985-1994, stocks were about 25 percent lower in the 1995-1999 period. During the price spikes of the new millennium, stocks were 40 to 50 percent lower than the 1985-1994 period and 25 percent lower than the 1995-1999 period.

THE FAILURE OF PUBLIC POLICY

Excessive industry concentration and anti-consumer pricing behavior is the result of lax antitrust law enforcement by both the Clinton and Bush Administrations allowed too many mergers because they did not take the unique characteristics of the energy industry into account. The Federal Trade Commission has failed to recognize the inability of supply and demand to respond to price signals, which allows market power to be abused at much lower levels of concentration than is the case in most other industries.

Because there are few firms in the market and because consumers cannot easily cut back on energy consumption, prices hold above competitive levels for significant periods of time. The problem is not a conspiracy, but the self-intrested action of large companies with market power. With weak competitive market forces, individual companies have flexibility for strategic actions that raise prices and profits.

- Individual companies can let supplies become tight in their area and keep stocks low, since there are few competitors who might counter this strategy, and push prices up when demand increases because they have no fear that competitors will not raise prices to steal customers.

- Every accident or blip in the market triggers a price shock that leads to additional profits. Moreover, operating complex energy systems at very high levels of capacity places strains on the physical infrastructure and renders it susceptible to accidents.

The explanation for the high and volatile price of gasoline offered by the industry and the Bush Administration emphasizes that "overdependence on any one source of energy, especially a foreign source, leaves us vulnerable to price shocks, supply interruptions and in the worst case, blackmail." The explanation is so oversimplified and incomplete that it must be considered at best misleading and it leads to a policy that incorrectly overemphasizes domestic production.

The central premise of the energy bill pushed by the administration is that energy companies need more money to boost production of domestic energy supplies. To that end, a grab bag of subsidies – totaling over $20 billion – was earmarked for the oil and gas industry, while other expensive alternatives also would receive assistance. On the natural gas side, the bill promotes costly backstop technologies, like liquefied natural gas imports and an Alaska natural gas pipeline, that will lock in high gas prices.

Further boosting the profitability of the petroleum industry with subsidies and access to resources in environmentally sensitive areas would not increase production a great deal, nor will it decrease prices to consumers. Over the past four years, the domestic oil and gas industry has enjoyed a huge increase in profitability, but the pricing abuse has gotten worse, not abated.

- Because domestic resources represent a very small share of the global resources base and are relatively expensive to develop, the increase in the amount of oil and gas produced in America will not be sufficient to put downward pressure on world prices.
- Even if the U.S. could affect the market price of basic energy resources, which is very unlikely, that would not solve the structural problem in domestic markets.

Tight markets in the U.S. can best be addressed by relieving pressure on the demand side, yet the energy bill being considered by Congress does little to relieve that pressure. The legislation fails to take serious measures to reduce demand by boosting the efficiency requirements for the most important energy consuming equipment – like automobiles and air conditioners.

CHANGING DIRECTION IN PUBLIC POLICY

The current uncompetitive and anti-consumer market conditions grew up over decades and they can only be reversed by a long-term policy that seeks to reduce the consumption of petroleum products and relieve the pressures on domestic markets. Vigorous and broad based public policies should be pursued to implement permanent institutional changes that lowerthe chances that markets will be tight and reduce the exposure of consumers to the opportunistic

exploitation of markets when they become tight. To achieve this reduction of risk, public policy should be focused on achieving several interrelated goals.

- **Easing tight markets:** Increasing fuel efficiency in the decade ahead at the rate achieved in the 1980s would save about 1.5 million barrels per day. Increasing refinery capacity by 10 percent, either through expansion at existing refineries or redevelopment of less than one half of the refineries closed in the past decade, would add another 1.5 million barrels per day.
- **Increase market flexibility:** Expanding stocks – with tax incentives to hold and draw down supplies in the fact of price increases, mandatory stocks requirements as a percentage of sales, and/or government owned/privately operated supplies – could alleviate the chronic problem of inadequate short-term shortages.
- **Promote a more competitive industry:** Further concentration of the petroleum industry should be resisted by vigorous enforcement of the Department of Justice Merger Guidelines. Restrictive marketing practices, such as zonal pricing and franchise restrictions on supply acquisition should be investigated and discouraged.
- **Deter private actions that make markets tight or exploit market disruptions.** Withholding of supply should draw immediate and intense public and governmental scrutiny through a joint federal state task force of attorney's general. Manipulation of commodity markets should be prevented. The incentives to manipulate markets can be reduced by imposing a windfall profits tax that triggers under specific circumstances of price and profit increases.

I. INTRODUCTION

"The Gas Morass of '04"[1]

The issue of energy prices has moved to the front pages of the nation's newspapers and center stage in election year policy debates. For example, on May 4, 2004, *The New York Times* ran a front-page business section story under the headline, "Drivers Tend to Shrug Off High Gas Prices, for Now."[2] It reported that consumers had not yet reacted strongly to record high prices, in part because the tax cut had cushioned the blow. It cited figures that indicated "the tax cut gave consumers about $70 billion in additional spending power this year, while the rise in crude oil prices… has so far cost Americans only about $35 billion." On the very same day, *The Washington Post* saw more pain in high gasoline prices under the headline "Caught Over a Barrel: Soaring Gas Prices Have Motorists' Wallets Running on Empty."[3] It recounted the lengths to which consumers were going to "save a nickel a gallon."

Public officials appear to be at least as confused as the newspaper headlines. At a recent hearing on gasoline and natural gas prices, for example, the General Counsel of the Federal Trade Commission (FTC) testified that 85 percent of the increase in gasoline prices was caused by increases in crude oil prices.[4] Less than a week later, however, another branch of the federal government contradicted the claim by the FTC. A spokesman for the Energy Information Administration (EIA) observed that 60 percent of recent price increases were caused by the domestic refining sector.[5] By the EIA count, the increase attributable to crude is less than half as much as the FTC claimed at the hearing. A couple of weeks later, however, the EIA spokesperson changed his tune, now claiming that "OPEC production cuts ranked higher as a cause for increased gas prices than tightness in the United States refining market."[6]

The energy price problem is not confined to gasoline markets. It afflicts natural gas as well. A December 2003 report from the Industrial Energy Consumers of America concluded that a "41 month natural gas crisis has cost U.S. consumers over $111 billion."[7] The bad news continued in the winter, summarized in headlines like "Natural Gas Prices Surge and Fingers are Pointing"[8] and "Heating Costs Going Through the Roof."[9]

Purpose and Outline

This paper seeks to fill the gap between the statements by the FTC and the EIA and chart a course through the morass of energy price headlines. It provides a detailed accounting of the sources of recent gasoline and natural gas price increases.[10] It explains the structural causes of those changes.

Section II describes the cost to consumers of the dramatic shift in domestic pricing behavior. It shows that shifts in the domestic market structure have played as large a role in the recent price spikes as increases in the world price of crude. Further, it shows that price increases paid to domestic energy resource producers, when domestic prices follow

international prices upward have been far larger than price increases paid directly to foreign energy producers when the international price of crude increases.

Section III explains why domestic producers were able to increase their take in domestic energy markets. It shows that a merger wave in the late 1990s dramatically changed the industry structure, concentrating the petroleum industry into the hands of a small number of giant, vertically integrated companies.[11] The business decisions of these companies restricted capacity, undermined independents and rendered many markets uncompetitive and vulnerable to manipulation.

Section IV explains why the FTC under both the Clinton and Bush administrations failed to stop energy industry mergers and failed to recommend or take policy action against clearly abusive practices in the energy industries. The FTC has failed to recognize that weak market forces (demand and supply that cannot respond easily to price changes) allow firms to exercise market power at lower levels of concentration than in other industries.

Section V explains why the policies embodied in the pending energy bill are misguided and proposes an alternative set of policies. It argues that increased profitability for oil companies through subsidies and permission to drill in environmentally sensitive areas will not produce enough new resources to reduce pressures on the world oil market. Because the same companies that have market power will likely control the additional output, it will do little to alleviate problems in domestic markets. Alternative policies to reduce demand, increase domestic market flexibility, and prevent market manipulation are suggested.

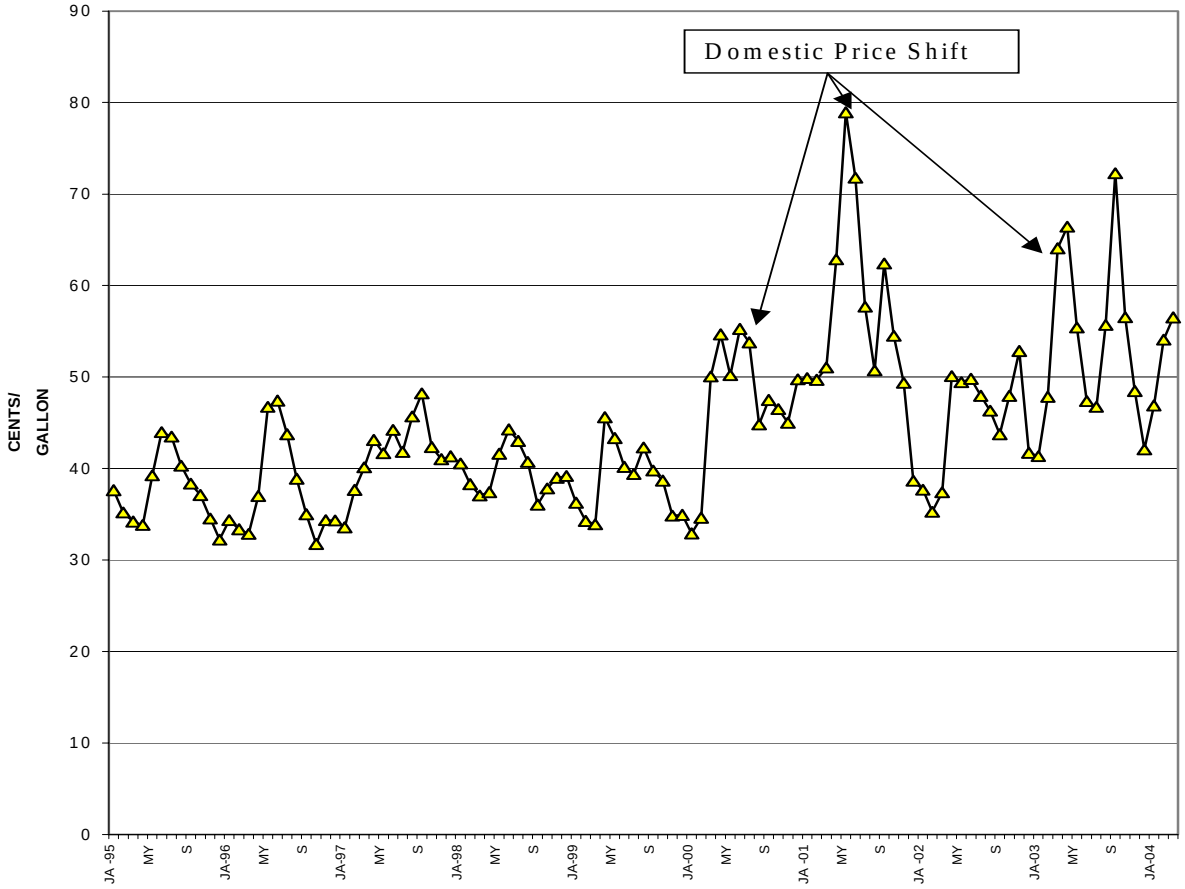
II. DOMESTIC ENERGY PRICE SHOCKS

A quick glance at the testimony of the FTC General Counsel reveals the source of his overestimation of the role of crude oil price increases. The FTC witness relied on an early 1999 analysis and seems to have looked at a long-term trend of prices, rather than looking at the recent and current situation.[12] Exhibits II-1 and II-2, which focus on the price increases resulting from shifts in domestic gasoline and natural gas market structures, show that in doing so he ignored a dramatic change in the pricing pattern of domestic energy sources: energy prices began to destabilize in the spring of 2000 and took off in early 2001.

METHODOLOGY

To gauge the magnitude of the domestic price shifts, we have compared the recent price increases to several baseline estimates. As is evident in the disagreement between the FTC and the EIA, the choice of baseline and the period over which one makes comparisons is extremely important. A series of questions must be answered.

Exhibit II-1: Domestic Gasoline Spread

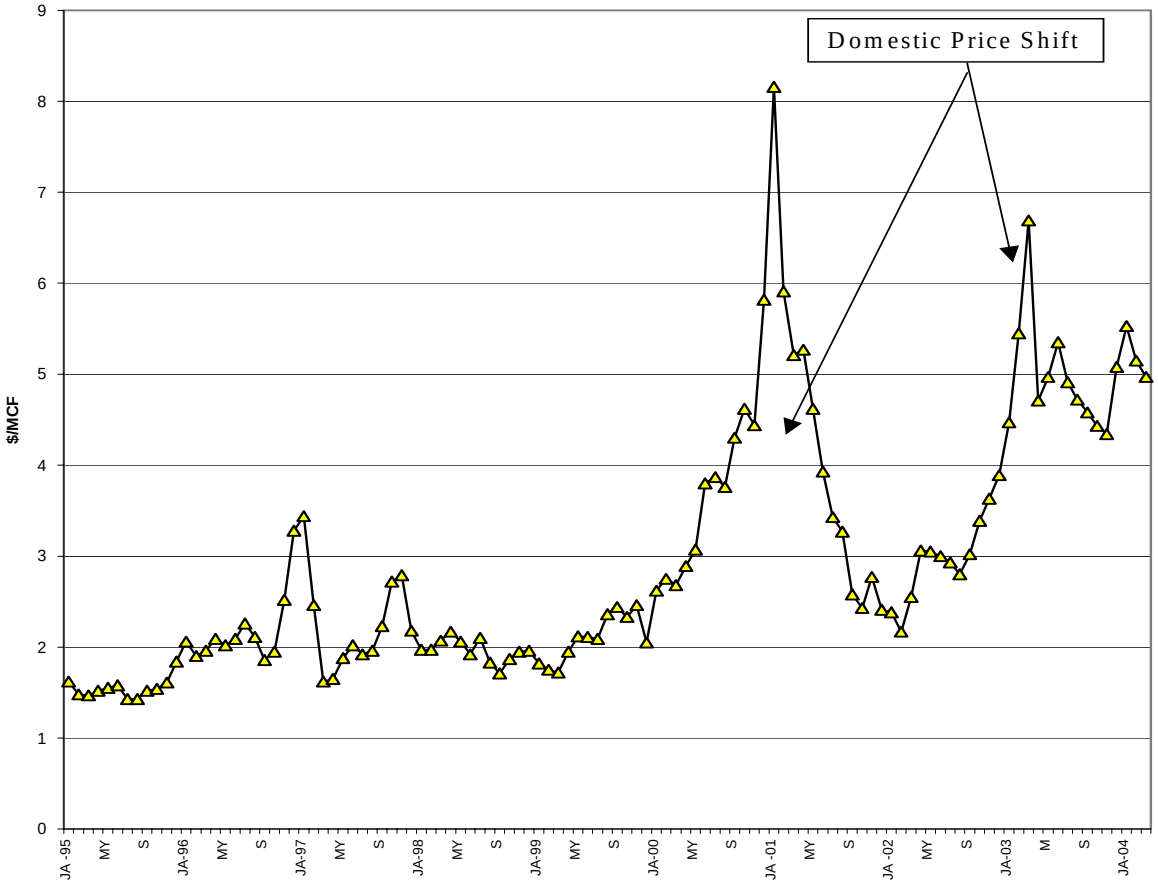


Source: See text for methodology, U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Weekly Petroleum Status Report*, various issues and database.

How far back should the analysis go? For purposes of this analysis we go back to January 1995. January 1995 was the implementation date of the Clean Air Act Amendments.[13] The Clean Air Act Amendments affected refinery operations and, in turn, gasoline prices. The Clean Air Act Amendments and electricity restructuring, which began in the mid-1990s, affected natural gas markets as well.[14] Moreover, a merger wave hit the industry in the second half of the 1990s. As discussed below, there is documentary evidence from the mid-1990s that oil industry executives contemplated tightening the supply side of the oil market through the merger wave. **Longer-term comparisons would make the recent pricing abuse appear even greater.**

At what date does the change in behavior take place? The data itself provides an easy answer. There appears to have been a sharp break in the pricing behavior of domestic energy markets in early 2000. This change in behavior escalated sharply in 2001.

Exhibit II-2: Natural Gas Wellhead Prices, Actual and Projected



Source: See text for methodology, U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Weekly Petroleum Status Report*, various issues and database.

What factors should be analyzed? For gasoline, we focus on the domestic spread. The domestic spread is defined by the Energy Information Administration as the price at the gasoline pump minus crude oil costs and taxes.[15] This represents the share in the pump price that domestic refining and marketing operations take. (Refining and marketing are also known as downstream operations in the industry.) Neither the cost of crude nor taxes is within the control of domestic energy companies. By calculating the domestic spread, we isolate the impact of changes in the domestic market from changes in the cost of crude, which is an input to the production of gasoline, heating oil and other petroleum products.

For natural gas, we focus on the wellhead price. Natural gas is overwhelmingly (90 percent) a domestic resource. Crude oil is not an input to the production of natural gas, but it does influence the price somewhat, since there are some uses, particularly industrial, in which crude oil and natural gas are substitutes.[16] In order to isolate the effect of crude, we observe

that between January 1995 and December 1999, natural gas averaged about 67 percent of the cost of crude. We use this as the historic average.

After isolating the effect of crude prices in this way, we compare crude price movements to domestic energy price movements. We examine the relationship of crude to the domestic factors isolated.

How should baseline prices be calculated? In order to estimate the magnitude of a shift in pricing behavior, we must have some estimate of what prices would have been absent the shift. For purposes of this analysis, and given the context of the debate over current prices, we have chosen two baseline methods.

Above we noted the estimate of the Industrial Energy Consumers of America (IECA) of a $111 billion increase in natural gas wellhead prices. This is based on a simple comparison of prices before and after a specific date (in their case June 2000). While such an estimate presents a baseline, it does not take into account factors such as the cost of crude, seasonality of demand or the general trend of increasing demand. Therefore, we have calculated the price increases using two more sophisticated methods. The results are lower than those calculated by the IECA.

For the domestic gasoline spread, we use the historic average from January 1995 to January 2000 as one baseline. For a more refined estimate, we use a trend line based on the seasonality of demand and the increasing trend of demand.[17]

For natural gas, we base the historic average on the relationship between the price of natural gas and the price of crude oil in the January 1995 to December 1999 period.[18] For the trend line we add in a seasonality factor to the crude-driven price.[19]

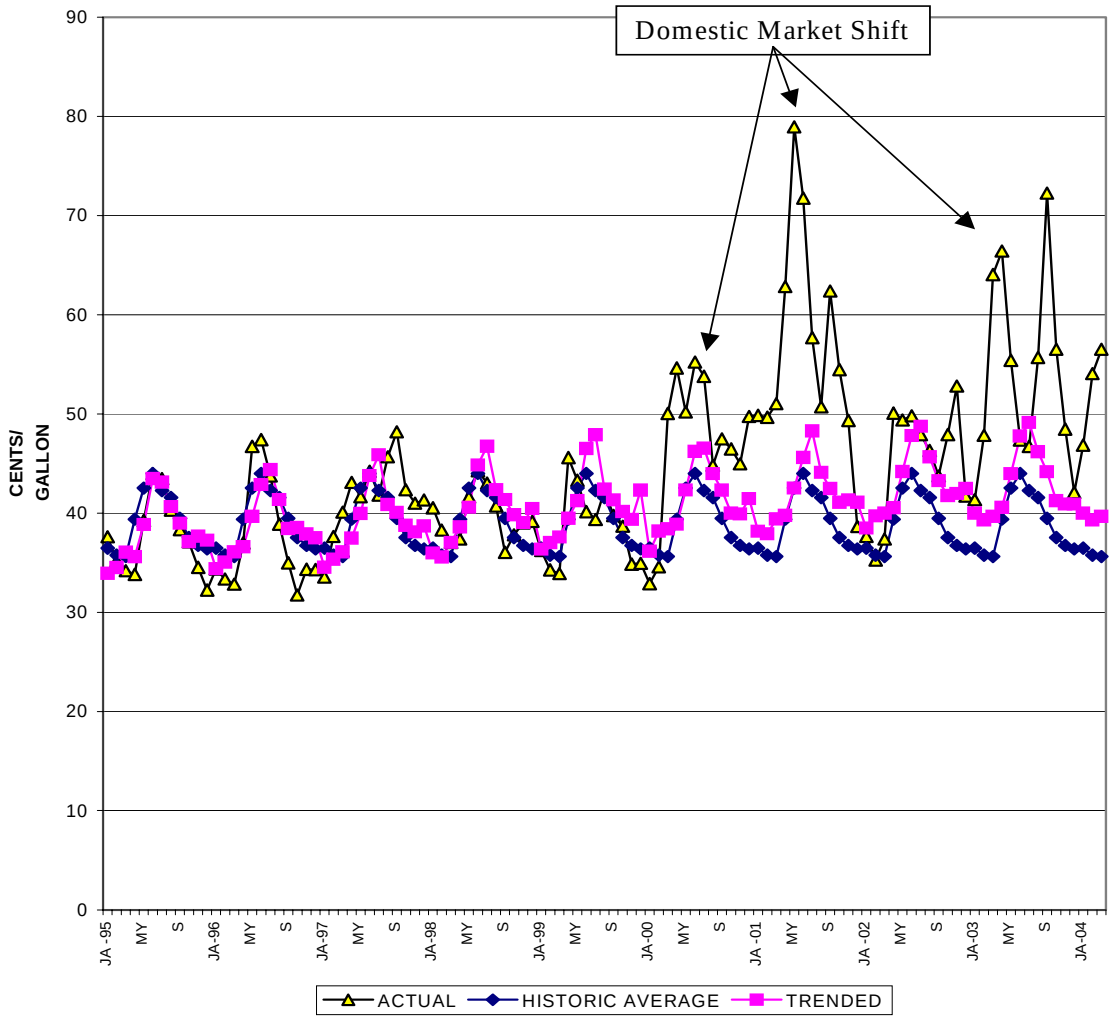
Exhibits II-3 and II-4 above include these baseline estimates and indicate that they are good predictors of prices in the period prior to January 2000.

Domestic Price Ratchets

Exhibit II-3 above shows the domestic spread on gasoline. Throughout the second half of the 1990s, the domestic spread fluctuated seasonally within a narrow range of 32 to 48 cents per gallon. The average domestic spread was about 39 cents per gallon over the period. The domestic spread jumped in mid-2000 and skyrocketed in early 2001. It then plummeted back to historic levels during the winter recession of 2001-2002. It began to rise again in late 2002 and has been above historic levels almost continually ever since. The average spread from January 2000 to March 2004 has been about 51 cents per gallon.

Compared to the historic average, the increased cost to consumers since January 2001 has been about $63 billion. Compared to the trended base line, the increase has been about $48 billion. Only 5 percent of gasoline is imported as product.

