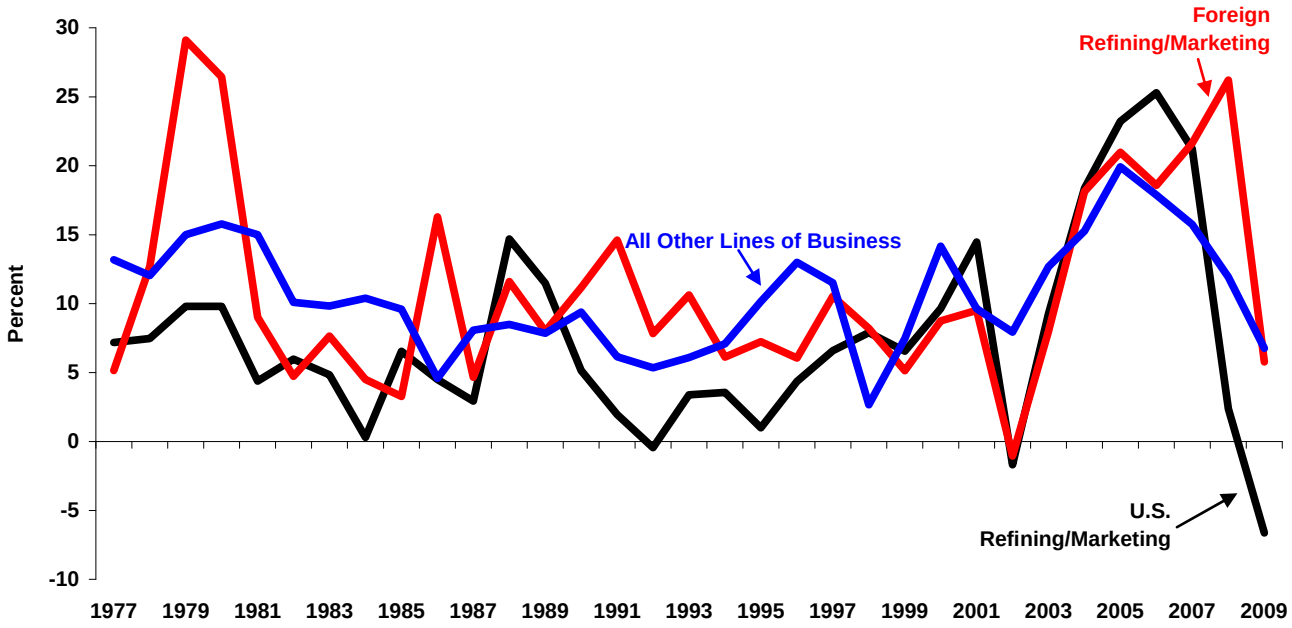
Refining and Marketing

U.S. Refining/Marketing

The average profitability (contribution to net income divided by net investment in place or return on investment (ROI)) of U.S. refining/marketing operations of the respondents to the Financial Reporting System (FRS) survey was negative 7 percent in 2009 (**Figure 18**), the lowest in the 33-year history of the FRS. Further, because the loss of 2009 almost immediately followed an unusually profitable 5-year period (2004 through 2008) that included the 4 highest returns in the history of the FRS, the perception of the loss may be magnified.

Changes in the profitability of the FRS companies generally happen for two reasons: differences in the rate of change of FRS[21] product prices relative to the rate of change of the crude oil price; and changes in operating costs. Reductions in operating costs due to successful cost-cutting efforts during the 1990s and early 2000s led to increased profitability during that period **(**see **Figure 6** in the **"Financial Developments"** section). Subsequently, product prices grew faster than crude oil prices during 2004-2008,[22] leading to a period of unusually high profitability. Relative to 2008, 2009 product prices fell by more than did crude oil prices, resulting in lower profitability. Concurrent reductions in operating costs (**Table 13**) were insufficient to prevent the largest loss in the history of the FRS.[23]

Figure 18. Return on Investment in U.S. and Foreign Refining/Marketing,[a] and All Other Lines of Business for FRS Companies, 1977-2009



[a]: International Marine has been combined with Foreign Refining/Marketing for the years 2003-2009 to avoid disclosure of company-level data.

Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

[21] Unless stated otherwise, all references to things such as prices and volumes are those reported by the FRS companies.

[22] The weighted-average profitability over 2003-2008 was 16 percent, and the weighted-average profitability of the 1990-2002 period was 5 percent.

[23] Although low earnings often occur over the history of the FRS, losses are unusual, occurring only in 1992, 2002, and 2009.

Table 13. Sales, Prices, Costs, and Margins in U.S. Refining/Marketing for FRS Companies, 2008-2009

	2008	2009	Percent Change 2008-2009
Refined Product Sales (Million Barrels per Day)[a]	20.4	20.6	1.0
	(2009 dollars per barrel)		
Gasoline Average Price	110.05	74.46	-32.3
Distillate Average Price	126.39	70.96	-43.9
Other Products Average Price	80.87	51.09	-36.8
All Refined Products Average Price	110.20	69.41	-37.0
Less: Raw Materials Costs and Product Purchases	98.97	62.46	-36.9
Equals: Gross Refining Margin	11.23	6.95	-38.1
Less: Operating Costs	9.73	7.31	-24.9
Equals: Net Refining Margin[b]	1.49	-0.36	n.a.
Reseller/wholesaler spread (dealer price - wholesale price)	4.99	2.32	-53.5
Retailer spread (company-operated price - dealer price)	8.74	7.69	-12.0

[a]Refined product sales include sales for resale to other FRS companies and sales of imported products.