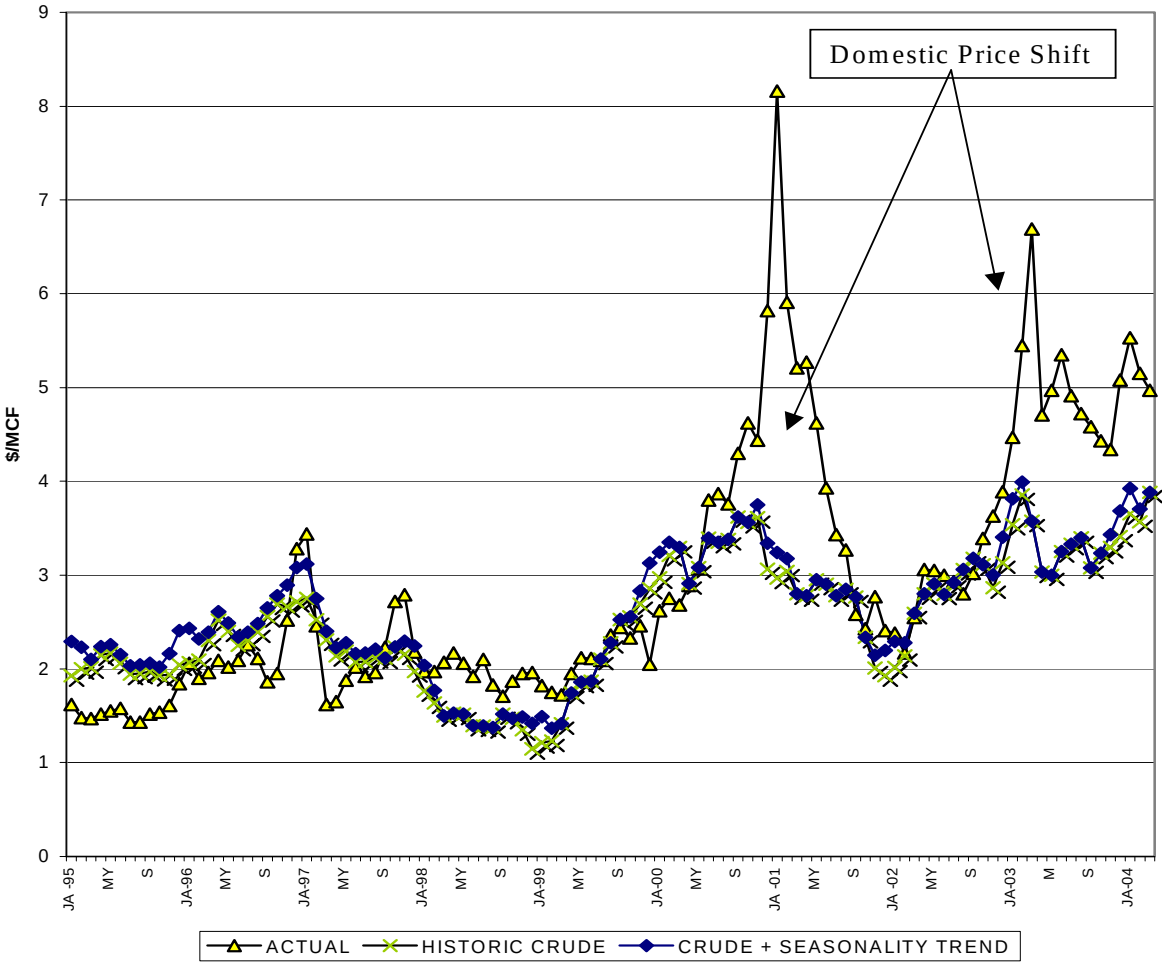
Exhibit II-3: Domestic Gasoline Spread, Actual and Projected



Source: See text for methodology, U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review, Weekly Petroleum Status Report*, various issues and database.

The picture is similar for natural gas, which is overwhelmingly produced from domestic sources (see Exhibit II-4). There was a run-up in prices in mid-2000 and a peak in early 2001, reinforcing the sense of an energy crisis. Prices tumbled during the 2001-2002 recession, but have mounted again and stabilized at over twice the level of the late 1990s. The total increase in the wellhead price of natural gas above the historic relationship to crude was about $98 billion ($99 billion compared to historic and $97.6 billion compared to trended). Of this total, about $15 billion goes to foreign suppliers of natural gas, since the U.S. imports about 15 percent of its total supply.

Exhibit II-4: Natural Gas Wellhead Prices, Actual and Projected

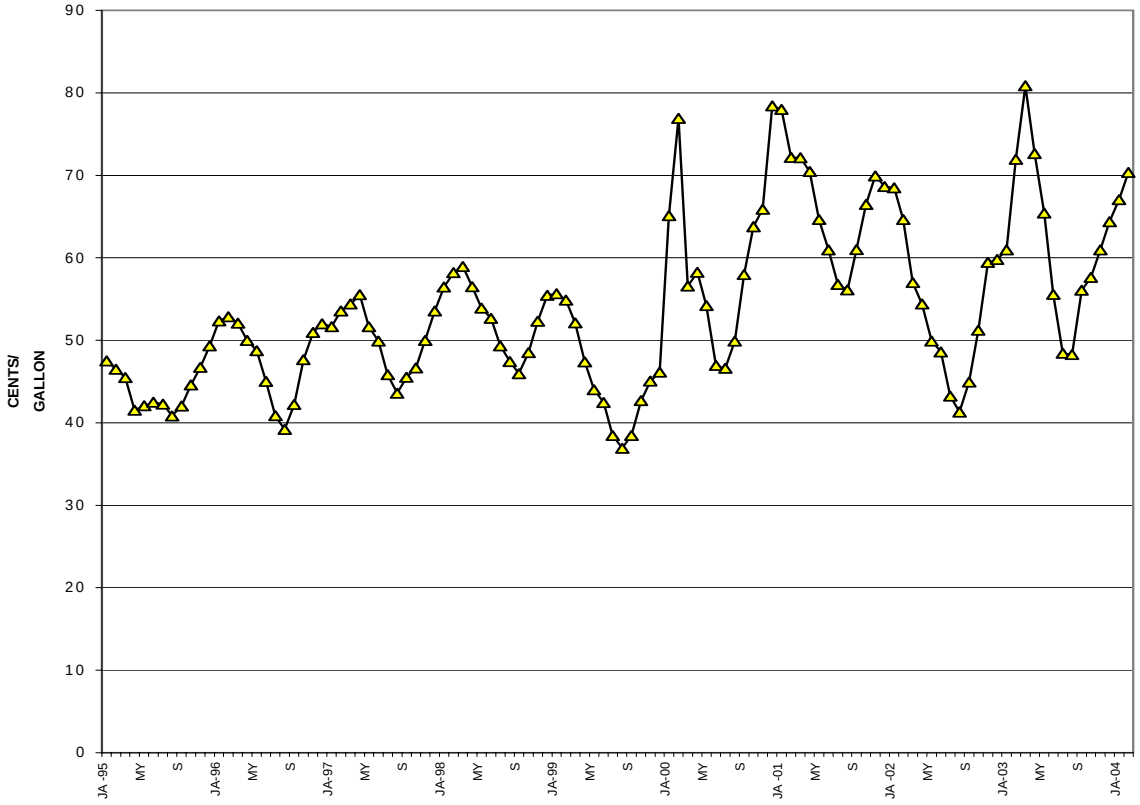


Source: See text for methodology, U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Weekly Petroleum Status Report,* various issues and database.

The domestic price shift was much larger after December 2000. The increase in the domestic spread has been much larger since 2001. The increase in 2000 averaged between $.6 billion per month (trended) and $1.0 billion per month (historic average). Since January 2001, the increase has averaged between $1 billion per month (trended) and $1.3 billion per month (historic average). Virtually all of the increase took place after wellhead prices skyrocketed in early 2001.

Exhibit II-5 shows the domestic spread on heating oil. The pattern parallels gasoline, with the winter season being the peak for the domestic heating oil spread. In the January 1995 to December 1999 period, the heating oil domestic spread varied in the narrow range of 40 cents to 60 cents per gallon and averaged 48 cents. Since January 2000 it has varied in a much

Exhibit II-5: Domestic Heating Oil Spread



Source: Energy Information Administration, *Petroleum Marketing Monthly* and *Monthly Energy Review*, various issues and database.

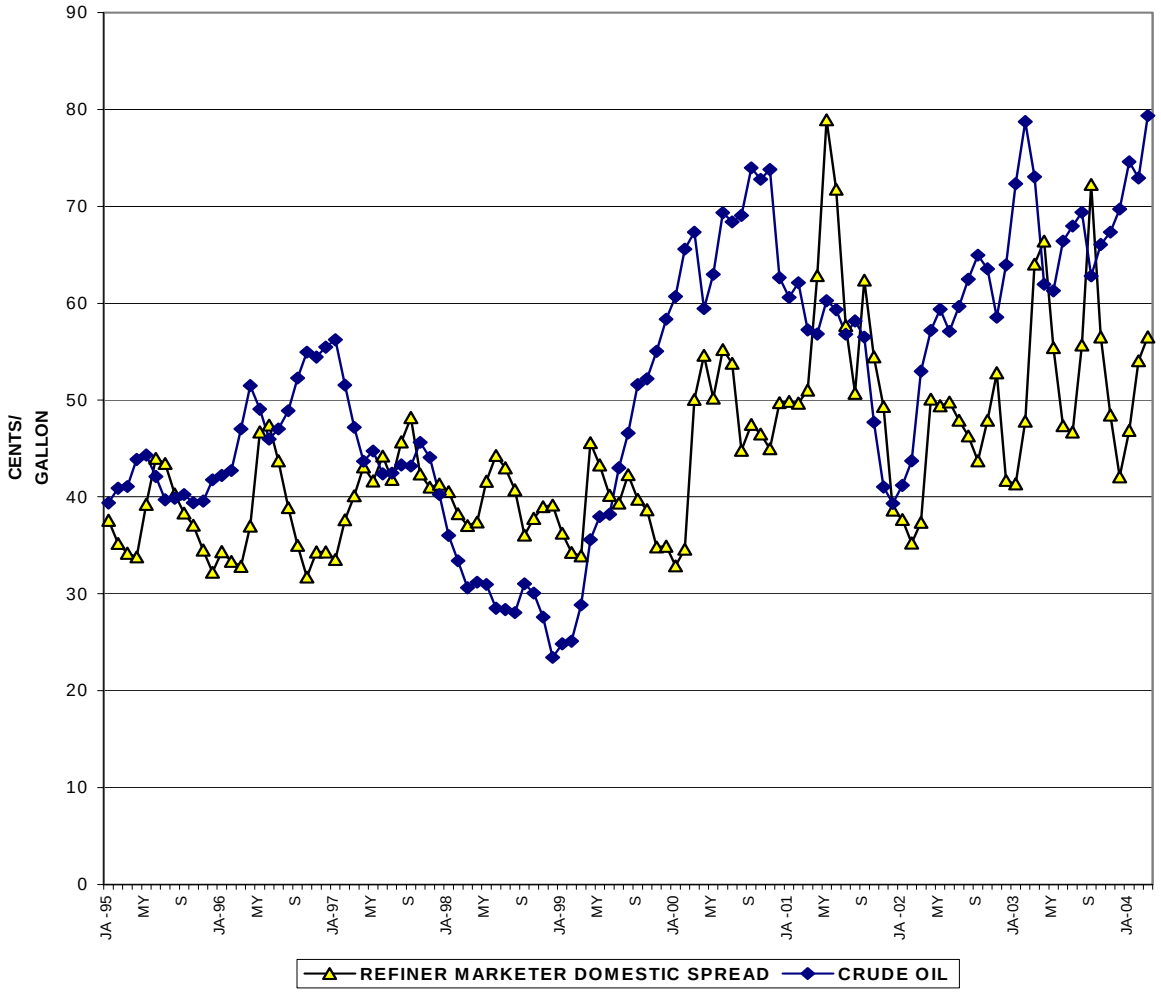
wider range (40 cents to 80 cents) and averaged 62 cents. This increased costs to consumers by $2 to $3 billion per year. The other fuel used by residential consumers – propane – exhibited a similar pattern. The spread moved up in 2000 and peaked in 2001. It moderated somewhat in 2002, but rose again and remained well above historic averages in 2003 and 2004.

The Role of Crude

Exhibit II-6 plots crude oil costs and the domestic spread on the same axes. It is interesting to note that prior to January 2000, there was virtually no relationship between the domestic spread and the price of crude. Nor is there any reason to believe that there should have been. In fact, the regression coefficient for January 1995 to January 2000 was slightly negative, though not statistically significant. After January 2000, there was a positive and statistically significant relationship. The domestic spread rose with crude prices.

Thus, the record prices we see today are the result of the combination of historic highs in both crude oil prices and the domestic spread.

Exhibit II–6: High Crude Oil Prices and High Domestic Gasoline Spreads Combine to Produce Record Prices at the Pump

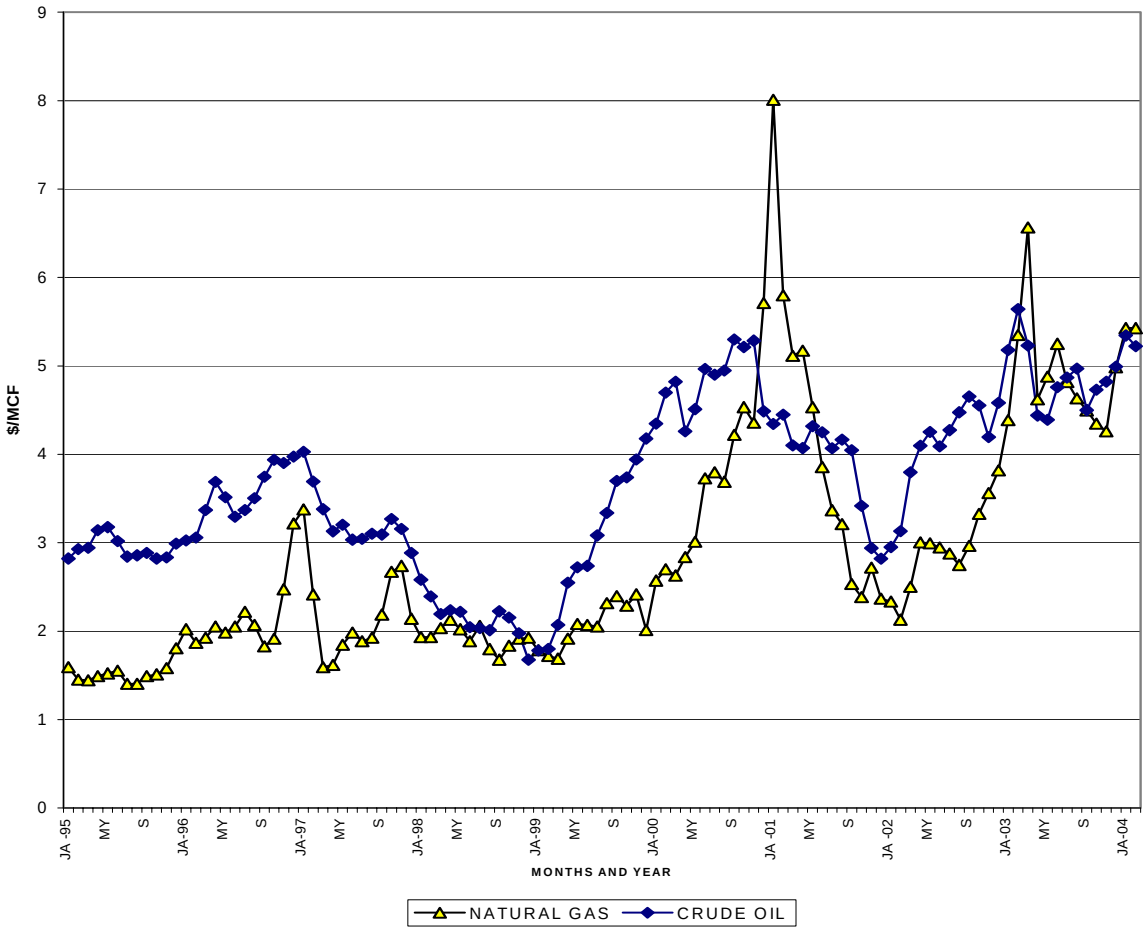


Source: U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Petroleum Marketing Monthly, Weekly Petroleum Status Report,* various issues and database.

Exhibit II-7 plots crude oil costs and natural gas wellhead prices. Again, prior to January 2000 the relationship between natural gas and crude oil prices was weak and statistically not significant. While natural gas averaged about 67 percent of crude, it did not follow the price movements of crude very closely. Since January 2000, the relationship has been larger (the regression coefficient is four times as large) and statistically significant. Since January 2000, the natural gas wellhead price has been about 90 percent of the price of crude. Since January 2001, it has been 93 percent.

It would appear that the domestic industry seized the opportunity of rising crude prices to increase their share of the delivered price of energy. In order to accomplish this, of course,

Exhibit II-7: Wellhead Price of Natural Gas and Crude Oil



Source: U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, *Weekly Petroleum Status Report*, various issues and database.

the firms in the industry had to have market power. The next section argues that the consolidation resulting from the 1997-2002 merger wave created that market power.

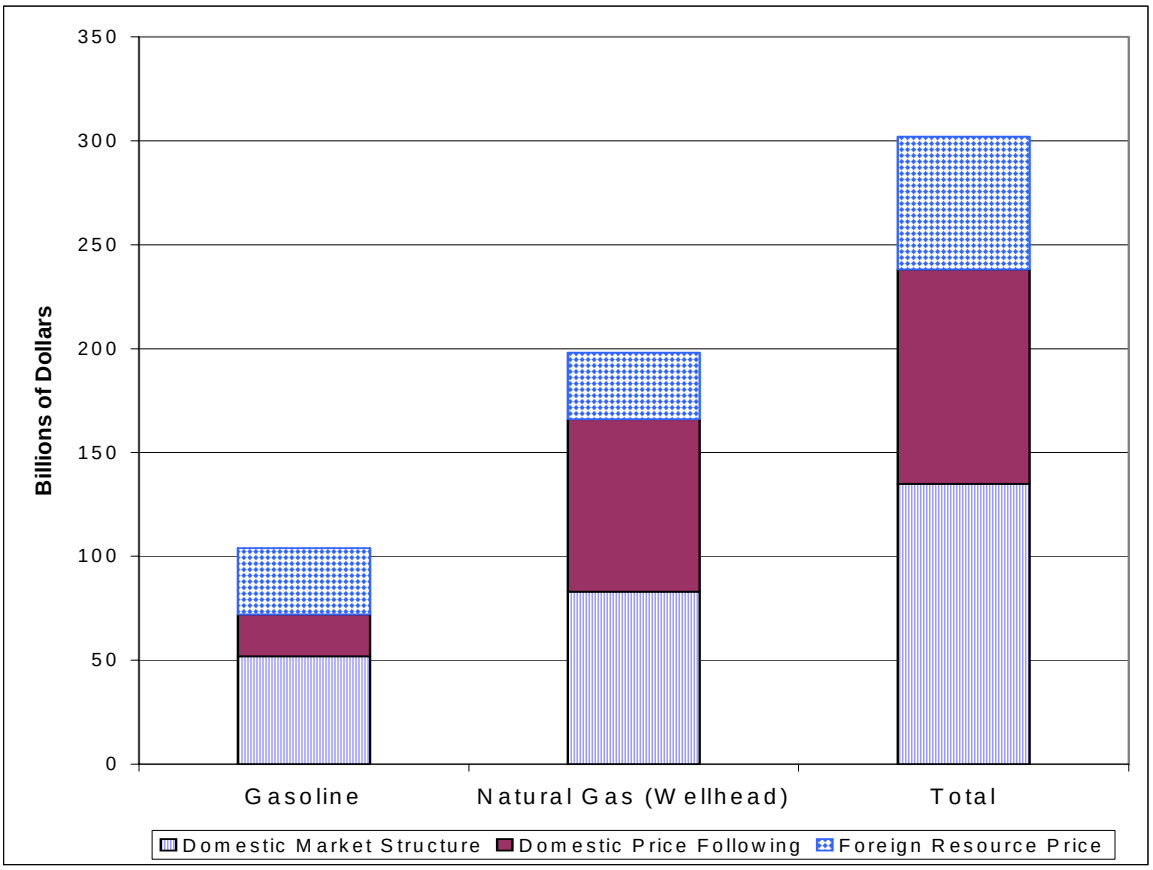
With both resource costs and domestic pricing practices leading to price increases, care must be exercised in estimating the various components of recent price increases. As with the discussion of the domestic causes of the price increases, how much is attributed to foreign resource prices and how much to domestic factors depends on how far back we look and how we calculate the baseline. Moreover, it is important to separate out domestic price following behavior from the market structure changes described above.

When international prices go up, Americans pay more to foreign producers of energy resources. To the extent that the price of domestic raw materials follows the international price up, consumers also pay more to domestic producers of energy resources. When the

domestic price of crude follows the foreign price of crude ("price following"), the increase ends up in the pockets of domestic resource owners. In one sense, the complaints of the large industrial consumers who are losing business to foreign firms or shifting their operations to overseas locations that have not suffered natural gas price increases, remind us that all prices do not follow international prices, penny-for-penny. Domestic market conditions affect how prices follow. When the domestic price rises more than the foreign price or change their relationship to the final price, because of increases in the domestic spread or a shift in natural gas pricing behavior, that is a "domestic price shift."

If we use January 1995 to December 1999 as the base period, as was done above, the average price of crude was $17.40 per barrel. The total increase in the cost of crude oil as an input for gasoline since December 1999 would be approximately $49 billion (see Exhibit II-8). This should be compared to the estimate based on the historic average prices since it is based on the same average historic cost approach. The domestic price shift ($63 billion) is larger than the crude increase. Of the total increase in crude costs of $49 billion, about $20

Exhibit II-8: Domestic and Foreign Causes of Recent Price Increases (Base Crude Cost = $17.40)



Source: See text for calculations.

billion went to domestic crude producers. Combining market structure changes and domestic price following, we find that 75 percent of the total ($83 billion) went to domestic companies.

Applying the same crude oil price assumptions to natural gas, we find an increase of about $98 billion, equal to the increase we have estimated for the domestic shift. Approximately 85 percent went to domestic companies.

Combining these two estimates, we conclude that of the $310 billion increase, approximately 45 percent was caused by the domestic price shift and 34 percent by domestic price following. Thus, of the total, 79 percent went to domestic companies and 21 percent went to foreign energy suppliers.

Although the above approach is consistent with the overall analysis, it is possible to construct other scenarios in which the raw material costs play a larger role. For example, one might take as the base price the lowest price of crude in the post-January 2000 period (less than $16.50 per barrel), which occurred in December 2001. The domestic spread was at the historic level. Natural gas was close to its historic level. Since then, crude oil prices have increased dramatically. The domestic spread has increased as well. Natural gas prices have stayed much closer to crude prices than they did historically. Taking this view, the total dollar increase is smaller (about $239 billion), but occurred over a shorter period of time. The domestic share of the increase is smaller, about 72 percent. The most important part of the increase in this view is price following, at 43 percent of the total, rather than the market structural changes, at 29 percent of the total.

The bottom line is clear. The domestic price shifts are important under any scenario. The domestic share of the total, combining domestic price shifts and price following, are dominant. Foreign crude price changes are certainly also important.

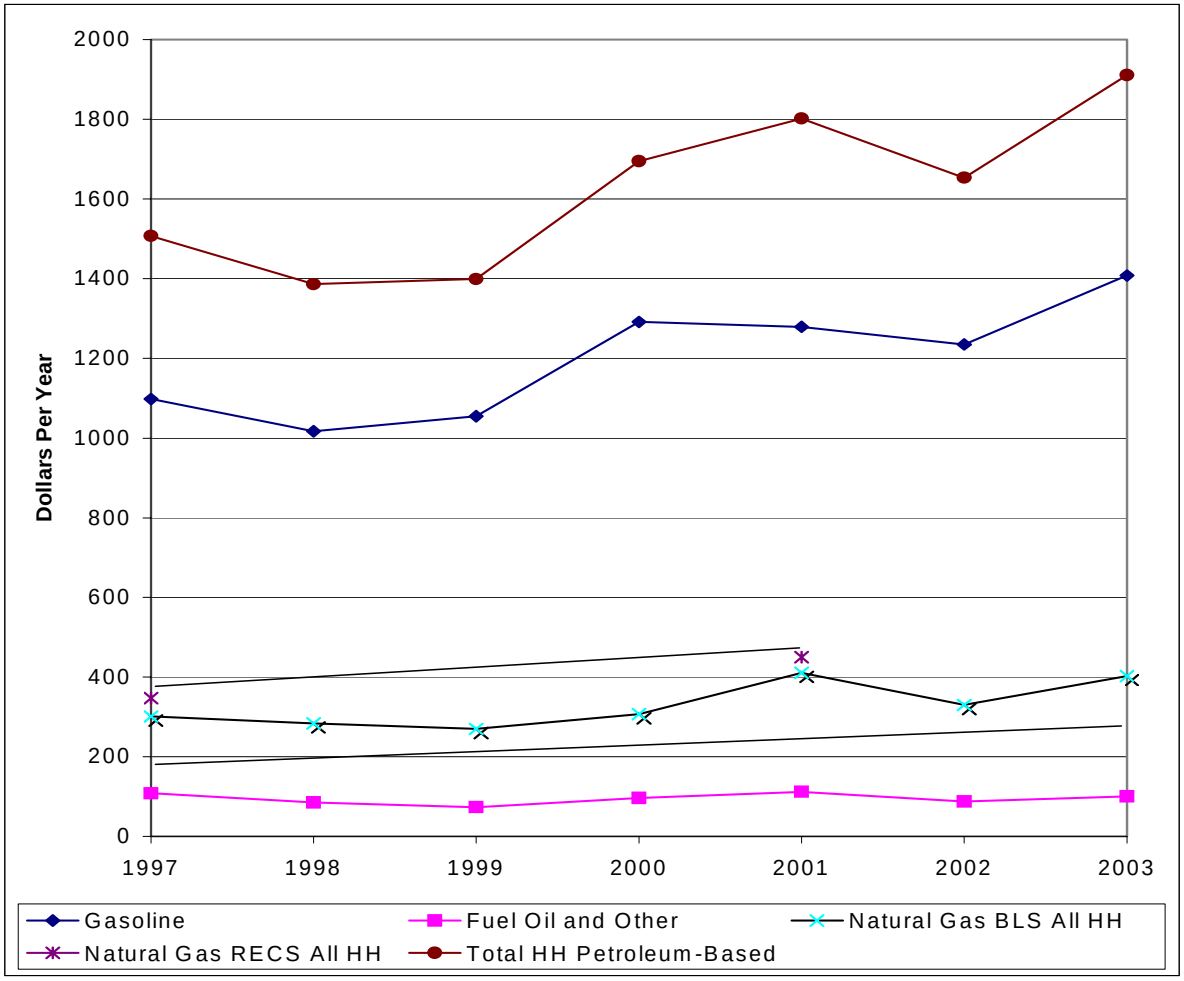
HOUSEHOLD IMPACTS

Part of the increase in energy prices is paid by businesses. They may seek to recover these cost increases from consumers in the prices of goods and services they sell. However, a substantial part of the energy price increases are paid directly by consumers for their household energy costs – gasoline and heating oil, natural gas, for heating, cooking and hot water, and electricity, which is increasingly produced with natural gas.

The average price increase for gasoline was over $.30 per gallon, or over 25 percent. The average price increase at the wellhead was $2.10 per MCF, or over 30 percent of the delivered price to residential consumers.

Taken together, in 1999, household expenditures for gasoline, heating oil and natural gas accounted for about $1400 per year of total household expenditures as reported by the Bureau of Labor Statistics Consumer Expenditure Survey (see Exhibit II-9).[20] This is the average for all households, which includes households that do not own cars and “all electric residences” that use none of these fuels, as well as some that only use gas for cooking, but not

Exhibit II-9: Household Energy Expenditures



Sources: Bureau of Labor Statistics, *Consumer Expenditures*, various years; Energy Information Administration, *Residential Energy Consumption Surveys*, 1997, 2001.

heating. On average, price increases over the past four years associated with the price shock for these residential items added about $350 per household per year (including all factors). Thus, domestic energy price shocks have increased household energy bills by 25 percent. The comparison between 1999 and 2003 is even more dramatic, a $500 increase which represents a jump of over 35 percent.

Thus, not only is the figure large, but also it imposes a substantial direct and indirect burden on residential consumers. Large industrial consumers of natural gas have suffered severe disruptions, plant shut downs and job losses.

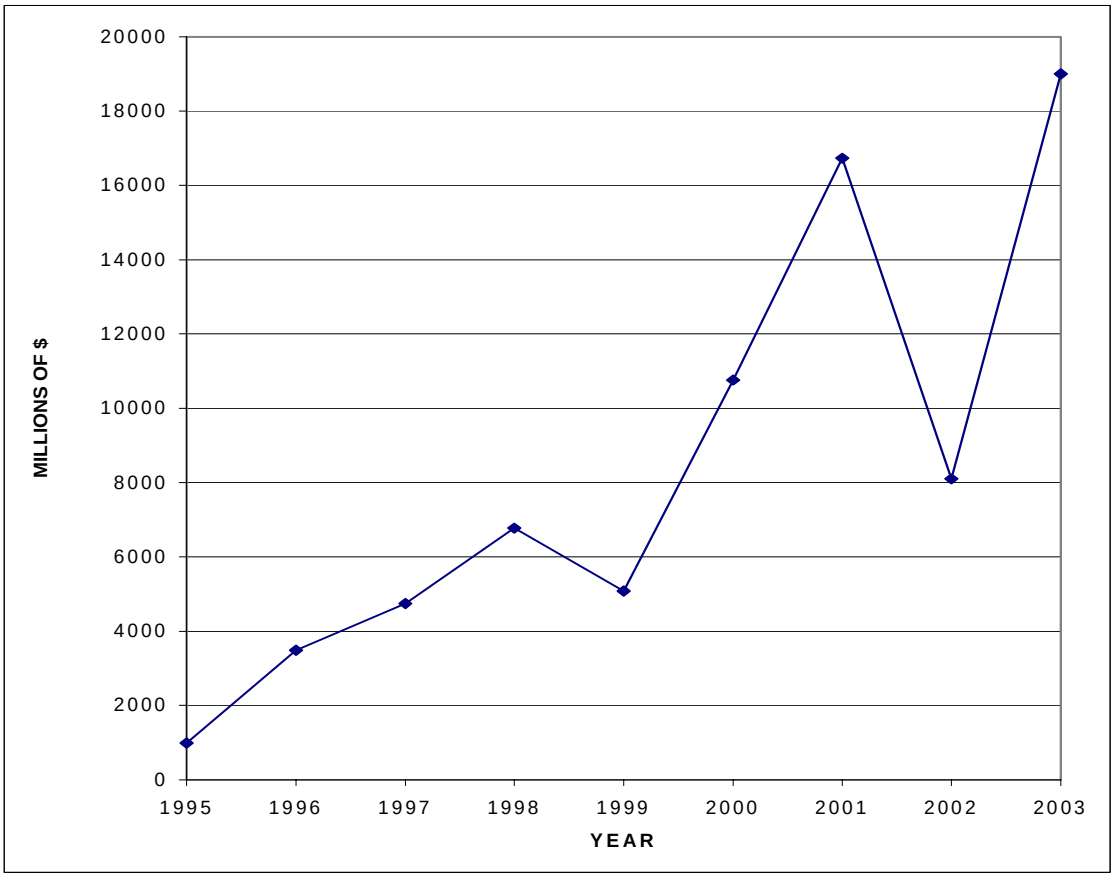
PROFITING FROM PRICE INCREASES IN CONCENTRATED MARKETS

If price increases are not caused by cost increases, they result in profit increases. Thus, after price, the second important indicator to which economic analysts look for signs of the exercise of market power and market failure is profits.

Tracking profits from publicly available sources is difficult because some of the companies do not break out domestic operations, while mergers make long term trends difficult to see and the allocation of one-time charges to specific lines of business are frequently not identified.[21] Very recent data gathered by the Department of Energy are not available, but general filings from the Securities and Exchange Commission are.

The bottom line for the domestic downstream industry, literally and figuratively, was a sharp run up in oil company profits from refining and marketing in 2000 and 2001 (see Exhibit II-10). Net operating income (income before special items and taxes) tripled from

Exhibit II-9: Refining/Marketing Net Operating Income



Source: Energy Information Administration, *Performance Profiles of Major Energy Producers: 1999* (Washington, D.C.: January 2001); *Performance Profiles of Major energy Producers: 2001* (Washington, D.C.: January 2003); *Performance Profiles of Major Energy Producers: 2002* (Washington, D.C.: February 2004).

1997-1999 to 2001. While profits were down in 2002, due to very low prices early in the year as a result of the severe economic downturn and travel slowdown following September 11, they were still just above the levels of the late 1990s. They have skyrocketed since.

It should be noted that although 1999 was a slightly below average year, 2000 was an extremely good year. *Fortune* reported return on equity of 25 percent for the petroleum industry in 2000,[22] while *Business Week* reported 22 percent.[23] This was almost twice the historic average for the industry and about 50 percent more than other large corporations achieved.[24] The extremely high profits for 2001 were not sustainable in the face of the weak economy of early 2002. Prices declined and profits fell early in 2002. By the end of 2002, profits had increased dramatically. The sharp price increases in 2003 produced another year of record high profits.[25]

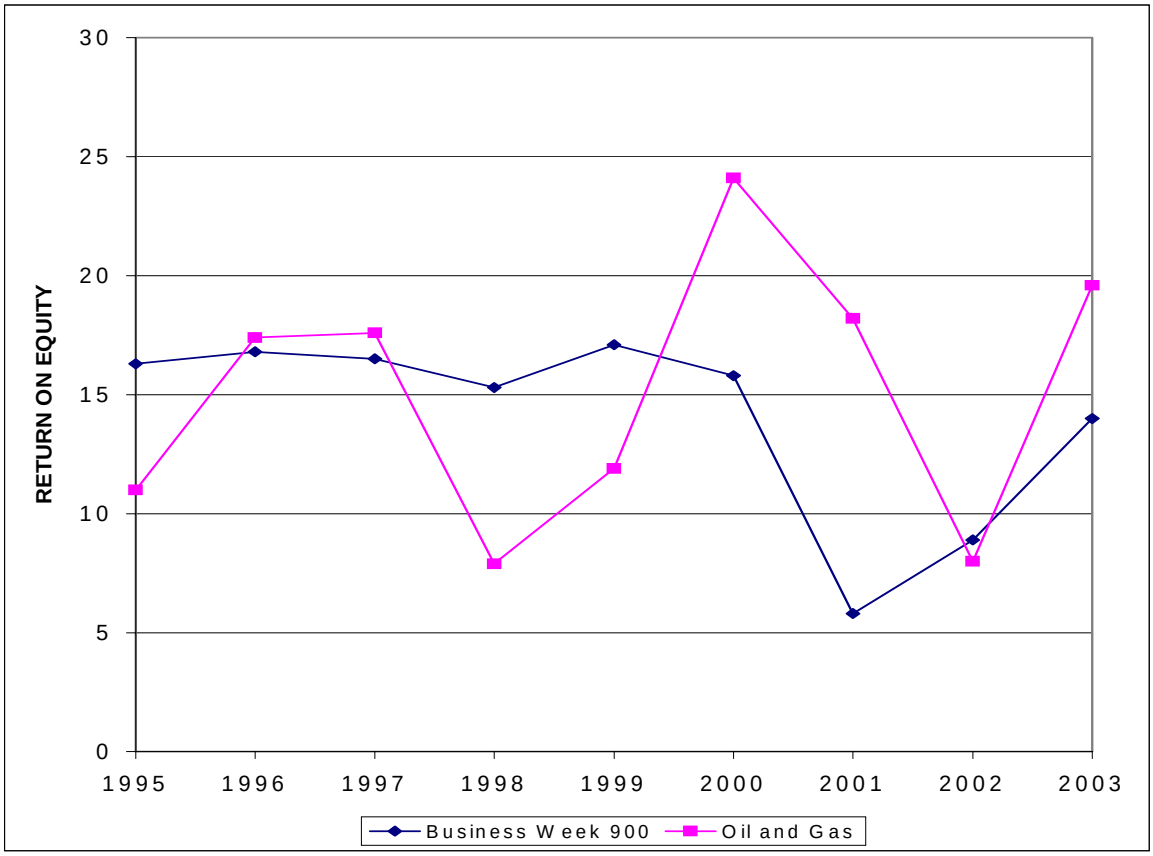
These profits are continuing. Although 2003 was a record year for both downstream operations and total industry profits, the first quarter of 2004 saw large increases in profits, especially in downstream operations. Including BP, which does not break out domestic U.S. operations, downstream profits were up 35 percent, while upstream profits were flat and total industry profits were up 17 percent. If we examine only domestic U.S. operations for companies that have both upstream and downstream operations, we find that downstream, domestic U.S. sector profits increased over 50 percent, while domestic upstream U.S. profits increased just under 10 percent. If the primary problem were foreign owners of energy resources pushing up the price, profit margins on domestic downstream operations would not be soaring.

If we compare the annual after-tax profits of the companies listed by *Business Week* in the oil and gas industry in the first four years of the new millennium to the last five years of the 1990s, we find a huge increase in profits (see Exhibit II-11). After-tax profits increased by over $50 billion, the equivalent of about $75 billion in pre-tax dollars. Exhibit II-8 is based only on the companies included in the *Business Week* survey, which account for less than half of all domestic natural gas and crude oil production and about 80 percent of all refinery capacity. Thus, on an industry-wide basis, the increase in after-tax profits in the 2000-2003 period could be as high as $80 billion. Before taxes, the figure could be as much as $110 billion. In all likelihood, that number will grow dramatically in 2004.

III. THE CAUSES OF DOMESTIC PRICE SHOCKS

To what can we attribute the dramatic shift in domestic pricing behavior? This chapter argues that concentration in the industry created the conditions for the exercise of market power over price by the petroleum industry. That concentration was the result of lax antitrust law enforcement by both the Clinton and Bush Administrations. They allowed too many mergers because they did not take the unique characteristics of the energy industry into account. There are indications that the Clinton Administration began to recognize the mistake

Exhibit II-10: Return on Equity: Oil and Gas Companies



Source: *Business Week 900*, annual results.

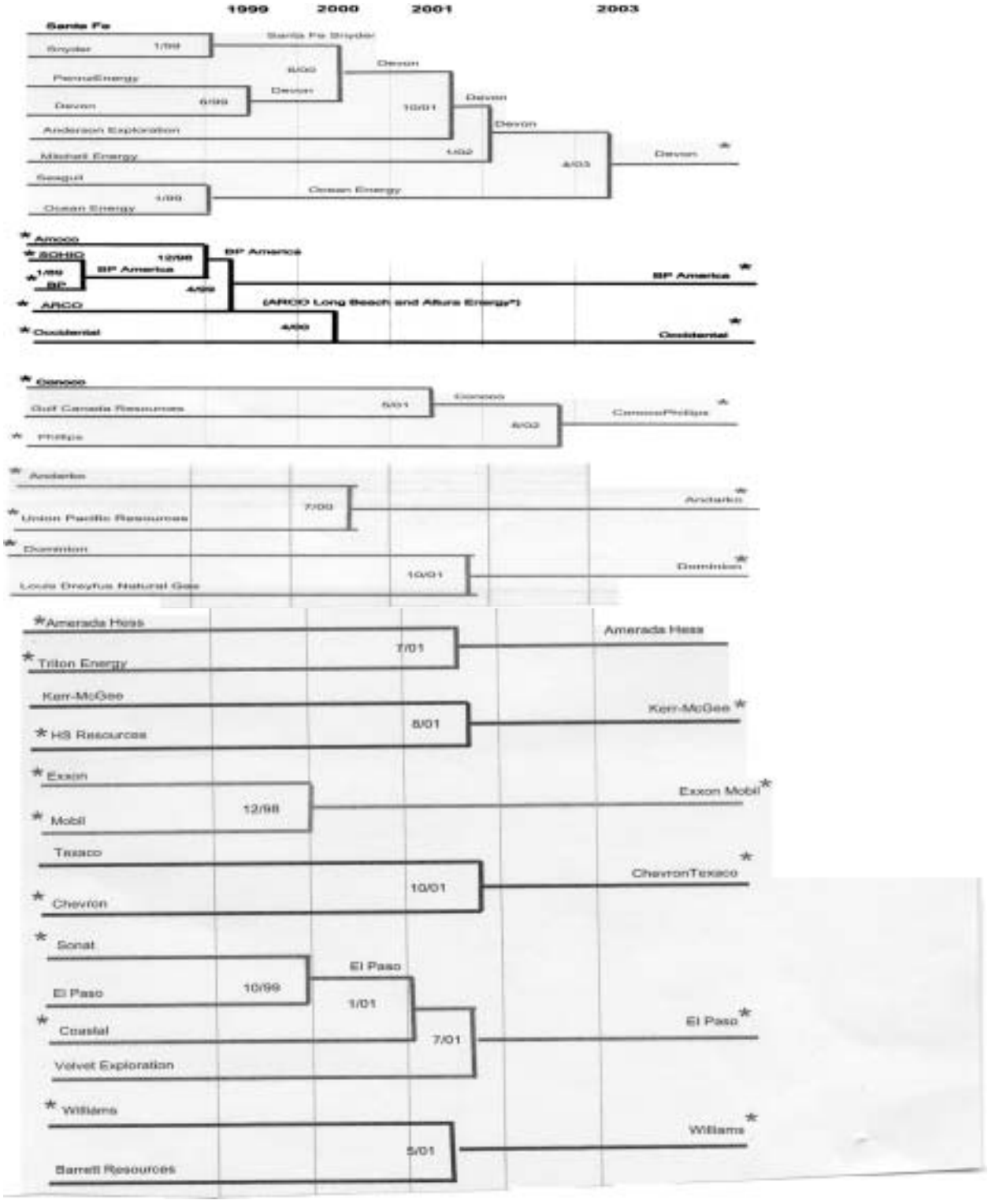
in allowing industry structure to become so concentrated and began to criticize the industry and take steps against it. Thereafter, the Bush Administration was much more friendly to the industry and showed little inclination to criticize it, not to mention to take steps to reign in its market power. A price explosion followed.

THE MERGER WAVE

It was becoming obvious in mid-2000 was that the industry was becoming sufficiently concentrated in several parts of the country that competitive market forces were weak. The problem afflicts both the production of oil and gas and the downstream operations of the oil industry.

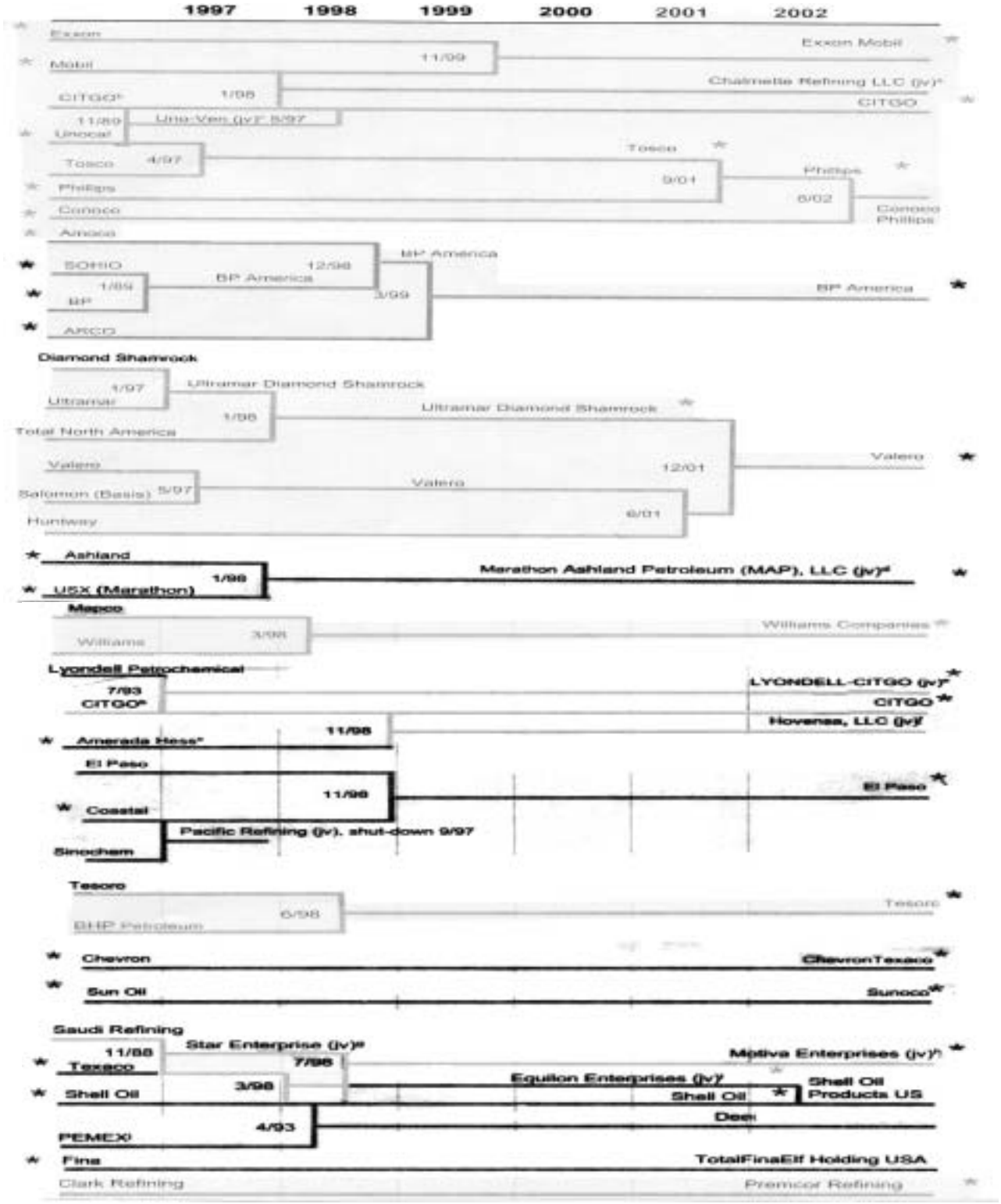
The Department of Energy analyzes major U.S.-based energy producing companies in a program called the Federal Reporting System (FRS). Tracking the "Recent Mergers Affecting Oil and Gas Producers," the FRS report identified a total of 34 companies that merged into 13 (see Exhibit III-1) from 1997 to 2002.[26] The previous year, the report identified 15 refining companies that had shrunk to seven (see Exhibit III-2).[27]

Exhibit III-1: Recent Mergers Affecting Frs Oil And Gas Producers



Source: Energy Information Administration, *Performance Profiles of Major energy Producers: 2002* (Washington, D.C.: February 2004), p. 20.

Exhibit III-2: Genealogy Of The 2001 FRS Refiners



Source: Energy Information Administration, *Performance Profiles of Major energy Producers: 2001* (Washington, D.C.: January 2003), p. 78.

Of the 31 companies listed in the sector by *Business Week* in 1995, 21 engaged in mergers with other companies between 1997 and 2002. Of the 21 listed by *Business Week* in 2003, 15 had engaged in mergers in the previous five years. Almost all of the mergers involved large companies that had previously been listed in the sector. The big got bigger and domestic prices started ratcheting up soon thereafter.

Exercising Market Power Over Price

With increasing concentration, long-term strategic decisions by the industry about production capacity interact with short-term (mis)management of stocks to create a tight supply situation that provides ample opportunities to push prices up quickly. Because there are few firms in the market and because consumers cannot easily cut back on energy consumption, prices hold above competitive levels for significant periods of time.

The problem is not a conspiracy, but the self-interested action of large companies with market power. With weak competitive market forces and high barriers to entry, individual companies have flexibility for strategic actions that raise prices and profits.[28]

- Individual companies can let supplies become tight in their area and keep stocks low, since there are few competitors who might counter this strategy.
- Companies can simply push prices up when demand increases because they have no fear that competitors will not raise prices to steal customers.
- Individual companies do not feel compelled to quickly increase supplies with imports, because their control of refining and distribution ensures that competitors will not be able to deliver supplies to the market in their area.
- Because there are so few suppliers and capacity is so tight, it is easy to keep track of potential threats to this profit-maximizing strategy.
- Every accident or blip in the market triggers a price shock and leads to increased profits.
- Moreover, operating the complex system at very high levels of capacity places strains on the physical infrastructure and renders it susceptible to accidents.

It has become evident that stocks of product are the key variable that determines price shocks.[29] In other words, stocks are not only the key variable; they are also a strategic variable. The industry does a miserable job of managing stocks and supplying product from the consumer point of view. Policymakers have done nothing to force them to do a better job.

If the industry were vigorously competitive, each firm would have to worry a great deal more about being caught with short supplies or inadequate capacity and would hesitate to

raise prices for fear of losing sales to competitors. Oil companies do not behave this way because they have power over price and can control supply. The capacity and stocks of product on hand are no longer dictated by market forces, they can be manipulated by the oil industry oligopoly to maximize profits.

A March 2001 FTC report, authored by Chairman Robert Pitofsky in response to the first post-2000 price spike, noted that by withholding supply, industry was able to drive prices up, and thereby maximize profits.[30] The FTC identified the complex factors in the spike and issued a warning:

> The spike appears to have been caused by a mixture of structural and operating decisions made previously (high capacity utilization, low inventory levels, the choice of ethanol as an oxygenate), unexpected occurrences (pipeline breaks, production difficulties), errors by refiners in forecasting industry supply (misestimating supply, slow reactions), and decisions by firms to maximize their profits (curtailing production, keeping available supply off the market). The damage was ultimately limited by the ability of the industry to respond to the price spike within three or four weeks with increased supply of products. However, if the problem was short-term, so too was the resolution, and similar price spikes are capable of replication. Unless gasoline demand abates or refining capacity grows, price spikes are likely to occur in the future in the Midwest and other areas of the country.[31]

A 2003 RAND study of the refinery sector reaffirmed the importance of the decisions to restrict supply. It pointed out a change in attitude in the industry, wherein "[i]ncreasing capacity and output to gain market share or to offset the cost of regulatory upgrades is now frowned upon."[32] In its place we find a "more discriminating approach to investment and supplying the market that emphasized maximizing margins and returns on investment rather than product output or market share."[33] The central tactic is to allow markets to become tight by "relying on… existing plant and equipment to the greatest possible extent, even if that ultimately meant curtailing output of certain refined product."[34]

> Indeed, many Rand discussants openly questioned the once-universal imperative of a refinery not "going short" – that is not having enough product to meet market demand. Rather than investing in and operating refineries to ensure that markets are fully supplied all the time, refiners suggested that they were focusing first on ensuring that their branded retailers are adequately supplied by curtailing sales to wholesale markets if needed.[35]

The RAND study drew a direct link between long-term structural changes and the behavioral changes in the industry, drawing the connection between business strategies to increase profitability and pricing volatility. It issued the same warning that the FTC had offered two years earlier:

> For operating companies, the elimination of excess capacity represents a significant business accomplishment: low profits in the 1980s and 1990s were blamed in part on overcapacity in the sector. Since the mid-1990s, economic performance industry-wide has recovered and reached record levels in 2001. On the other hand, for consumers, the elimination of spare capacity generates upward pressure on prices at the pump and produces short-term market vulnerabilities. Disruptions in refinery operations resulting from scheduled maintenance and overhauls or unscheduled breakdowns are more likely to lead to acute (i.e., measured in weeks) supply shortfalls and price spikes.[36]

The structural conditions in the domestic gasoline industry have only gotten worse as demand continues to grow and mergers have been consummated. The increases in prices and industry profits should come as no surprise. The spikes in the refiner and marketer take at the pump in 2002, 2003, and early 2004 were larger than the 2000 spike that was studied by the FTC. The weeks of elevated prices now stretch into months. The market does not correct itself. The roller coaster has become a ratchet.

Increases in natural gas wellhead prices follow a similar pattern. The increases in mid-2000 were small compared to the much larger increases in 2001, 2003 and 2004. The combination of structural changes and business strategies has cost consumers hundreds of billions of dollars.

GASOLINE SUPPLY

There are two clearly identifiable trends affecting the supply side of the gasoline market – a reduction in capacity relative to demand and an increase in concentration. These trends result from the business decisions of oil companies. Even the National Energy Policy Development Group recognized that the reduction in capacity was the result of business decisions of oil companies. Government did not choose to close refineries and carry much lower stocks, private businesses did.[37]

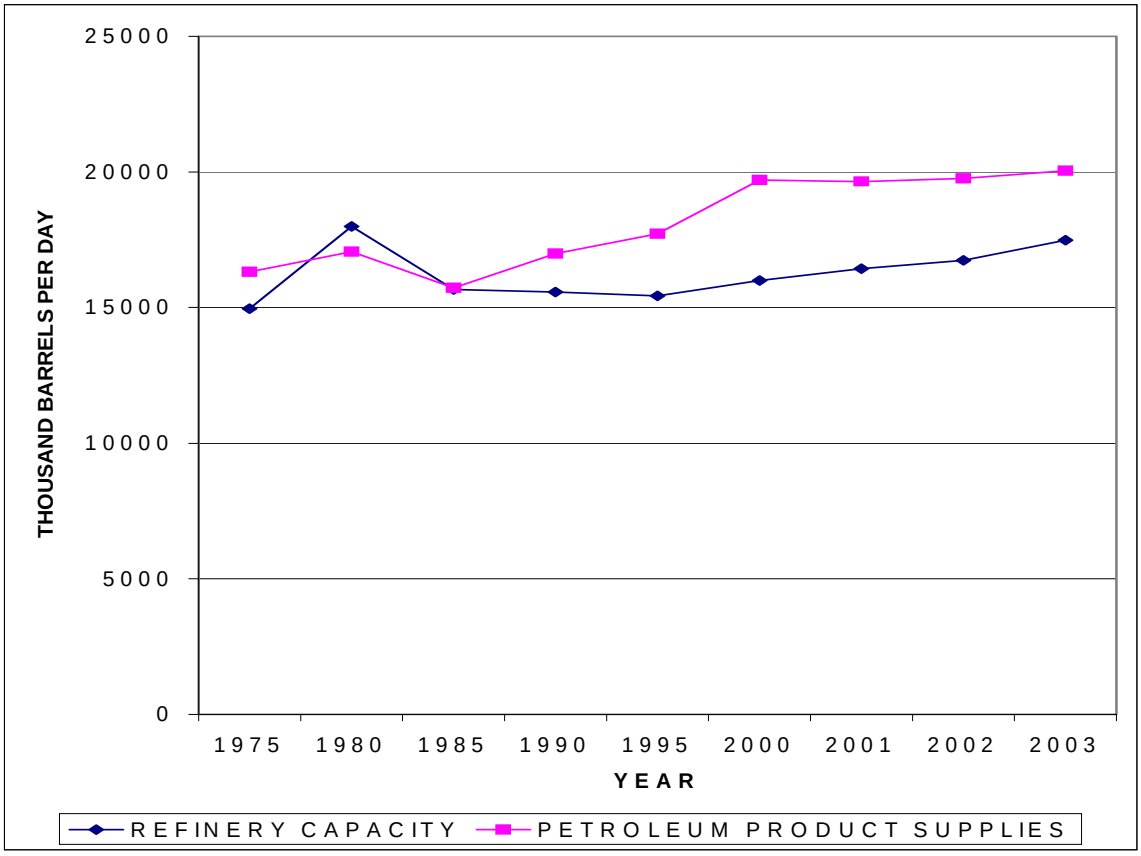
> Ongoing industry consolidation, in an effort to improve profitability, inevitably leads to the sale or closure of redundant facilities by the new combined ownership. This has been particularly true of terminal facilities, which can lead to reductions in inventory and system flexibility. While excess capacity may have deterred some new capacity investments in the past, more recently other factors, such as regulations, have deterred investment.[38]

The prominent role of business decisions in reducing capacity raises the concern that these decisions are intended to reduce competitive market forces and secure market power for major industry players. While mergers and acquisitions or facility closings are nominally justified by claims of efficiency gains,[39] they have a real economic effect of reducing competition.

Documents from the mid-1990s indicate that industry officials and corporate officers were concerned about how to reduce capacity, with observations such as "if the U.S. petroleum industry doesn't reduce its refining capacity, it will never see any substantial increase in refinery profits," from a Chevron Corporation document written in November 1995. A Texaco official, in a March 1996 memorandum, said refinery overcapacity was "the most critical factor" facing the industry and was responsible for "very poor refining financial results."[40]

With oil companies merging and eliminating "redundant" capacity, it should not be surprising to find that capacity has not kept up. Refinery capacity has not expanded to keep up with the growth in demand. Exhibit III-3 shows the relationship between refinery output and demand. In 1985, refinery capacity equaled daily consumption of petroleum products. By 2002, daily consumption exceeded refinery capacity by almost 20 percent.

Exhibit III-3: Refinery Capacity and Product Supplied

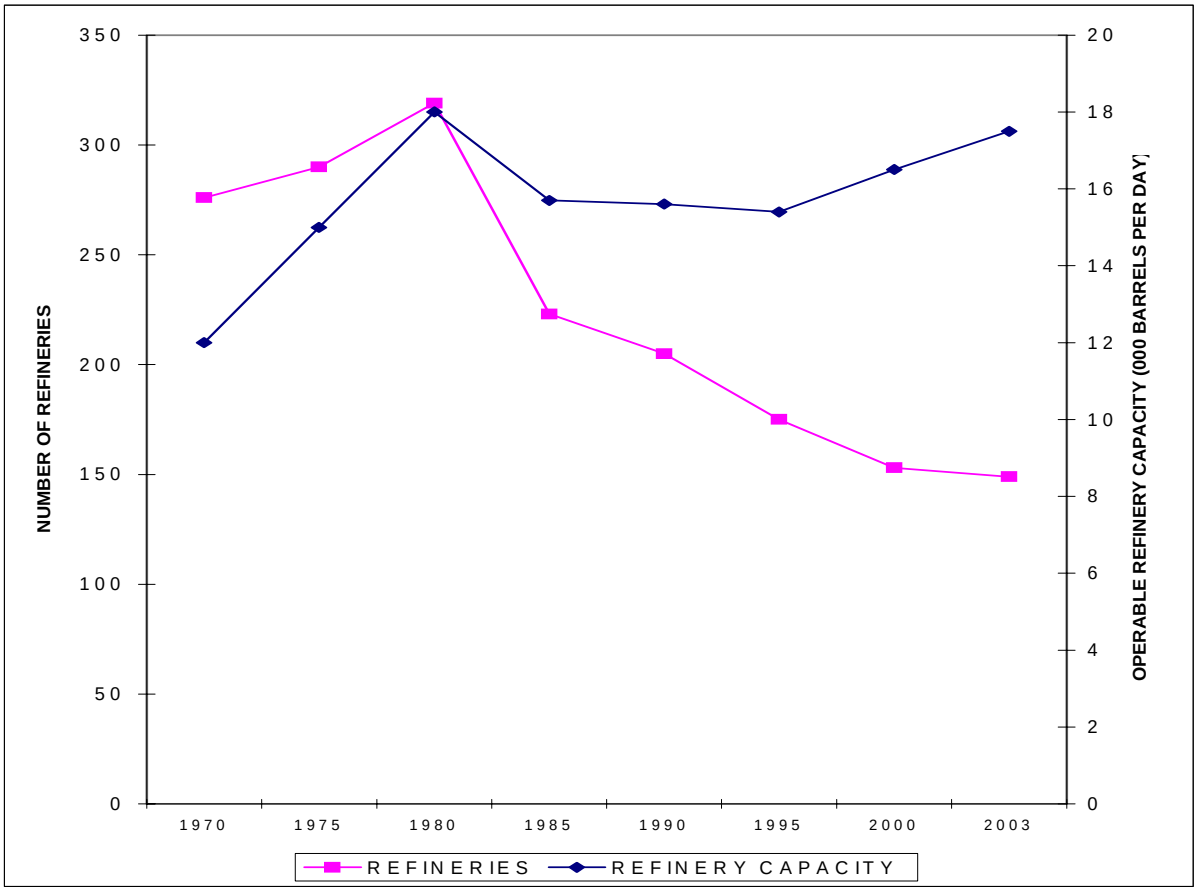


Source: U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Annual*, various issues, Tables S1, 36; *Weekly Petroleum Status Report*, various issues.

In the early1980s, a public policy providing support for small refineries was terminated. This accounted for the loss of about 100 refineries between 1980 and 1985 (See Exhibit III-4). Since then, scores of other refineries have been shut down. Government did not close refineries, private businesses did. In the 1990s alone, approximately 50 refineries were closed. Since 1995, over 20 refineries have been shut down. The number of operating refineries has been reduced by 13 percent since 1995. The refineries get larger, but smaller in number and are owned by fewer and fewer entities. Over the last two decades of the twentieth century, the number of firms engaged in refining in the United States declined by two-thirds.[41]

Once these trends become clear, the complaint that no new refineries have been built in recent years loses its compelling public policy impact.[42] Similarly, blaming the decline of capacity relative to demand on the Clean Air Act does not stand close scrutiny. Consolidation of the refinery industry is a business decision that began long before changes in the Clean Air Act amendments of 1990 and continued after the adjustment to changes in gasoline formulation.

Exhibit III-4: Refineries and Refinery Capacity



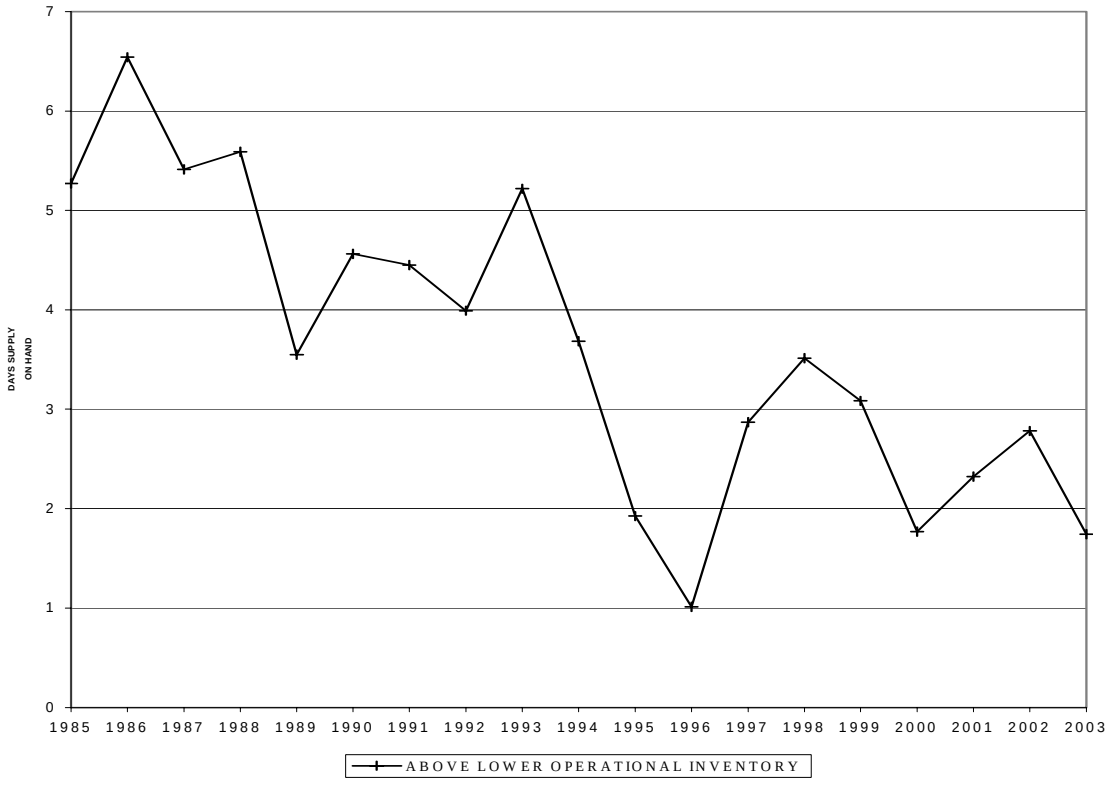
Source: U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Annual*, various issues, Tables S1, 36.

Decisions about stockpiling of product is a business decision. Exhibit III-5 shows the relationship between stocks and demand for gasoline. Stocks are measured as the number of days of demand for gasoline held in storage. The exhibit shows that the amount of stock above what is considered the lower operational inventory has declined. Because of the nature of operations of gasoline delivery systems, a certain level of stock is needed to keep the system running in real time (the lower operational level).[43] Operations are subject to disruption should stocks fall below this level.[44] It is the stocks above this level that are available to respond to shifts in demand or price. The reserves above the lower operational inventory level have declined to very low levels. They generally are in the range of a couple of days, compared to four or five days in the early 1990s and over a week in the 1980s.

Every investigation of every product price spike in the past several years points to "unusually low stock" as a primary driver.[45] But stock levels are no accident; they are the result of business decisions.

In analyzing the Midwest price spike of 2000, the Department of Energy again found stocks to be the culprit, starting an analysis entitled *Supply of Chicago/Milwaukee Gasoline Spring 2000* as follows:

Exhibit III-5: Gasoline Stocks On Hand



Source: U. S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, various issues and database.

> This summer's run-up in Midwest gasoline prices, like other recent price spikes, stemmed from a number of factors. The stage was set for gasoline volatility as a result of tight crude oil supplies, which led to low product stocks and relatively high crude oil prices. With little stock cushion to absorb unexpected events, Midwest gasoline prices surged when a number of supply problems developed, including pipeline and refinery supply problems, and an unexpectedly difficult transition to summer-grade Phase II reformulated gasoline.[46]

In explaining the early spring price run-up in 2001, inventories were the starting point: "Low petroleum inventories set the stage for our current situation, as they did last year both for heating oil and for gasoline."[47]

After the recession of 2001/2002, industry experts and Department of Energy officials again had to wring their hands in 2003 about tight supplies, refineries that are running at capacity and difficult transitions to new fuels, but deny any wrongdoing.[48] The explanations they offer are more like excuses than analysis. For example, the following excerpt from the Energy Information Administration *Summer 2003 Motor Gasoline Outlook* gives a flavor of the effort to gloss over fundamental problems:

> This summer, motor gasoline markets are expected to be tighter than last summer. Total spreads (retail price, excluding taxes, minus crude oil prices) are expected to average 55 cents per gallon compared to 41 cents per gallon in 2002. This results primarily from higher refinery utilization brought about by the increase in demand combined with low beginning-of-season inventory levels. But the projected spread is less than the 58 cents observed in the summer of 2001, when stocks were at record low levels and the Midwest suffered from ethanol-related blending problems.[49]

The EIA tried to soften the blow of a very high spread by comparing it to the astronomical level of 2001, rather than the level of 2002, which was itself significantly higher than the 1995-1999 average. The summer did not go as the EIA expected. The only thing that seems to be predictable is that we will not have enough stocks on hand to deal with the inevitable accidents and incidents that seem to drive up prices.

The tight supply-demand balance that results from industry decisions to close refineries may also contribute directly to the occurrence of accidents. The extremely high capacity utilization that creates high levels of profit also puts additional stress on equipment.[50]

Over the course of the last decade, the number of gasoline stations has declined as well, while the number of vehicles that need to be supported has grown. The number of gasoline stations has declined by 16 percent, from 210 thousand to 176 thousand. The number of motor vehicles has increased by 11 percent, from 189 million to 210 million. As a consequence, the number of motor vehicles per station has increased by 32 percent. Each station pumps more gas, but there are fewer competitors.

NATURAL GAS SUPPLY

Behavior patterns in natural gas raise similar concerns. They cast doubt on the recent claim of the National Petroleum Council that the perception of the natural gas resource base has suddenly changed.[51] First, as a factual matter, non-industry analysts disagree.[52] Second, to the extent that there is a change in resource recovery, it reflects business decisions made over a number of years.

The move of the majors into gas changed the nature of the sector.[53] Decisions by the majors to acquire reserves through mergers and acquisitions, rather than exploration, shifted resources.[54] Decisions about which types of wells to drill may change replacement rates.[55] Exhibit III-6 shows another coincidence that cannot be ignored. The consolidation in the industry came hand-in-hand with the shift to acquisition of resources through merger (rather than exploration) and a shift of drilling away from exploration. A couple of years later the NPC concludes that a change in the resource base is evident. Decisions about which well to produce and which well to cap, how much to inject into storage, how to use pipeline capacity and, ultimately, how to report prices are affected by business decisions.

Standard and Poor's has recently noted that this trend has continued and raised questions about it:

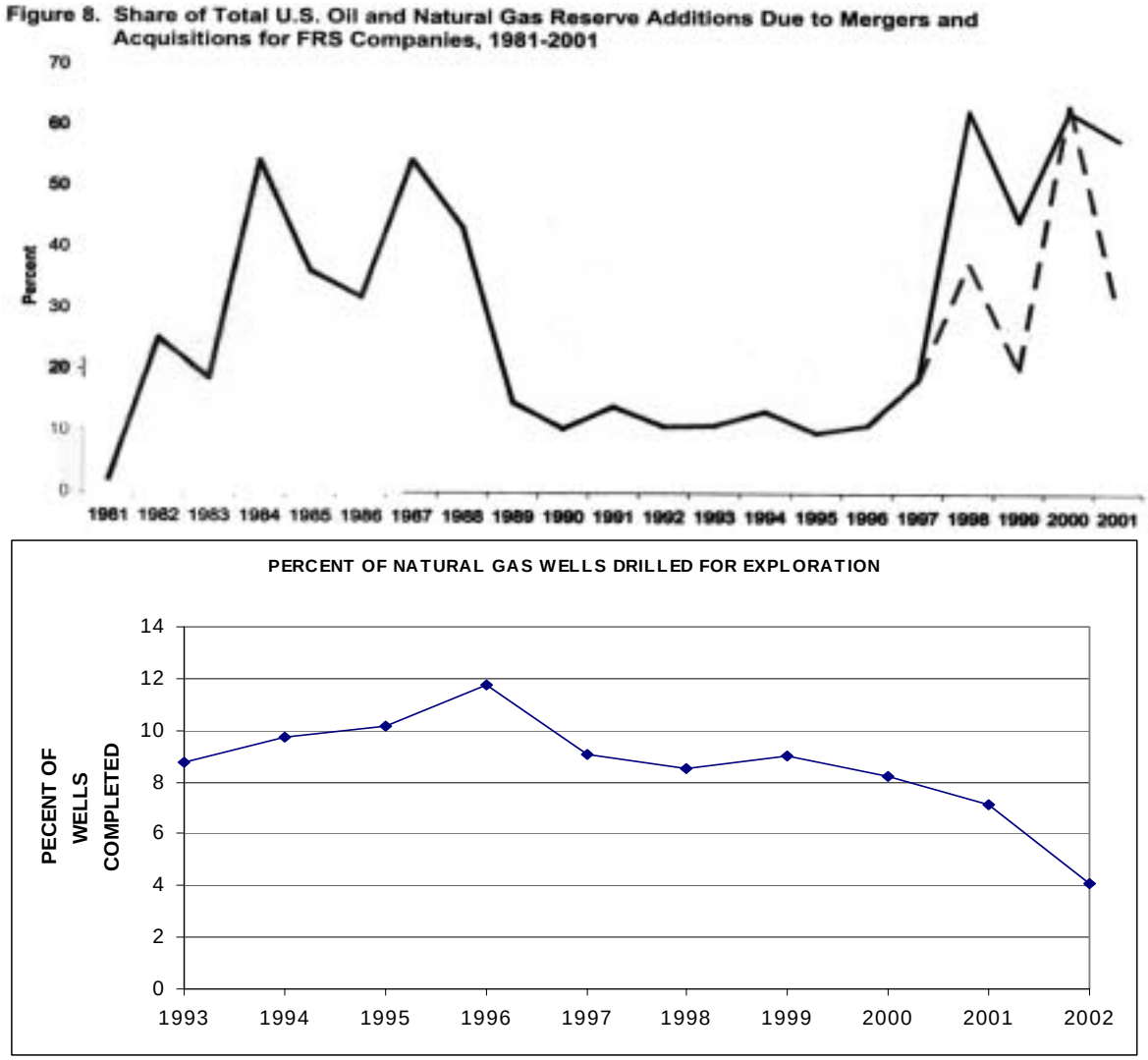
> It is unclear that producers are investing enough to grow production materially – and this follows a year [2003] in which the domestic gas production (including acquisitions) of integrated producers appears to have declined…
>
> [M]ajor integrated companies, which appear to be reinvesting only 30 to 40 percent of their domestic cash flow in the United States, have made strategic decisions to allow their shallow-water and onshore natural gas production to deplete to redeploy capital to international (mainly oil) projects.[56]

It is also important to recognize in the case of natural gas that the trading markets that drive the wellhead price are quite new. Most were set up in the 1990s, as part of the restructuring of the natural gas industry.[57] Enron played a large role in these markets and when it collapsed, so too did much private trading.[58] Today, the markets are "very thin" and that raises concerns about trading,[59] but the evidence is mounting that manipulation and abusive practices have long been part of these markets.[60]

Thus, it should not be surprising to find that capacity has not kept up and stockpiles are chronically low, causing markets to be tight; that was the outcome the industry sought to achieve with its wave of mergers and consolidation.

For natural gas we find a concern about stocks that is similar to the issue in gasoline markets. Here the question of stocks is very much influenced by the need to build stockpiles to meet the inevitable surge in demand during the winter heating season.[61] One recent study

Exhibit III-6: Shifts In Orientation Of FRS Companies In Acquisition And Development Of Natural Gas Resources



Source: Energy Information Administration, *Performance Profiles of Major Energy Producers: 2002*, February 2004, p. 82; Table B-16, *Performance Profiles of Major Energy Producers: 199*9, January 2001, B-16.

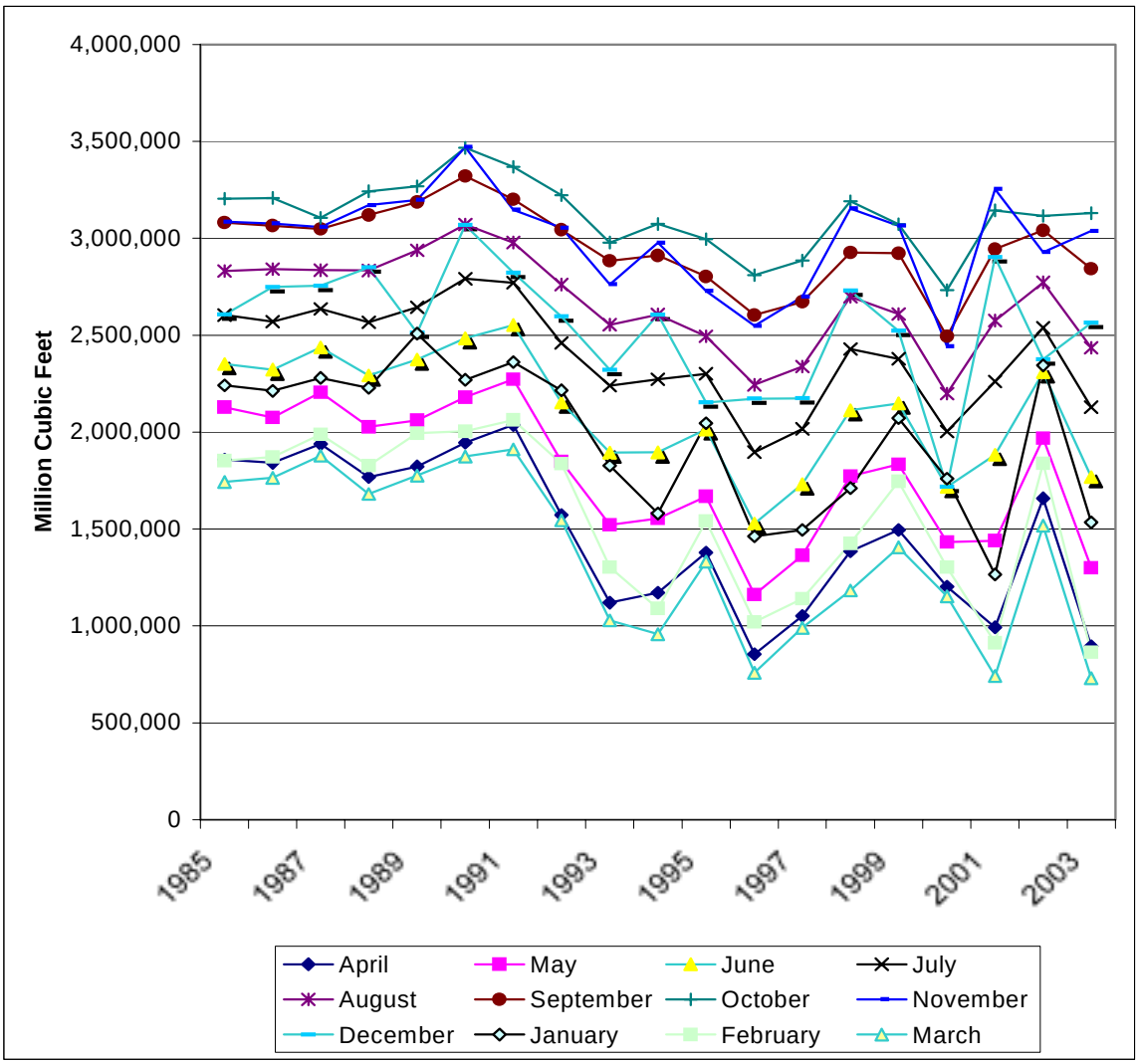
found the volatility of natural gas prices to be greater than oil prices because of the nature of the infrastructure required to deliver natural gas to consumers:

> The dependence of natural gas on more inflexible sources of supply and the greater role of transportation opens the window to profiteering. It appears that volatility in natural gas returns is more persistent than volatility in oil returns. By itself, this result suggests that there may be a 'larger window of profit opportunity' for investors in natural gas than in oil….

> [N]atural gas return volatility responds more to unanticipated events (e.g. supply interruptions, changes in reserves and stocks, etc.), regardless of which market they originate in… For example, a major event-causing shock will lead to an immediate increase in volatility in natural gas returns and culminate in a (relatively) prolonged period of volatility. If prices and thus returns rise in response to volatility, there may be immediate profit opportunities in natural gas following shocks in either market.[62]

The long-term trend to much lower stocks relative to demand is clear in natural gas as well (see Exhibit III-7 and III-8). Compared to the decade of 1985-1994, stocks were about 25 percent lower in the 1995-1999 period. During the price spikes of the new millennium, the second half of 2000 and the first half of 2001 and 2003, stocks were 40 to 50 percent lower

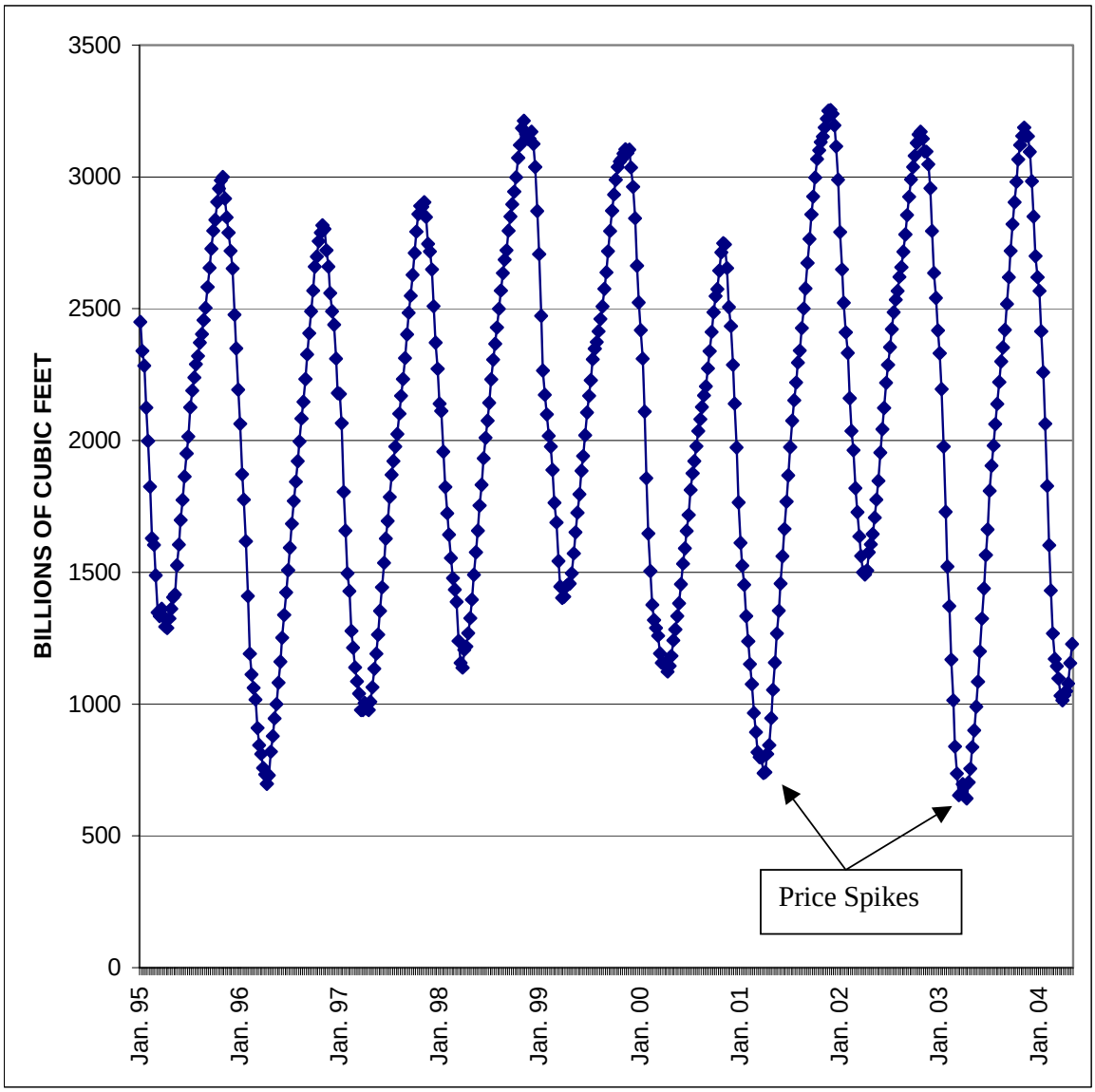
Exhibit III-7: Natural Gas Storage Since 1985



Source: Energy Information Administration, *Natural Gas Storage: Historical Data*, database

than in the 1985-1994 period and 25 percent lower than in the 1995-1999 period. These declines came during a period of a small increase in consumption. Exhibit III-8 can be used to make another point. By the fall of 2003, stocks of natural gas had rebounded to typical levels of previous years, yet prices did not moderate. This set off another round of complaints about market manipulation.[63] There are now investigations into the misreporting of gas in storage.[64]

Exhibit III-8: Working Gas Stocks Since 1995



Source: Energy Information Administration, *Natural Gas Storage: Historical Data*, database

IV. WEAK MARKET FUNDAMENTALS PUT ENERGY CONSUMERS AT INCREASED RISK

Aside from Chairman Pitofsky's analysis of the 2000 gasoline price spike in the upper Midwest, which came after his agency had approved a large part of the mergers that made up the wave, the FTC has generally been uncritical of conditions in the industry. In part this stems from the fact that the FTC views the situation through the very narrow lens of antitrust. In the case of a price spike, it is looking for collusive behavior that drives prices up, but these markets do not require collusion to be manipulated.

When Pitofsky finds that unilateral strategic actions in the long term have tightened the market and short-term tactics take advantage of this tightness, he identifies a public policy problem that is not strictly an antitrust problem at one level. Things may be bad, but there is nothing antitrust authorities can do about it. At another level, however, there is a fundamental flaw in the approach taken by the FTC. As the agency responsible for evaluating mergers in the industry, it has allowed the concentration to take place. Applying routine antitrust standards in its review, it could find no individual mergers it felt violated the antitrust laws. A few minor divestitures were ordered, but the merger wave was allowed to unfold largely unimpeded.

The problem is that the FTC has failed to recognize the unique conditions of the energy industries. Because of the unique conditions of supply and demand in energy markets, market power can be abused at much lower levels of concentration than is normally the case. The *Merger Guidelines* invite just such an analysis; the FTC has failed to consider the possibility. Confronted with a market structure in which consumers are being abused, instead of taking a narrow view, the FTC should consider how to address the problem.

Antitrust and Public Policy

Antitrust practice is based on the structure, conduct, performance paradigm (SCP), which has been the dominant approach for almost three-quarters of a century.[65] In SCP analysis the central concern is with market performance, since that is the outcome that affects consumers most directly. The concept of performance is multidimensional. The measures of performance to which we traditionally look are pricing, quality and profits. Pricing and profits address both efficiency and fairness. They are the most direct measure of how society's wealth is being allocated and distributed. The performance of industries is determined by a number of factors, most directly the conduct of market participants. Do they compete? What legal tactics do they employ? How do they advertise and price their products?

Conduct is affected and circumscribed by market structure. Market structure includes an analysis of the number and size of the firms in the industry, their cost characteristics and barriers to entry. Basic conditions of supply and demand also deeply affect market structure.

The focal point of market structure analysis is to assess the ability of markets to support competition, which "has long been viewed as a force that leads to an ideal solution of the economic performance problem."[66] Pure and perfect competition is rare, but the competitive goal is important.[67] Therefore, a great deal of attention has been focused on the relative competitiveness of markets and the conditions that make markets more competitive or workably competitive.[68] Further, specific measures of the extent of market power based on elasticities of supply and demand and market concentration (measured by the market shares of firms) have been developed.[69]

The multidimensional view of markets offered by the SCP framework fits the fundamental economic traits of energy production and consumption well. Energy markets are highly complex. Their volatility poses particular challenges for policy and economic analysis.

Contrasting energy commodities to financial instruments like stocks and bonds, a recent book entitled *Energy Risk* identified the uniqueness of energy markets. The key elements are the supply-side difficulties of production, transportation and storage, and the demand-side challenges of providing for a continuous flow of energy to meet inflexible demand, which is subject to seasonal consumption patterns.

> [T]he deliverables in money markets consist of a "piece of paper" or its electronic equivalent, which are easily stored and transferred and are insensitive to weather conditions. Energy markets paint a more complicated picture. Energies respond to the dynamic interplay between producing and using; transferring and storing; buying and selling – and ultimately "burning" actual physical products. Issues of storage, transport, weather and technological advances play a major role here.
>
> In energy markets, the supply side concerns not only the storage and transfer of the actual commodity, but also how to get the actual commodity out of the ground. The end user truly consumes the asset. Residential users need energy for heating in the winter and cooling in the summer, and industrial users' own products continually depend on energy to keep the plants running and to avoid the high cost of stopping and restarting them. Each of these energy participants – be they producers or end users – deals with a different set of fundamental drivers, which in turn affect the behavior of energy markets…
>
> What makes energies so different is the excessive number of fundamental price drivers, which cause extremely complex price behavior.[70]

Prices run up quickly because of even slight disruptions in the supply-demand balance and producers are slow to react because they do not fear that others can bring product to market and steal their business. Consequently, prices are said to be "sticky downward."[71] The majority of published studies find support for the "rockets and feathers" view.[72] Prices rise like rockets and float down like feathers.[73] When energy markets become as concentrated as they are in America, the feathers do not float all the way down.

Demand is Inelastic

The continuous flow of large quantities of product to meet highly seasonal demand is the central characteristic of the demand side of the market. In order to design proper policies to deal with energy demand and how it affects the market, we must have an appreciation for why people use energy as they do. Examining price and income elasticities leads to the conclusion that energy is a necessity of daily life. Recognizing this fact leads to policy choices that can have the greatest impact while imposing the least cost and inconvenience on consumers.

Energy consumption is determined by the physical and economic structure of daily life. People need to drive on a daily basis because of the way our communities are built and our transportation systems designed. Stores are far from homes. Homes are far from work. Social and after-school activities are dispersed. In most communities, mass transit is scarce and inconvenient. It is necessary to drive to get from here to there. We own more cars and drive more miles on a household basis over time. These trends and patterns have become stronger and more deeply entrenched as our society has become wealthier and the tendency for two-earner households has grown. For the past three decades there has been an almost perfect, one-to-one correspondence between economic growth and the growth of total miles driven.[74]

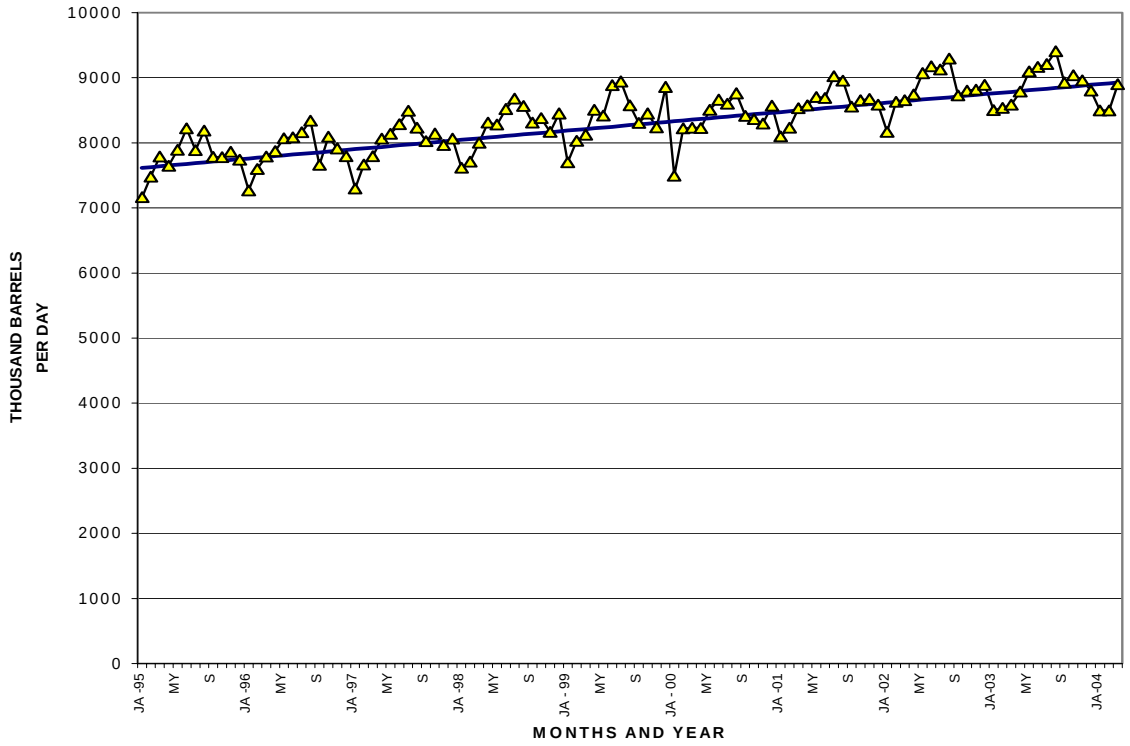
People consume natural gas for heating primarily and, increasingly, indirectly for electricity. The amount they consume is dictated in large part by the kinds of buildings in which they live and work and the energy efficiency of the appliances they use. Natural gas has become the fuel of choice in many residential uses. It has been the favorite of the electricity industry for about a decade.

The result of the underlying socioeconomic determinants of automobile travel is to render gasoline demand “inelastic.” The demand elasticity for gasoline has been studied hundreds of times in the U.S. and abroad. The best estimate of short-term elasticity (usually measured by demand response in a period of about a year) is -.2.[75] In other words, when prices increase by 10 percent, demand declines by only 2 percent. The best estimate of the long-term elasticity is about -.4.[76] Both of these are quite low.

While fewer estimates of the elasticity of demand for natural gas have been made, the results are similar.[77] Short-term elasticities are in the range of .3, long-term elasticities are in the range of .6. An occasional estimate of long-term elasticity is in the neighborhood of 1.0, which is not sufficient to discipline market power.

Demand is generally predictable in a seasonal pattern (as shown in Exhibits IV-1 and IV-2). With demand quite predictable and inelastic, price is determined by the supply side. The flow of product and stockpiles are critical. Supplies must be adequate to deal with shifts in demand. Demand may help to set the stage, but it is supply that provides the action.

Exhibit IV-1: Gasoline Consumption



Source: U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, various issues and database.

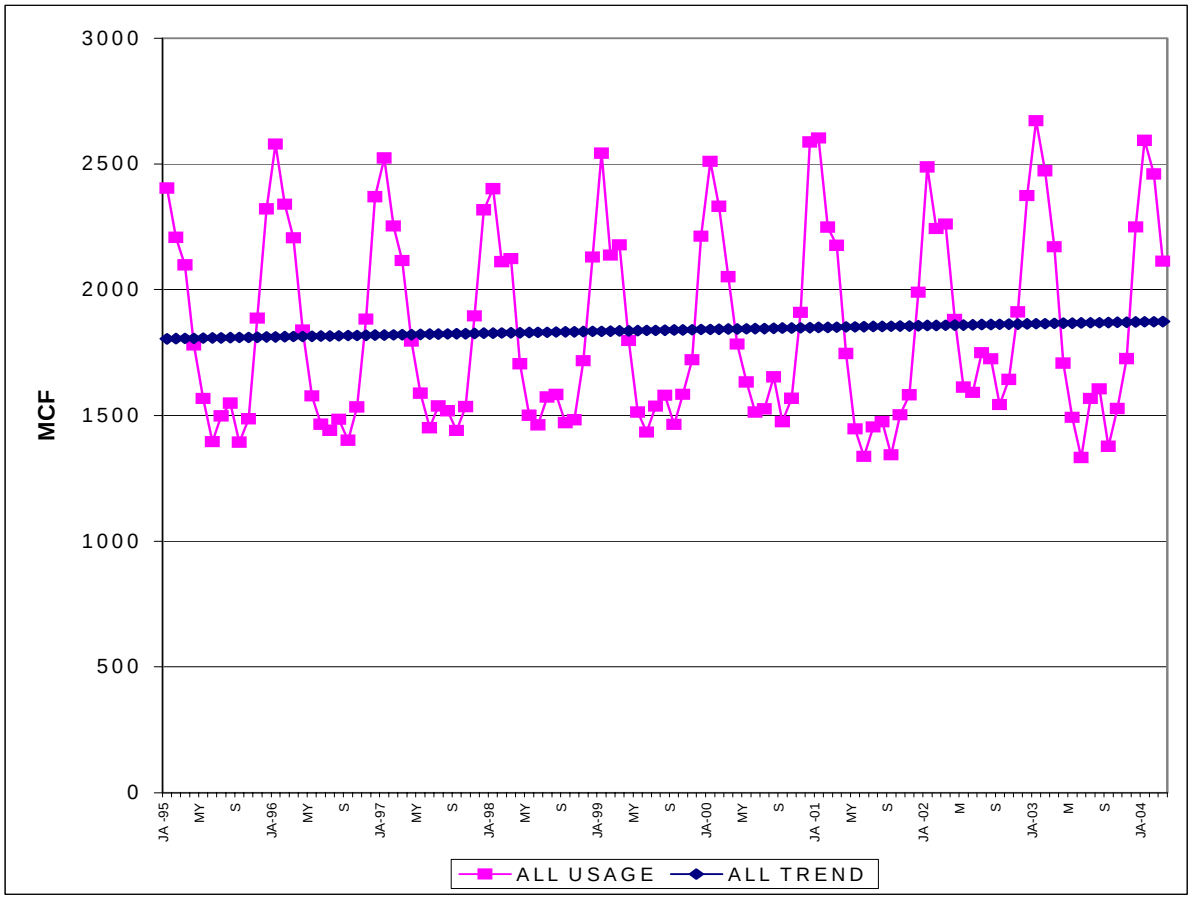
The low elasticity of demand is the critical factor in rendering the energy market volatile and vulnerable to abuse. When demand is inelastic, consumers are vulnerable to price increases, since they cannot cut back on or find substitutes for their use of the commodity. When the most important market force in disciplining market power, demand elasticity, is as low as observed for gasoline and natural gas, there are many opportunities to exercise market power.

SUPPLY IS INELASTIC

Short-term supply in the energy industry is also extremely inelastic. That is, it cannot be quickly increased. The key elements are the supply-side difficulties of production, transportation and storage for providing for a continuous flow of energy.[78]

Because of the nature of the underlying molecules, the production, transportation and distribution networks are extremely demanding, real time systems. Energy is handled at high pressure, high temperature and under other physical conditions that are, literally, explosive. These systems require perfect integrity and real time balancing much more than other

Exhibit IV-2: Seasonality of Natural Gas Consumption



Source: U.S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, various issues and database.

commodities. Transportation and distribution infrastructure is extremely capital intensive and inflexible. Many sources of energy are located far from consumers, requiring transportation over long distances. The commodities are expensive to transport and store. They are delivered over a network that is sunk in place with limited ability to expand in the short and medium term.

Refineries, storage facilities and pipelines are not only capital intensive, but they take long lead times to build. They have significant environmental impacts. In the short term, their capacity is relatively fixed. Refineries must be reconfigured to change the yield of products. Although pipelines have largely depreciated their historic, sunk costs, expansion would be capital intensive. Thus, pipeline capacity is generally a fixed capacity as well.

Accidents have a special role in networks such as these. Because of the demanding physical nature of the network, accidents are prone to happen. Because of the volatile nature

of the commodity, accidents tend to be severe. Because of the integrated nature of the network and demanding real time performance, accidents are highly disruptive and difficult to fix.

These physical and economic characteristics render the supply-side of the market inelastic.[79] Given the basic infrastructure of supply in the industry, the availability of excess capacity and stocks to meet changes in demand is the critical factor in determining the flexibility of supply. Since output is slow to respond to price, stockpiles, storage and importation of product become critical elements of the gasoline market.[80]

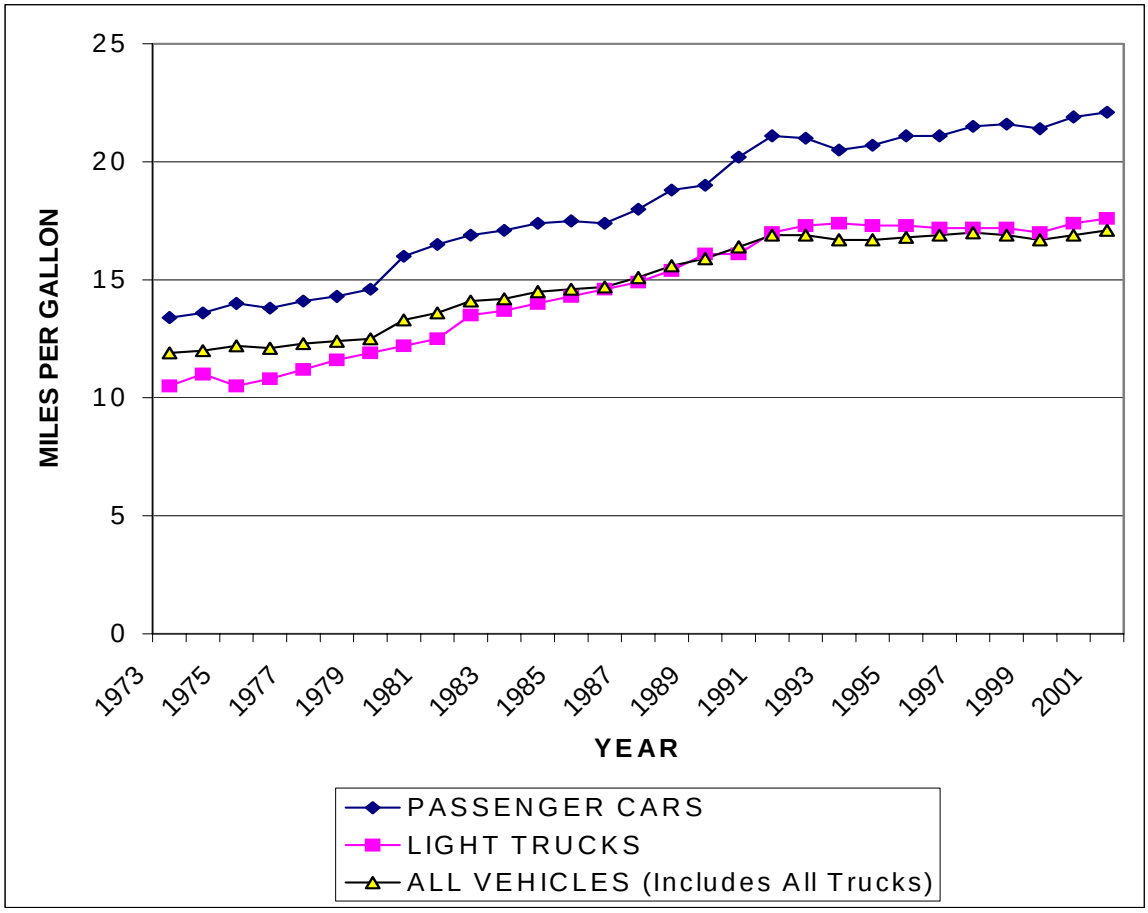
> Stocks are the key factor in policy responses to market power where supply is inelastic.
>
> Economic frictions (including transportation, storage, and search costs) which impede the transfer of the underlying commodity among different parties separated in space or time can create the conditions that the large trader can exploit in order to cause a supracompetitive price…
>
> Although the formal analysis examines transportation costs as the source of friction, the consumption distortion results suggest that any friction that makes it costly to return a commodity to its original owners (such as storage costs or search costs) may facilitate manipulation.
>
> The extent of market power depends on supply and demand conditions, seasonal factors, and transport costs. These transport cost related frictions are likely to be important in many markets, including grains, non-precious metals, and petroleum products.
>
> Transportation costs are an example of an economic friction that isolates geographically dispersed consumers. The results therefore suggest that any form of transaction costs that impedes the transfer of a commodity among consumers can make manipulation possible…
>
> All else equal, the lower the storage costs for a commodity, the more elastic its demand.[81]

THE GAS GUZZLER PROBLEM

The ability of producers to exercise market power on the supply side is magnified immensely when the supply-demand balance is tight. High levels of demand strain resources and make it difficult to keep stock up. During the 1990s, America shot itself in the pocketbook by building two fleets of gas guzzlers that are helping to keep energy markets tight – low mileage Sport Utility Vehicles/light trucks and natural gas-fired power plants.

Exhibit IV-3 shows that improvement in average gas mileage stopped in the 1990s, primarily because of the increasing use of light trucks, whose fuel efficiency has declined. Overall, average mileage has declined because of the increased use of less efficient SUVs and light trucks.

Exhibit IV-3: Motor Vehicle Fuel Efficiency

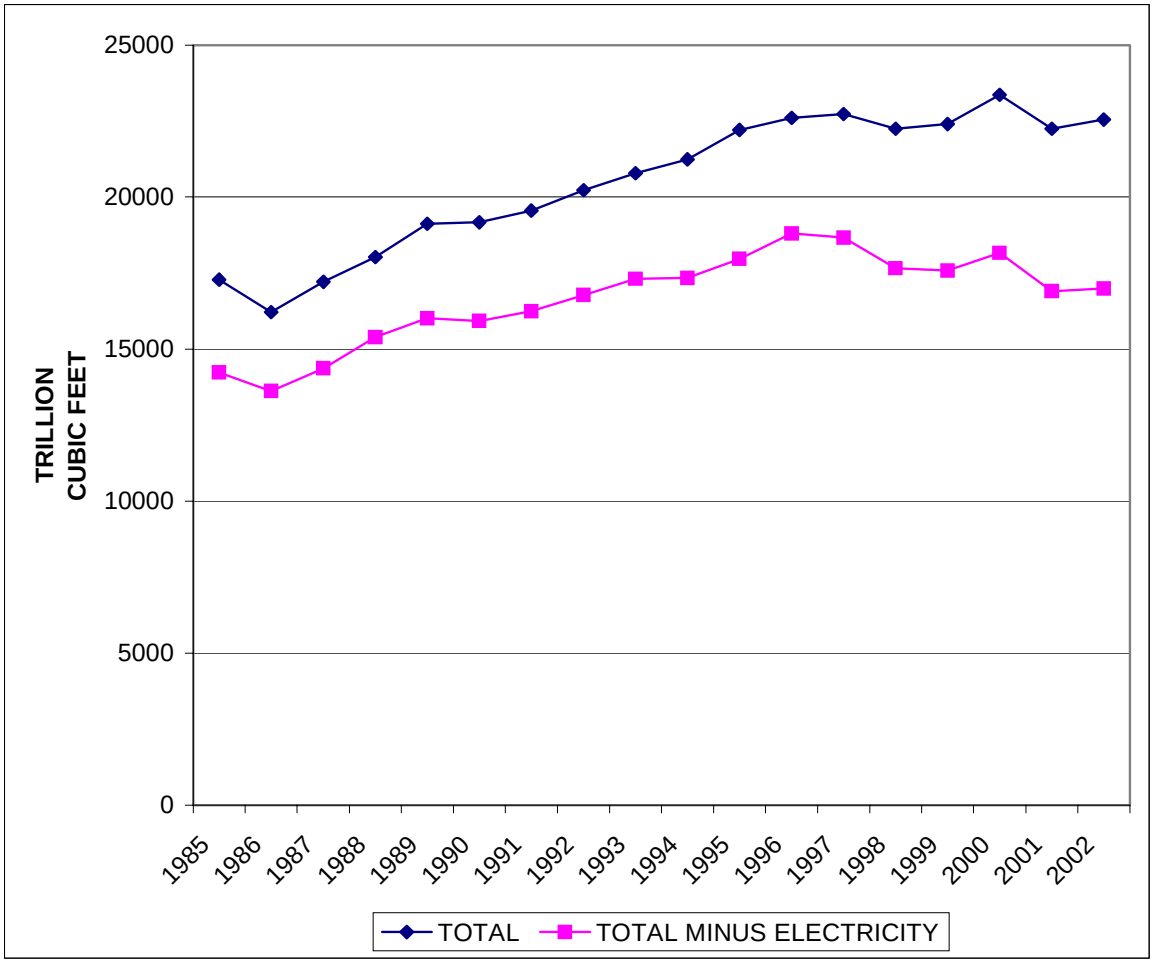


Source: U. S. Department of Energy, Energy Information Administration, *Monthly Energy Review*, Table 1.10.

If the rate of improvement in the fleet fuel efficiency had been maintained at historical levels throughout the 1990s, America would be consuming over one million barrels per day less of gasoline.[82] Gasoline savings of that magnitude would have offset the entire decline of domestic production during the 1990s,[83] a figure that would have alleviated the tight gasoline markets and made them much less vulnerable to price shocks. Determined efforts can achieve a much higher level of efficiency in the automobile fleet.

Exhibit IV-4 shows the consumption of natural gas. Overall consumption grew because of the increased consumption in the electricity sector. This increased consumption by gas fired generating plants shifted the pattern of demand more heavily into the summer months. As a result, it has become more difficult to put gas in storage in preparation for the winter heating season. The increase in natural gas consumption in the electricity sector is

Exhibit IV-4: Natural Gas Consumption



Source: U. S. Department of Energy, Energy Information Administration, *Monthly energy Review*, Table 4.4.

equal to about ten percent of total production and 50 percent of natural gas imports.[84] Here too, vigorous promotion of efficiency could substantially reduce consumption and alleviate pressure on natural gas markets.[85]

Concentration in the Petroleum Industry Creates Market Power

Antitrust authorities have traditionally used two measures of market concentration. The four firm concentration ratio is equal to the market share of the four largest firms. If the four largest firms control 60 percent or more of the market, the market is a tight oligopoly.[86] The HHI (Hirshman Herfindahl Index), used by the Department of Justice, is the sum of the

square of the market shares of all firms in a market. Under its Merger Guidelines, the DOJ considers a market with an HHI of 1000 or less to be unconcentrated. Such a market would have the equivalent of ten equal-sized competitors. In such a market, the four firm concentration ratio would be 40 percent. Any market with a concentration above this level is deemed to be a source of concern. The DOJ considers an HHI of 1800 as the point at which a market is highly concentrated. This level falls between five and six equal-sized competitors.

The fallacy of blindly applying the statistical formula for market structure analysis was pointed out over two decades ago by two prominent conservative economists. William Landes and Richard Posner use the Lerner index,[87] which measures the amount by which prices can be set above costs as the result of the exercise of market power, and is directly related to the HHI.[88]

Landes and Posner underscore the importance of the elasticity of demand.[89] They point out that when demand elasticities are low, market power becomes a substantial problem. In their words, the Lerner Index "comes apart."

> [T]he formula "comes apart" when the elasticity of demand is 1 or less. The intuitive reason is that a profit-maximizing firm would not sell in the inelastic region of its demand curve, because it could increase its revenues by raising price and reducing quantity. Suppose, for example, that the elasticity of demand were .5. This would mean that if the firm raised its price by one percent, the quantity demanded of its product would fall by only one-half of one percent. Thus its total revenues would be higher, but its total costs would be lower because it would be making fewer units of its product.
>
> Raising price in these circumstances necessarily increases the firm's profits, and this is true as long as the firm is in the inelastic region of its demand curve, where the elasticity of demand is less than 1.
>
> If the formula comes apart when the elasticity of demand facing the firm is l or less, it yields surprising results when the elasticity of demand is just a little greater than 1. For example, if the elasticity of demand is 1.01, equation (la) implies that the firm's price will be 101 times its marginal cost. There is a simple explanation: a firm will produce where its demand elasticity is close to one only if its marginal cost is close to zero, and hence a relatively low price will generate a large proportional deviation of price from marginal cost.[90]

Leonard Waverman notes that by comparison to most industries and standard antitrust practice, the elasticity of demand in energy industries is quite low:

> Arguing that a CED [cross elasticity of demand] of 1 is 'high' is equivalent to arguing that an own-price elasticity of 1.0 is high, an argument which would *not* generally be made. In anti-trust economics own price elasticities well above one are considered as connoting a lack of market power. In his survey of

the empirical literature in the field of industrial organization, "a firm with such an elastic demand curve [elasticity of demand about 12] has little market power."[91]

A second problem with the myopic FTC approach stems from the narrow search for collusion. The *Merger Guidelines* recognize that market power can be exercised with coordinated, or parallel, activities and even unilateral actions in situations where there are small numbers of market players.[92] The area of noncollusive, oligopoly behavior has received a great deal of attention. A variety of models have been developed in which it is demonstrated that small numbers of market participants interacting in the market, especially on a repeated basis, can learn to signal, anticipate, and parallel one another to achieve outcomes that capture a substantial share of the potential monopoly profits.[93]

Nevertheless, even by traditional standards, the wave of industry mergers noted above has resulted in a level of concentration that creates the basis for business behaviors and strategies that can exploit market power. Several major mergers between vertically integrated companies in the top tier of the oil industry have pushed petroleum product markets to levels of concentration that are a serious concern.

Exhibit IV-5 shows the two measures of market concentration. Over the past decade when a host of mergers were approved, antitrust authorities did not take the fundamentals sufficiently into account in reviewing mergers. They have prevented a few local markets from becoming highly concentrated, but that was far too lenient a standard. Because supply and demand are so inelastic and vertical leverage is so important, antitrust authorities should have insisted that markets remain unconcentrated (i.e., below the moderately concentrated threshold).

The recent mergers have pushed three of the country's five regional refining markets (Petroleum Administrative Defense Districts or PADD) into a danger zone of concentration. This concentration reflects a business decision in which "operating refineries have sought to concentrate their activities in markets where they hold a leading market share."[94] There has clearly been a sharp increase in the level of concentration in all markets except the Mountain West. The East Coast, Mountain West and West Coast all fall well above the unconcentrated zone. The upper Midwest is close to the lower limit of the concentrated zone based on HHI, with the four firm concentration ratio moving well above the unconcentrated level.

Product markets are much smaller than refinery markets. That is, while refineries may serve a broad area, most consumers buy virtually all of their gasoline in the metropolitan area in which they live. Most studies of gasoline prices use the metropolitan area as the unit of analysis. While we lack data on a city-by-city basis, some data is readily available on a state-by-state basis. It confirms that the trend of increasing concentration has brought the industry to a level that is a source of concern.

Exhibit IV-5 includes analyses of California, Illinois, Wisconsin and Connecticut based on the number of branded gasoline stations in each state. We have selected a time frame

Exhibit IV-5: Concentration in Domestic Downstream Gasoline Operations

Concentration Of Refineries In Regional Markets

PETROLEUM ADMIN. DEFENSE DISTRICT (PADD)	1994 HHI	1994 4-FIRM CR	2000 HHI	2000 4-FIRM CR
I. East Coast	1297	62	2007	77
II. Upper Midwest	731	40	980	52
III. Gulf Coast	453	29	753	42
IV. Mountain West	1000	49	1061	51
V. West Coast	1037	54	1376	67

Concentration Of Gasoline Distribution In State Markets

State	1994 HHI	1994 4-Firm	1999 HHI	1999 4-Firm
California	1143	60	1432	73
Connecticut	1022	53	1415	65
Illinois	1053	55	1311	63
Wisconsin	1175	65	1400	66

Sources: Refinery: U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Annual 1999*, Volume 1 (June 2000); Table 38 for market shares, p. 122 for PADDs. The states in each PADD are as follows I = ME, NH, VT, MA, RI, CT, NY, NJ, PA, WV, DE, MD, VA, NC, SC, GA, FL; II= OH, MI, IN, KY, TN, IL, WI, MN, IA, MO, OK, KS, MB, SD, ND, III= AL, MI, AK, LA, TX, NM; IV= MT, WY, CO, UT, ID; V= WA, OR, NV, AZ, CA, HI AK.

Gasoline: *National Petroleum News*, Annual Survey of Outlets; *Lundberg, Connecticut Market Report: February, 1999*; DOE, U.S. Department of Energy, Energy Information Administration, *Assessment of Summer 1997 Motor Gasoline Price Increase*, May 1998, p. 64

similar to that of the prior refinery analysis. California was selected because the West is frequently mentioned in discussions of high gasoline prices. There was also a U.S. Department of Energy study available for comparison. Illinois and Wisconsin were selected because they have been focal points of concern in recent price spikes. Connecticut is included because it represents another PADD and there was a separate analysis available for comparison.

We observe sharp increases in concentration in each of these states. Each is now well into a range of concentration that is a source of concern for competitiveness. The level of concentration we estimate on the basis of outlets is consistent with the other analyses that are based on volume of sales.

The previous discussion focuses on horizontal concentration. Vertical integration between segments of the industry may have an impact as well. Vertical integration by dominant firms may create a barrier to entry requiring entry at two stages of production,[95] or foreclosing critical inputs for competitors in downstream markets.[96] Vertical arrangements may restrict the ability of downstream operators to respond to local market conditions.[97] Vertical integration not only removes important potential competitors across stages of production,[98] but also may trigger a wave of integrative mergers,[99] rendering small independents at any stage extremely vulnerable to a variety of attacks.[100]

Gasoline markets are vulnerable to the negative effects of vertical integration. Product must move downstream from the refinery or the tanker to the pump. Vertically integrated operations are closed to independent sources of supply. They may impose zonal pricing formulas or restrictions on sources of supply on their distribution outlets.[101] With vertical integration, the market may be less responsive than it could be both in the short term, since competing product has difficulty getting into individual markets at the end of a vertically[102] integrated chain, and in the long term because new competitors in any market may have to enter at several stages of the business.

An interesting study of cities across the country as well as the first merger in the wave of late 1990s mergers (the Tosco/Unocal merger of 1997) finds support for this concern. The study finds that both horizontal concentration and vertical integration are associated with high prices:

> Upstream concentration is positively correlated with price, the market share of independents is negatively correlated with price and the average market share of the vertically integrated suppliers covaries positively with wholesale price…
>
> Moreover, the incentive to raise price is also positively correlated with the geographic proximity of integrated stations to rival independents, indicating that the greater the degree of competition, or cross-price elasticity, between integrated retailers and rival independent retailers, the greater the integrated firm's incentive to raise rivals' wholesale costs.[103]

In light of these findings, the integration of refining and distribution is important. The percentage of stations owned by companies that also own refineries did not change much over the decade, but the size of the largest integrated owners increased dramatically. The integrated companies also appear to be more regionalized.[104] Each company covers a smaller area more densely, resulting in less competition.

We do not have similarly detailed analysis of the natural gas market, but the court ruling in the lawsuit against Enron can make the point. "Enron was positioned to yank prices up because its Enron Online [EOL] trading platform controlled fully 40 percent of average daily trading on the Henry Hub natural gas spot market. Further, other traders in that market "routinely looked to EOL and Enron for current [Henry Hub] spot market pricing information," according to the CFTC complaint."[105] The Henry Hub is the most important

price setting spot market in the nation. That would virtually ensure that the hub was highly concentrated at that time.

These levels of concentration would cause concern in any industry, but in the energy industries they are of extreme concern because the underlying market forces are weak. Because the supply and demand elasticities for gasoline and natural gas are so low[106] and the expenditures on energy are so large,[107] we believe these industries should be held to close scrutiny because the exercise of market power results in higher prices.[108] Antitrust authorities have failed to exercise proper caution to protect the public interest and consumers are suffering as a result.

V. PUBLIC POLICY

It may seem a bit odd to spend time arguing that the attitude of the Administration in Washington toward the energy industry is important. It goes without saying that it is. The close association of both the President and Vice President with the petroleum industry and the aggressive pro-industry position it has taken raises this issue to another level. First, the coincidence between the election of November 2000 and the dramatic increase in prices that followed raises a question – is there a causal link behind the correlation? Second, the search for policy in an atmosphere of crisis is deeply affected by the Administration's attitude.

Policy Orientation Matters

There is no doubt that the Bush Administration represented a dramatic shift in policy. The National Energy Policy Development Group was formed under Vice President Cheney in the spring of 2001. As we have seen, crude oil prices were well off their historic highs at that moment, while the domestic spread was at the first of several peaks. Nevertheless, when the NEPDG released its report, the underlying problem was portrayed as one in which "overdependence on any one source of energy, especially a foreign source, leaves us vulnerable to price shocks, supply interruptions and in the worst case, blackmail."[109] The resulting policy recommendations were tilted strongly in favor of the industry.[110] The Vice President quickly became embroiled in controversy over questions of excessive industry influence in its deliberations, a dispute that is still pending in the Supreme Court.[111]

The high level of engagement of energy industry executives, like Enron's CEO Ken Lay, in securing the rapid appointment of a new Chairman at the Federal Energy Regulatory Commission (FERC), which oversees the natural gas industry, and in gaining access to the policy process was another favorable signal to the industry.[112] The subsequent refusal of the Administration to recognize that manipulation had played a large part in the California energy crisis and the delayed and minuscule penalties imposed sent another signal to industry.[113] The

timid approach the FERC took in response to reports of natural gas price manipulation reinforced the message.[114]

The Bush Administration also moved quickly to roll back air conditioner efficiency standards that had been set by the Clinton Administration. These would have curbed the demand for electricity – reducing the need for as many as 50 power plants. They would have particularly affected natural gas consumption, since summer peaking demand draws heavily on natural gas.[115] The administration's luke warm attitude toward to energy efficiency as the cornerstone of the policy response was made clear by the Vice President, when he relegated it to "a personal choice," not a policy option. The Administration recently lost a court battle over this decision, but the signal could not have been stronger.

The tilt toward the industry reached its zenith in the energy bill. As one long-term observer of Washington energy policy put it, "Some blame must rest with the White House and Vice President Cheney, whose task force, meeting in secret with energy industry leaders, wrote the libretto for the bill."[116] The central premise of the energy bill pushed by the administration is that energy companies need more money to boost production of domestic energy supplies. To that end, a grab bag of subsidies – totaling over $20 billion – was earmarked for the oil and gas industry, while other expensive alternatives also would receive assistance.[117] On the natural gas side, the bill promotes costly backstop technologies, like liquefied natural gas imports and an Alaska natural gas pipeline, which will lock in high gas prices.

These signals were in sharp contrast to the reaction of the Clinton Administration to the early signs of trouble in energy markets in 2000. As discussed above, after approving many of the mergers that led to the consolidation in the industry, Clinton appointee Robert Pitofsky had issued a tough FTC report on the gasoline price spikes in the upper Midwest in the summer of 2000.[118] The Department of Energy had begun to express serious concerns about the abuse of market power in the electricity industry.[119] Similarly, the Clinton Administration created a heating oil reserve for the Northeast, another sign that it would take a stronger stance against the industry.

The Wrong Explanations Lead to the Wrong Policy

The explanation for the high and volatile price of gasoline offered by the industry and the Bush Administration is so oversimplified and incomplete that it must be considered at best misleading. At worst, it is wrong because it points to policies that do not address important underlying causes of the problem and therefore will not provide a solution.

This explanation has serious flaws in the gasoline market:

- Blaming high gasoline prices on high crude oil prices ignores the fact that over the past few years the domestic refining and marketing sectors have

imposed larger increases on consumers at the pump than crude price increases would warrant.

- Blaming tight refinery markets on Clean Air Act requirements to reformulate gasoline ignores the fact that in the mid-1990s the industry adopted a business strategy of mergers and acquisitions to increase profits that was intended to tighten refinery markets and reduce competition at the pump.

- Claiming that the antitrust laws have not been violated in recent price spikes ignores the fact that forces of supply and demand are weak in energy markets and that local gasoline markets have become sufficiently concentrated to allow unilateral actions by oil companies to push prices up faster and keep them higher longer than they would be in vigorously competitive markets.

- Eliminating the small gasoline markets that result from efforts to tailor gasoline to the micro-environments of individual cities will not increase refinery capacity or improve stockpile policy to ensure lower and less volatile prices if the same handful of companies dominate the regional markets.

There are similar flaws in the explanation for natural gas markets:

- Blaming natural gas price increases on crude oil prices ignores that fact that natural gas wellhead prices have increased much faster than the price of oil.

- It ignores the fact that natural gas markets lack liquidity and transparency and have been manipulated.

- The merger wave led by the major petroleum companies has impacted the natural gas market.

The obsession with domestic drilling is misguided. Because domestic resources represent a very small share of the global resources base and are relatively expensive to develop, it is folly to pursue a supply-side solution to the energy problem:

> This policy will not increase significantly the US production of crude oil, will not reduce significantly OPEC's influence, and it will distort the US macroeconomy. These outcomes are caused by a policy that is not consistent with the depleted state of the domestic resource base and with the economics of international oil.

> In any plausible scenario, however, the actual effect will be close to zero. If OPEC correctly anticipates production from ANWAR (the Arctic Natural Wildlife Reserve), which would not be difficult given its long lead times, OPEC could slow additions to capacity very modestly such that its utilization rate (and its effect on price) would be changed relative to a scenario in which no oil is produced from the ANWR… Regardless of OPEC behavior, the 1-2 mbd [million barrels per day] from ANWR would reduce the OPEC's share of the world oil market by 2-3 percent. Such a change would be virtually undetectable given the large fluctuation in crude oil prices.[120]

The increase in the amount of oil and gas produced in America will not be sufficient to put downward pressure on world prices; it will only increase oil company profits, especially if large subsidies are provided, as contemplated in recent energy legislation. Moreover, even if the U.S. could affect the market price of basic energy resources, which is very unlikely, that would not solve the structural problem in domestic markets.

Tight markets in the U.S. can best be addressed by relieving pressure on the demand side, yet the energy bill being considered by Congress does little to relieve that pressure. Additionally, the legislation fails to take serious measures to reduce demand by boosting the efficiency requirements for the most important energy consuming equipment – like automobiles and air conditioners. As one recent analysis concluded:

> It is not dependence on imported oil per se that makes the economy vulnerable to price swings, but the dependence on oil itself… A reduction in our vulnerability to swings in the price of oil requires a reduction in our use of oil, regardless of where on the planet it is produced.[121]

Further boosting the profitability of the petroleum industry with subsidies and access to resources in environmentally sensitive areas would not increase production a great deal, nor will it decrease prices to consumers. Over the past three years, the domestic oil and gas industry has enjoyed a huge increase in profitability, but the pricing abuse has gotten worse, not abated. With a depleted, costly resource base that represents a very small share of the global total, domestic production simply cannot discipline the world price of oil.

The energy legislation fails to address the factors that have led to the creation of a concentrated market and the industry's consequent failure to respond to increased demand in a responsible manner. The legislation is silent on the market power problem flowing from the high degree of concentration on the supply-side of the market. In fact, in some ways it will make matters worse. It contains language that could make it more difficult to punish fraud in energy commodity markets. In addition, the repeal of the Public Utility Holding Company Act would allow the large oil and gas producers to buy up electric utilities, thereby integrating their natural gas production with consumption. The result would be to further diminish market forces in the industry, exacerbating the problems that are already too painfully evident.

Policy that Reflects the Domestic Reality

If the U.S. is to both reduce the market power of energy producers and stem the flow of imports, public policy must start immediately and aggressively on an efficiency path to lower energy consumption.[122]

It is time for public policy to seek permanent institutional changes that both reduce the chances that markets will be tight and reduce the exposure of consumers to the opportunistic exploitation of markets when they become tight. To achieve this reduction of risk, public policy should be focused on achieving four primary goals:

- Restore reserve margins by developing both efficiency (demand-side) and expanding refinery capacity (supply-side).
- Increase market flexibility through stock and storage policy.
- Discourage private actions that make markets tight and/or exploit market disruptions by countering the tendency to profiteer by withholding of supply.
- Promote a more competitive industry.

A goal of achieving an improvement of vehicle efficiency (increase in fleet average miles per gallon) equal to economy-wide productivity over the past decade (when the fleet failed to progress) would have a major impact on demand. It would require the fleet average to improve at the same rate it did in the 1980s. It would raise average fuel efficiency by five miles per gallon, or 20 percent. This is a mid-term target. This rate of improvement should be sustainable for several decades. This would reduce demand by 1.5 million barrels per day within a decade.[123] This would return consumption to the level of the mid-1980s.

Expanding refinery capacity by 10 percent equals approximately 1.5 million barrels per day. This would require 15 refineries, if the average size equals the refineries currently in use. This is less than one-third the number shut down in the past ten years and less than one-quarter of the number shut down in the past fifteen years. Alternatively, a ten percent increase in the size of existing refineries, which is the rate at which they increased over the 1990s, would do the trick, as long as no additional refineries were shut down.

Placed in the context of redevelopment of recently abandoned facilities or expansion of existing facilities, the task of adding refinery capacity does not appear daunting. Such an expansion of capacity has not been in the interest of the businesses making the capacity decisions. Therefore, public policies to identify sites, study why so many facilities have been shut down, and establish programs to expand capacity should be pursued.

This combination of demand-side and supply-side policies to improve the long run market balance would restore the supply/demand balance to levels that typified the mid-1980s.

It has become more and more evident that private decisions on the holding of stocks will maximize short-term private profits to the detriment of the public. Increasing concentration and inadequate competition allows stocks to be drawn down to levels that send markets into price spirals. While the strategic petroleum reserve has been developed as a strategic stockpile and companies generally take care of operating stocks, the marketplace is clearly not attending to economic stockpiles. Companies will not willingly hold excess capacity for the express purpose of preventing price increases. They will only do so if they fear that a lack of supply or an increase in brand price would cause them to lose business to competitors who have available stocks. Regional gasoline markets appear to lack sufficient competition to discipline anti-consumer private stock policies.

Public policy must expand stocks. Participants in the distribution of gasoline could be required to hold stocks at a percentage of retail sales. Public policy could also either directly support or give incentives for private parties to keep storage. It could lower the cost of storage through tax incentives by drawing down stocks during seasonal peaks. Finally, public policy could directly underwrite stockpiles. We now have a small Northeast heating oil reserve. It should be continued and sized to discipline price shocks, not just prevent shortages. Similarly, a Midwest gasoline stockpile should be considered.

In the short term, government must turn the spotlight on business decisions that make markets tight or exploit them.

Withholding of supply should draw immediate and intense public scrutiny, backed up with investigations. Since the federal government is likely to be subject to political pressures not to take action, state governments should be authorized and supported in market monitoring efforts. An ongoing joint task force of federal and state attorney's general could be established. The task force should develop databases and information to analyze the structure, conduct and performance of gasoline markets.

As long as huge windfall profits can be made, private sector market participants will have a strong incentive to keep markets tight. Market manipulation could and should be made illegal. The pattern of repeated price spikes and volatility has now become an enduring problem. Because the elasticity of demand is so low – because gasoline is so important to economic and social life – this type of profiteering should be discouraged. A windfall profits tax that kicks in under specific circumstances will take the fun and profit out of market manipulation.

Further concentration of these industries is quite problematic. The Department of Justice *Merger Guidelines* should be rigorously enforced. Moreover, the efficiency defense of consolidation should be looked on skeptically, since inadequate capacity is a market problem.

Restrictive marketing practices, such as zonal pricing and franchise restrictions on supply acquisition should be examined and discouraged. These practices restrict flows of product into markets at key moments.

Markets should be expanded by creating more uniform product requirements. These should not result in a relaxation of clean air requirements.

Decisions by the oil cartel to increase crude prices have cost consumers, but private business decisions about production capacity, stocks and product supply and the failure of public policy to slow the growth of demand by promoting efficiency have cost much more.[124] Given the importance of energy in the economy, "consumers of petroleum products in the United States expect that, as with water and electricity, public officials will ensure the reliability and affordability of supplies."[125] Americans have come to believe that the price spikes are the result of industry manipulation.[126] This paper shows that there are important ways that this suspicion is well-founded. Over the past three years, policymakers have failed to provide consumers with a stable market and things are getting worse, not better.[127]

(Endnotes)

[1] Oldenburg, Don, "Caught Over a Barrel: Soaring Gas Prices Have Motorists' Wallets Running on Empty," *The Washington Post*, May 4, 2004, C-1.

[2] Banerjee, Neela, "Drivers Tend to Shrug Off High Gas Prices, for Now," *The New York Times*, May 4, 2004, C-1.

[3] Oldenburg, May 4, 2004, p. C-1.

[4] Kovacic, William E., "Prepared Statement of the Federal Trade Commission," *Market Forces, Anticompetitive Activity and Gasoline Prices—FTC Initiatives to Protect Competitive Markets*, Subcommittee on Antitrust, Competition Policy and Consumer Rights, Committee on the Judiciary, United States Senate, April 7, 2004.

[5] Beattie, Jeff, "Gas Prices Still Climbing, EIA Says," *The Energy Daily*, April 12, 2004, citing Gary Caruso, Administrator of the Energy Information Administration. The Energy Information Administration, *Short Term Energy Outlook – March 2004*, dated March 9, 2004, stated that "about half of the increase reflects higher crude oil prices, with the remainder reflecting the impact of low inventories, robust demand, and uncertain availability of imports."

[6] Gerth, Jeff, "Higher Oil Prices Are Damaging Global Economy, a Study Shows," *The New York Times*, May 4, 2004, C-6, quoting Gary Caruso, Administrator of the Energy Information Administration.

[7] Industrial Energy Consumers of America, *41 Month Natural Gas Crisis Has Cost U.S. Consumers $111 Billion*, Washington, December 3, 2003.

[8] Romero, Simon, "Natural Gas Prices Surge and Fingers are Pointing," *The New York Times*, December 13, 2003, p. C-1.

[9] "Heating Costs Going Through Roof," *CBS Evening News*, Jan. 20, 2004, www.cbsnews.com; Mayer, Caroline E., "The Cost of Keeping Warm: Weather Threatens to Push Heating Bills to New Heights," *The Washington Post*, January 17, 2002, p. E-1; Hopper, Michael, "Heating Costs Pinch Pockets," *Topeka Capital-Journal*, January 18, 2004; "Low Temperatures, High Prices," *York Daily Record*, January 19, 2004.

[10] At the hearing on *Market Forces, Anticompetitive Activity and Gasoline Prices—FTC Initiatives to Protect Competitive Markets* Subcommittee on Antitrust, Competition Policy and Consumer Rights, Committee on the Judiciary, April 7, 2004, Senator Schumer responded to the statement by Mr. Kovacic by pointing out that the domestic oil companies profit when OPEC's actions raises the price of crude,.

[11] At the hearing on *Market Forces, Anticompetitive Activity and Gasoline Prices—FTC Initiatives to Protect Competitive Markets* Subcommittee on Antitrust, Competition Policy and Consumer Rights, Committee on the Judiciary, April 7, 2004, Senator Wyden appeared as the first witness and raised the issue of market structure.

[12] The study cited was Energy Information Administration, "Price Changes in the Gasoline Market: Are Midwestern Gasoline Prices Downward Sticky?" (Washington, February 1999).

[13] The Clean Air Act of 1990 started the shift to natural gas in the electricity sector.

[14] In fact, at the time of the 1995 changes in Clean Air Act requirements, the Department of Energy conducted a study of the impact of environmental requirements on the refining industry. It concluded that "pollution abatement operating costs have been and continue to be a small part of overall operating costs." (U.S. Department of Energy, Energy Information Administration, *The Impact of Environmental Compliance Costs on U.S. Refining Profitability* [Washington, October 1997], p. 3). The study shows operating costs per gallon associated with pollution abatement at about $.01 per gallon and large capital costs for a short period of time to meet new requirements, but these had already begun to decline by 1995. The impact of capital expenditures must also be small, in the range of a penny per gallon. Other studies lead to similar estimates of costs associated with pollution abatement of a few cents per gallon; see Nadim, Farahad, et al., "United States Experience with Gasoline Additives," *Energy Policy*, 29, 2001. Similarly, general reviews of the industry at the time concluded that "a close examination reveals that the change in refining costs attributable to RFG had no major impact on margin behavior between 1993 and 1995" (U.S. Department of Energy, Energy Information Administration, *Petroleum 1996: Issues and Trends* [Washington, September 1997], p. 137). In fact, overall operating costs have been declining. Peterson, D.J. and Serej Mahnovski, *New Forces at Work in Refining: Industry Views of Critical Business and Operations Trends* (Santa Monica, CA: RAND Corporation, 2003), p.

xv, note that following "a wave of mergers, acquisitions, joint ventures and selective divestitures… [whose] aim was cutting costs, gaining economies of scale, increasing returns on investment, and boosting profitability…" consolidation and restructuring appear to have had the salutary effect executives intended, "EIA data indicates that mid and large-size refiners reduced their per barrel operating costs."

[15] Energy Information Administration, *Summer 2003 Motor Gasoline Outlook* (Washington, April 2003), analyzes the spread.

[16] The evidence indicates that natural gas markets are regional rather than global because of "the existence of a capital intensive and inflexible transportation system," (Soderholm, P., "Fuel Flexibility in Western European Power Sector," *Resource Policy*, 26, 2000, p. 162, cited in Ewing, Bradley T., Farooq Malik and Ozan Ozfidan, "Volatility Transmission in the Oil and Natural Gas Markets," *Energy Economics*, 24, 2002, p. 536. The authors also cite Energy Information Administration, *Performance Profiles of Major Energy Producers* [Washington, 1998]).

> Thus, we find significant direct and indirect transmission of volatility from the natural gas sector to the oil sector. Our results do not indicate that volatility in the oil returns is affected by shocks originating either in the oil sector… or the gas sector… In addition, the estimated coefficient on the cross error term is insignificant, suggesting the absence of an indirect effect of shocks in the natural gas sector on the oil sector.

[17] The prediction equation is Domestic Spread = 1.545 + (Product Supplied * .004524) +(Month of Year * .1562) + Seasonal Adjustment (based on historic averages, Ja=0; F,M,A,O,N,D=-1; M=1,June=4,July=5, A=1)

[18] Wellhead Price= (Crude * .67)/5.75.

[19] Wellhead Price= (Crude * .67)/5.75) + (Month * .137) (N, F =1; D, Ja=2, all others =0).

[20] Available at http://www.bls.gov/cex/home.htm. Exhibit II-9 uses the average for all households. The Energy Information Administration, *Residential Energy Consumption Survey*, allows one to calculate the averge for households that use a fuel, as well as for all households.

[21] Public Citizen, *Record Oil Company Profits Underscore Market Consolidation*, May 31, 2001; Fortune 500, July 18, 2001; *Business Week*, First Quarter Results, May 21, 2001.

[22] *Fortune 500*, July 18, 2001.

[23] *Business Week*, Spring 2001, p. 92.

[24] U.S. Department of Energy, Energy Information Administration, *Performance Profile* (Washington, 2001), pp. 7-8.

[25] "A Record Setting Year," *National Petroleum News*, March 2004.

[26] Energy Information Administration, *Performance Profiles of Major Energy Producers: 2002* (Washington, February 2004), p. 20.

[27] Energy Information Administration, *Performance Profiles of Major Energy Producers: 2001* (Washington, January 2003), p. 78.

[28] Even introductory economics texts now contain long discussions of strategic behavior and game theory [see, for example, Taylor, John B., Economics (Boston: Houghton Mifflin, 1998), Chapter 11] and it has become a routine part of applied policy analysis [Hastings, Justine, "Factors that Affect Prices of Refined Petroleum Products" (Washington, Federal Trade Commission Public Conference, August 2, 2001)].

[29] Ye. Michael, John Zyren and Joanne Short, "Elasticity of Demand for Relative Petroleum Inventory in the Short Run," *International Atlantic Economic Journal*, March 2003; Linn, ScottC. And Zhen Zhu, "Natural Gas Prices and The Gas Storage Report: Public News and Volatility in Energy Futures Markets," *Journal of Futures Markets*, 24: 2004; Esnault, Benoit, "The Need for Regulation fo Gas Storage: The Case of France," *Energy Policy*, 31: 2003.

[30] Federal Trade Commission, *Midwest Gasoline Price Investigation* (Washington, March 29, 2001.

[31] Federal Trade Commission, *Midwest Gasoline*, pp. i... 4.

[32] Peterson and Mahnovski, p. 16.

[33] Peterson and Mahnovksi, p. 42.

[34] Peterson and Mahnovski, p. 17.

[35] Peterson and Mahnovksi, p. 17.

[36] Peterson and Mahnovski, p. xvi.

[37] Federal Trade Commission, *Midwest Gasoline*, note 23, citing Organization for Economic Co-operation and Development and Department of Energy documents states "Higher crude prices led producers to draw down inventories in anticipation of replacing them later at lower prices."

[38] National Energy Policy Development Group, *National Energy Policy* (Washington, May 2001), p. 7-13 (hereafter NEPDG).

[39] They certainly have value on the stock market (see Edwards, Kenneth, John D. Jackson and Henry L. Thompson, "A Note on Vertical Integration and Stock Ratings of Oil Companies in the U.S.," *The Energy Journal*, 2000).

[40] "Oil Data Show Industry Role in Shortages a Possibility," *The New York Times*, June 15, 2001.

[41] Peterson and Mahnovksi, p. xv.

[42] NEPDG, p. 7-13.

[43] U.S. Department of Energy, Energy Information Administration, *Petroleum Supply Monthly* (Washington, April 2000), p. 145, defines the lower operational inventory as follows:

> Lower operational Inventory (LOI): The lower operational inventory is the lower end of the demonstrated operational inventory range updated for known and definable changes in the petroleum delivery system. While not implying shortages, operational problems or price increases, the LOI is indicative of a situation where inventory-related supply flexibility could be constrained or non-existent. The significance of these constraints depends on local refinery capability to meet demand and the availability and deliverability of products from other regions or foreign sources.

[44] The general literature on stock and storage behavior shows that stocks are typically kept to ensure operational flow (see Pyndick, Robert S., "Inventories and the Short-Run Dynamics of Commodity Prices," *RAND Journal of Economics*, Spring 1994, "The Present Value Model of Rational Commodity Pricing," *The Economic Journal*, May 1993).

[45] Energy Information Administration, *Petroleum 1996: Issues and Trends* (Washington, September 1997), p. 27. The U.S. Department of Energy identified "lower than normal gasoline stocks" in a chapter entitled "Spring '96 Gasoline Price Runup." Energy Information Administration, *Assessment of Summer 1997*, p. 5; "Statement of John Cook, Director, Petroleum Division, U.S. Department of Energy," *Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representative*, May 15, 2001, p. 1.

[46] Joanne Shore, Petroleum Division. The FTC reached a similar conclusion in its Midwest Gasoline Price Investigation, at note 23.

[47] "Statement of John Cook, Director, Petroleum Division, U.S. Department of Energy, *Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representative*, May 15, 2001, p. 1.

[48] U.S. Energy Information Administration, *Do Current High Petroleum Product Prices?* (Washington, March 12, 2003), pp. 1-2.

[49] U.S. Energy Information Administration, *Summer 2003 Motor Gasoline Outlook* (Washington, April 2003).

[50] Peterson and Mahnovksi, p. 43.

[51] *Balancing Natural Gas Policy: Fueling the Demands of a Growing Economy* (Washington, September 2003).

[52] Huntington, Hillard G. "Presentation to The Future of Natural Gas Markets: A Forum at RFF," November 21, 2004, *EMF 20: Natural Gas, Fuel Diversity and North American Energy Markets*, November 2003, shows the NPC estimate as an extreme outlier in terms of price.

[53] Energy Information Administration, *The Majors' Shift to Natural Gas* (Washington, September 2001).

[54] EIA, Performance Profiles: 2002, pp. 81-83.

[55] EIA, Performance Profiles: 2002, pp. 71-72.

[56] Beattie, Jeff, "U.S. Oil and Gas Producers Investing in Mergers, Not More Drilling – S&P," *Energy Daily*, April 26, 2004.

[57] Energy Information Administration, *The Natural Gas Industry and Markets in 2002* (Washington, February 2004), p. 3.

[58] EIA, *The Natural Gas Industry*, p. 2.

[59] Four years after the initial signs of trouble and in spite of reforms instituted by the Federal Energy Regulatory Commission, things were still bad, reflected "In numbers the FERC Chairman Pat Wood compared to a "cold shower," staff of the Federal Energy Regulatory Commission said Wednesday that only 20 percent of companies are reporting all of their natural gas trades and about 10 percent are reporting power trades to public indices." (Davis, Tina, "Gas Prices Reporting Better, But Still Lagging –FERC," *Energy Daily*, May 6, 2004.

[60] Moody, Dian, *Natural Gas Price Indices: Price Manipulation Issues* (Washington: American Public Power Association, January 2003).

[61] Caruso, Guy, *Outlook for Natural Gas & Petroleum*, Energy Information Administration, May 19, 2003; Trapman, William, *Natural Gas Storage*, Energy Information Administration, October 29, 2002, show the low levels of storage in early 2001 and 2003. Policy Development and Energy Sections, *Natural Gas Price Volatility*, June 3, 2003, pp. 3-4, notes storage is in 2003 at the start of the injection season was "50% lower than the previous year" and that "high prices of gas during the storage season make firms think twice about making purchases of gas for injection."

[62] Bradley, Malik and Ozfidan, p. 536.

[63] Johnson, Jeff, "Chemical CEOs Protest Natural Gas Prices," *Chemical and Engineering News*, Feb. 2, 2004.

[64] Lobensz, George, "CFTC Probing Manipulation of Natural Gas Storage Data," *Energy Daily*, May 5, 2004.

[65] Scherer, F. M. and David Ross, *Industrial Market Structure and Economic Performance* (Boston: Houghton Mifflin, 1990). Shepherd, William G., *The Economics of Industrial Organization* (Englewood Cliffs, NJ: Prentice Hall, 1985).

[66] Scherer and Ross, p. 15.

[67] Scherer and Ross, pp. 16…17.

[68] Summarizing the literature, Scherer and Ross, pp. 53-54, develop a long list of characteristics.

[69] Landes, W. M. and R. A. Posner, "Market Power in Anti-trust Cases," *Harvard Law Review*, 19: 1981, two prominent conservative economic analysts offer a similar concept. The most frequent starting point for a discussion of the empirical measurement of the price impact of monopoly power is the *Lerner Index*. As Scherer and Ross (pp. 70…71) note, the *Lerner Index* is defined as:

L = (Price – Marginal Cost)/ Price.

> Its merit is that it directly reflects the allocatively inefficient departure of price from marginal cost associated with monopoly. Under pure competition, [Ll]=0. The more a firm's pricing departs from the competitive norm, the higher is the associated Lerner Index value. A related performance-oriented approach focuses on some measure of the net profits realized by firms or industries.

Landes and Posner (pp. 938-945) state the price cost margin as the firm's elasticity of demand. They then transform the index into an expression that uses market shares of firms and the market elasticity of demand and supply:

> We point out that the Lerner index provides a precise economic definition of market power, and we demonstrate the functional relationship between market power on the one hand and market share, market elasticity of demand, and supply elasticity of fringe competitors on the other.

$$L = \frac{(P - C)}{P} = \frac{1}{E_d} \qquad \frac{S_d}{e_m + e_j (1 - s_i)}$$

where:

S_d = the market share of the dominant firm

e_m = elasticity of demand in the market

e_s = elasticity of supply of the competitive fringe

s_j = market share of the fringe.

In words this formula says that the markup of price over cost will be directly related to the market share of the dominant firm and inversely related to the ability of consumers to reduce consumption (the elasticity of demand) and the ability of other firms (the competitive fringe) to increase output (the elasticity of this supply). These are market characteristics and fundamentals that are accessible to economic analysts.

[70] Pillipovic, Dragana, *Energy Risk: Valuing and Managing Energy Derivates* (New York: McGraw-Hill, 1998), p. 3.

[71] Energy Information Administration, *Price Changes in the Gasoline Market* (Washington, March 1999), reviews several decades of studies with mixed results in the analysis of gasoline price asymmetry – the tendency of prices to increase rapidly, but fall slowly. The report concludes that there is strong evidence of pattern asymmetry (i.e. prices do rise faster than they fall) but not amount asymmetry (eventually they fall back all the way). This is not the majority view, however.

[72] Reilly, Barry and Robert Witt, "Petrol Price Asymmetry Revisited," *Energy Economics*, 1998.

[73] Bacon, Robert W., "Rockets and Feathers: The Asymmetric Speed of Adjustment of UK Retail Gasoline Prices to Cost Changes," *Energy Economics*, 1991; Galeotti, Marzio, Alessandro Lanza and Matteo Manera, "Rockets and Feathers Revisited: An International Comparison on European Gasoline Markets," *Energy Economics*, 2003; Borenstein, Severin and Andrea Shepard, "Sticky Prices, Inventories and Market Power in Wholesale Gasoline Markets," *RAND Journal of Economics*, 2002, p. 322; U.S. General Accounting Office, "Energy Security and Policy: Analysis of the Pricing of Crude Oil and Petroleum Products" (Washington, March 1993). Moreover, one fundamental difference between the price spikes of recent years and the "rockets and feathers" debate should be underscored. In the recent circumstances, we are not dealing with crude oil price changes alone, so the question is not whether refiner/marketer margins "catch up," or whether some of the change in crude oil price ends up in the refiner/marketer pockets (bottom line). The recent price spikes have been significantly driven by refiner/marketer margins. Even if margins return to historic levels after the spike, there is no doubt that a net increase in marketer margins has occurred.

[74] *National Energy Policy*, p. 3-13.

[75] Espey, Molly, "Gasoline Demand Revisited: An International Meta-Analysis of Elasticities," *Energy Economics* 20, 1998, 273-295, identifies 363 estimates of short-term elasticity. The median is -.23 for the short term and -.43 for the long term. Kayser, Hilke A., "Gasoline Demand and Car Choice: Estimating Gasoline Demand Using Household Information," *Energy Economics*, 22, 2000, estimated the short-term elasticity in the U.S. at -.23. Puller, Steven L. and Lorna A. Greening, "Household Adjustment to Gasoline Price Change: An Analysis Using 9 Years of US Survey Data," *Energy Economics*, 21, 1999, pp. 37-52, find a one-year price elasticity of -.34, but model a more complex structure of responses within shorter periods. They find a larger elasticity of miles traveled in the first quarter after a price shock (-.69 to -.76), but that demand "snaps back." The larger reduction in miles driven is still "inelastic." Moreover, the reduction in miles driven is larger than the reduction in fuel consumed since it appears that households cut back on the most efficient driving miles (i.e. higher speed vacation miles).

[76] Espy, Molly, "Explaining the Variation in Elasticity Estimates of Gasoline Demand in the United States: A Meta-analysis," *The Energy Journal*, 17, 1996, Table 2, shows the average elasticity of demand for U.S. only studies at -.42.

[77] See Bohi, Douglas R. *Analyzing Demand Behavior: A Study of Energy Elasticities* (Baltimore: Johns Hopkins University Press, 1981);

[78] Federal Trade Commission, *Midwest Gasoline Price Investigation* (Washington, March 29, 2001), pp. i…4.

[79] Consodine, Timothy J. and Eunnyeong Heo, "Price and Inventory Dynamics in Petroleum Product Markets," *Energy Economics*, 22, 2000, p. 527, conclude "supply curves for the industry are inelastic and upward sloping." See also "Separatiblity, Functional Form and Regulatory Policy in Models of Interfuel Substitution," *Energy Economics*, 1989.

[80] Consodine, Timothy J., "Inventories Under Joint Production: An Empirical Analysis of Petroleum Refining," *Review of Economics and Statistics*, 1997, p. 527, "high inventory levels depress prices… In some cases, imports of product are more variable than production or inventories.

[81] Pirrong, Stephen Craig, *The Economics, Law and Public Policy of Market Power Manipulation* (Boston: Kluwer, 1996), pp. 10… 24… 59. See also, Williams, Jeffrey and Brian Wright, *Storage and Commodity Markets* (Cambridge: Cambridge University Press, 1991); Deaton, Angus and Guy Laroque, "On the Behavior of Commodity Prices," *Review of Economics and Statistics*, 1992.

[82] Friedman, David, et. al., *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles* (Washington, D.C.: Union of Concerned Scientists, June 2001). Friedman, David, *A New road: The Technology and Potential of Hybrid* (Washington, D.C.: Union of Concerned Scientists, January 2003), lays out a scenario in which conventional vehicles move to 40 MPG and hybrids move to 60 MPG.

[83] EIA, *Monthly Energy Review*, Table 3.1a.

[84] EIA, *Monthly Energy Review*, Table 4.4.

[85] Ellioit, R. Neal, Anna Monis Shipley, Steven Nadel and Elizabeth Brown, *Natural Gas Price Effects of Energy Efficiency and Renewable Energy Practices and Policies* (Washington: American Council for an Energy Efficient Economy, December 2003).

[86] Shepherd, p. 389.

[87] Landes and Posner, 1981; Ordover, J.A. and R. D. Willig, "Herfindahl Concentration, Rivalry, and Mergers," *Harvard Law Review*, 95, 1982.

[88] W. Kip Viscusi, John M. Vernon, and Joseph E. Harrington, Jr., *Economics of Regulation and Antitrust* (Cambridge: MIT Press, 2000), pp. 147-150.

[89] Landes and Posner, p. 947. "Since market share is only one of three factors in equation (2) that determine market power, inferences of power from share alone can be misleading… The proper measure will attempt to capture the influence of market demand and supply elasticity on market power."

[90] Landes and Posner, p. 942.

[91] Waverman, Leonard, "Econometric Modelling of Energy Demand: When Are Substitutes Good Substitutes?," *Energy Demand: Evidence and Expectations* (Surrey University Press, 1992), p. 16. Urga, Giovanni and Chris Walters, "Dynamic Translog and Linear Logit Models: A Factor Demand Analysis of Interfuel Substitution in US. Industrial Energy Demand," *Energy Economics*, 25:2003, p. 18, concludes that "estimates of long run cross elasticities are well below the threshold of unity."

[92] U.S. Department of Justice and Federal Trade Commission *Horizontal Merger Guidelines* (Washington, 1997), at section 0.1.

> The rule of thumb reflected in all iterations of the Merger Guidelines is that the more concentrated an industry, the more likely is oligopolistic behavior by that industry.... Still, the inference that higher concentration increases the risks of oligopolistic conduct seems well grounded. As the number of industry participants becomes smaller, the task of coordinating industry behavior becomes easier. For example, a ten-firm industry is more likely to require some sort of coordination to maintain prices at an oligopoly level, whereas the three-firm industry might more easily maintain prices through parallel behavior without express coordination.

[93] Taylor, Chapter 11; Viscusi, Vernon, and Harrington, Chapter 5; Jean Fudenberg and Jean Tirole, "Noncooperative Game Theory for Industrial Organization: An Introduction and Overview," in Richard Schmalensee and Robert D. Willig, (eds.) *Handbook of Industrial Organization* (New York: North-Holland, 1989).

[94] Peterson and Mahnovksi, p. 24.

[95] Scherer and Ross, p. 526, formulate the issue as follows "To avoid these hazards, firms entering either of the markets in question might feel compelled to enter both, increasing the amount of capital investment required for entry."

[96] Shepherd, pp. 289-290, describes this issue as follows:

> When all production at a level of an industry is "in-house," no market at all exists from which independent firms can buy inputs. If they face impediments or delays in setting up a new supplier, competition at their level will be reduced. The clearest form of this is the rise in capital a new entrant needs to set up at both levels.
>
> Ores, special locations, or other indispensable inputs may be held by the integrated firm and withheld from others. The integration prevents the inputs from being offered in a market, and so outsiders are excluded. A rational integrated firm might choose to sell them at a sufficiently high price.

[97] Shepherd, p. 294, argues that integration by large firms creates this problem. Restrictions may be set on areas, prices or other dimensions … Only when they are done by small-share firms may competition be increased. When done by leading firms with market shares above 20 percent, the restrictions do *reduce* competition.

[98] Perry, Martin K., "Vertical Integration: Determinants and Effects," in Schmalensee and Willig (eds.), *Handbook of Industrial Organization,* p. 197.

[99] Perry, p. 247.

[100] Scherer and Ross, pp. 526-527; Shepherd, p. 290.

[101] Borenstein, Severin, A. Colin Cameron and Richard Gilbert, "Do Gasoline Prices Respond Asymmetrically to Crude Oil Price Changes?" *Quarterly Journal of Economics*, 1997.

[102] Scherer and Ross, pp. 526-527; Shepherd, p. 290.

[103] Gilbert, Richard and Justine Hastings, "Vertical Integration in Gasoline Supply: An Empirical Test of Raising Rivals' Costs" (Competition Policy Center, University of California, Berkeley, 2001), p. 27; see also Hastings, Justine, "Vertical Relationships and Competition in Retail Gasoline Markets: Empirical Evidence from Contract Changes in Southern California" (Competition Policy Center, University of California, Berkeley, 2000).

[104] In 1990, 22 integrated companies covered an average of 28 states. In 1999, 17 companies covered an average of 26 states.

[105] "Beattie, Judge Green Lights Lawsuit," p. 3.

[106] Landes and Posner, p. 947, stress the importance of adjusting scrutiny based on the market characteristics:

> Market Share Alone Is Misleading. -Although the formulation of the Lerner index… provides an economic rationale for inferring market power from market share, it also suggests pitfalls in mechanically using market share data to measure market power. Since market share is only one of three factors... that determine market power, inferences of power from share alone can be misleading. In fact, if market share alone is used to infer power, the market share measure… which is determined without regard to market demand or supply elasticity (separate factors in the equation), will be the wrong measure. The proper measure will attempt to capture the influence of market demand and supply elasticity on market power.

[107] Landes and Posner, p. 954, also argued that the size of the market at issue should be considered, "if very high market shares are required to justify a finding of monopoly power in a small market, then a lower market share should suffice in a large market."

[108] Recent studies that document the importance of concentration and market power in various markets at a micro level include Sen Anindya, "Higher Prices at Canadian Gas Pumps: International Crude Oil Prices of Local Market Concentration," *Energy Economics*, 2003; Delpachitra, Sarath B., "Price Rigidity in the Downstream Petroleum Industry in New Zealand: Where Does it Happen," *Energy Economics*, 2002; Adrangi, Bahram, Arjun Chatrath, Kambiz Raffiee, and Ronald D. Ripple, "Alaska North Slope Crude Oil Price and the Behavior of Diesel Prices in California," *Energy Economics*, 2001; Gilbert and Hastings; Borenstein, Cameron and Gilbert.

[109] "Text of the Speech of President Bush," in releasing the National Energy Task Force Report, *The Washington Post,* May 18, 2001.

[110] Secretary of the Treasury O'Neill recounts that the Vice President responded to the criticism of some of the administration policies with the blunt statement that, "We won the mid-terms [elections], this is our due."

The Washington Post, January 18, 2004, F-3. The quote is from Secretary of the Treasury O'Neill's account of vice President Cheney's reaction to O'Neill's complaint that the tax cuts would create a severe fiscal crisis.

[111] "Supreme Court to Hear Cheney Task Force Case," *Energy Daily,* December 16, 2003.

[112] *Frontline*, June 6, 2001.

[113] The California Attorney General reached a settlement with Dynegy for $280 million to settle complaints about price manipulation in about 6 months in 2000-2001. Included in the total was a settlement of $3 million that the Federal Energy Regulatory Commission had reached with Dynegy. In other words, the FERC has agreed to just about one penny on the dollar of the ultimate abuse (see Davis, Teena, "Dynegy Settle Power Fight with California," *Energy Daily,* April 28, 2004).

[114] Beattie, Jeff, "FERC Still Unsure About Reliability of Gas Price Reporting," *Energy Daily*, November 5, 2003.

[115] Kubo, Toru, Harvey Sachs, and Steven Nadel, *Opportunities for New Appliance and Equipment Efficiency Standards: Energy and Economic Savings Beyond Current Standards Programs* (Washington, D.C.: American council for an Energy-Efficient Economy, September 2001). Nadel, Steve and Howard Geller, *Smart Energy Policies: Saving Money and Reducing Pollutant Emissions through Greater Energy Efficiency* (Washington, D.C.: American Council for an Energy Efficient Economy, September 2001).

[116] King, Llewellyn, "The Energy Pig-Out Has Been Delayed," *Energy Daily*, December 2, 2003.

[117] King identifies half a dozen columnists and newspapers who are usually strong supporters of President Bush who find the bill unacceptable.

[118] Federal Trade Commission, *Midwest Gasoline Price Investigation*, March 29, 2001, pp. i…4.

[119] Energy Information Administration, *Horizontal Market Power in Restructured Electricity Markets* (March 2000).

[120] Cleveland, Cutler J. and Robert K. Kaufman, "Oil Supply and Oil Politics: Déjà vu All Over Again," *Energy Policy*, 31, 2003, pp. 485-487, point out the obvious math of the situation.

[121] Cleveland and Kaufman, p. 488.

[122] Cleveland and Kaufman, p. 488, note that "Just a 3 mile-per-gallon increase in the fuel efficiency of SUVs alone would reduce the US oil consumer of more than ANWR could supply," citing American Council for an Energy-Efficient Economy, *Vehicle Fuels Economy Standards: Big Energy Savings at a Modest Cost*, 2001.

[123] Friedman, et al.

[124] Peterson and Mahnovski, p. 5, note the following:

> Oil industry research, analyses and policy dialogs conducted in both the private and public sectors tend to emphasize the natural resource side of the business – upstream crude oil exploration and production. Much less analysis and discussion is devoted to oil companies as the downstream manufacturers of intermediate and finished petroleum products.

[125] Peterson and Mahnovski, p. 5.

[126] Harwood, J., "Americans Distrust Institutions in Poll," *Wall Street Journal*, June 13, 2002, cited in Peterson and Mahnovski, *New Forces At Work*, p. 19.

[127] For other products, imports play a larger role, close to 10 percent for distillate and 50 percent for residual fuel oil.