[b]The components to calculate the refined product margin may be retrieved from the EIA website at http://tonto.eia.doe.gov/cfapps/frs/frstables.cfm?tableNumber=28. Note that the table may be customized by changing the years selected.

n.a.: not applicable

Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

The net refined product margin (net margin) strongly correlates with profitability.[24] Examination of the components of the net margin usually illuminates the underlying reasons for changes in the profitability of U.S. refining/marketing operations. The net margin is the gross margin[25] minus operating costs per barrel of refined product sold. The negative $0.36-per-barrel net margin of 2009 was the lowest (in terms of 2009 dollars) [26] in the 33-year history of the FRS (see **Figure 6**, above) and the only time that a negative net margin occurred.

The average gross refining margin reported by the FRS companies in 2009 fell 38 percent compared with 2008 (**Table 13**). The average price received for petroleum products in 2009 decreased almost $41 per barrel relative to the 2008 value, while raw materials and purchased product costs fell almost than $37 per barrel to $62.46. These changes resulted in a $4.27-per-barrel decrease in the gross refining margin to $6.95. Further, the gross margin of 2009 was almost the lowest in the history of the FRS, exceeding only 1999's $6.91 gross margin.

[24] The net margin highly correlates with return on investment. The latest estimation of the relationship between refining margins and profitability is that the correlation coefficient is 0.94. Regressing the change in the U.S. refining/marketing return on investment (ROI) on the change in the net refining margin (2009 dollars) yielded the following estimated equation: diff ROI = -0.124 (0.411) + (diff net margin * 4.803 (0.324)), where the standard error of each estimated coefficient is listed in parentheses. The adjusted R-squared is 0.875. The F-statistic for the regression equation is 218.53, which is significant at a 99-percent level of confidence. The data used to estimate the relationship are for the years 1977 through 2009. Statistical testing indicates that a structural change may have occurred in 1998 when the FRS selection criteria changed and that the 2004 data may be an outlier, but incorporating adjustments to account for these does not materially affect the estimation results.

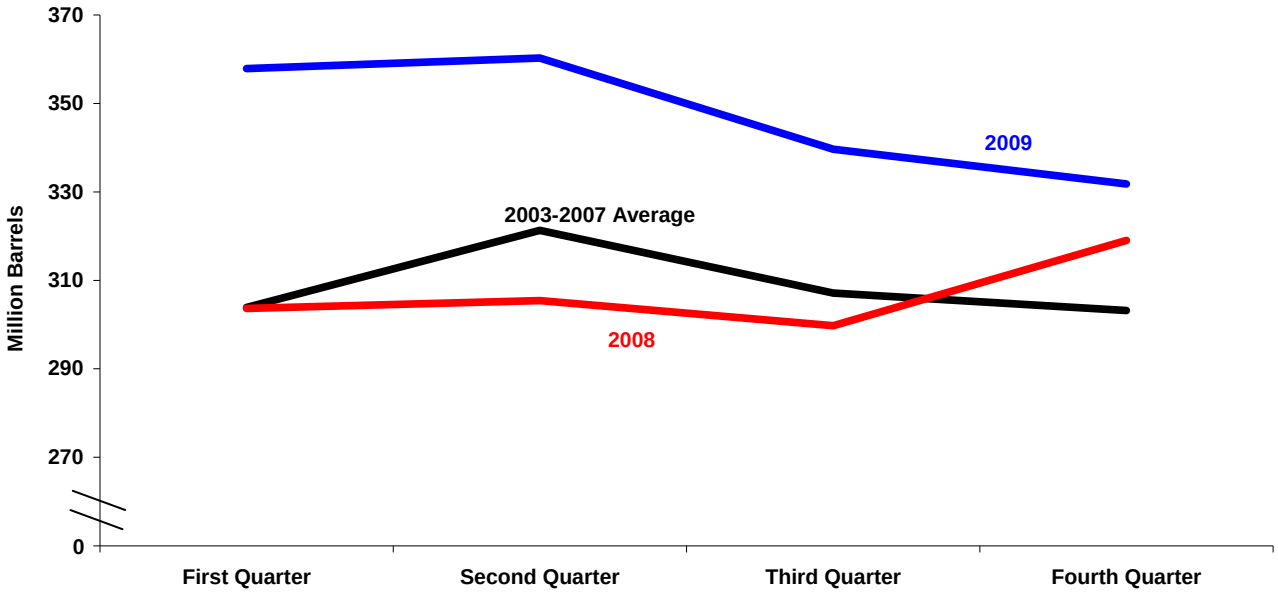
[25] For more detailed definitions, see the Brief Description of Financial Terms section.

[26] Unless otherwise indicated, all dollar values and percentage changes in this report are in constant 2009 dollars, adjusted using the Gross Domestic Product implicit price deflator.

Revenues and Costs

Industry-wide U.S. crude oil stock levels were higher in 2009, especially early in the year, than both 2008 and the average for 2003-2007 (**Figure 19**). This put downward pressure on industry-wide crude oil prices. During most of 2009 industry-wide crude oil prices were lower than in 2008 and resulted in a 37-percent lower average price.[27] These changes contributed to the 36-percent decrease in FRS raw material and purchased product costs for 2009 relative to 2008 (**Table 13**).[28]

Figure 19. Quarterly Average U.S. Crude Oil Stocks, 2003-2007 Average, 2008, and 2009



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly* , DOE/EIA-0109 (Various issues, Washington, DC), Table 51.

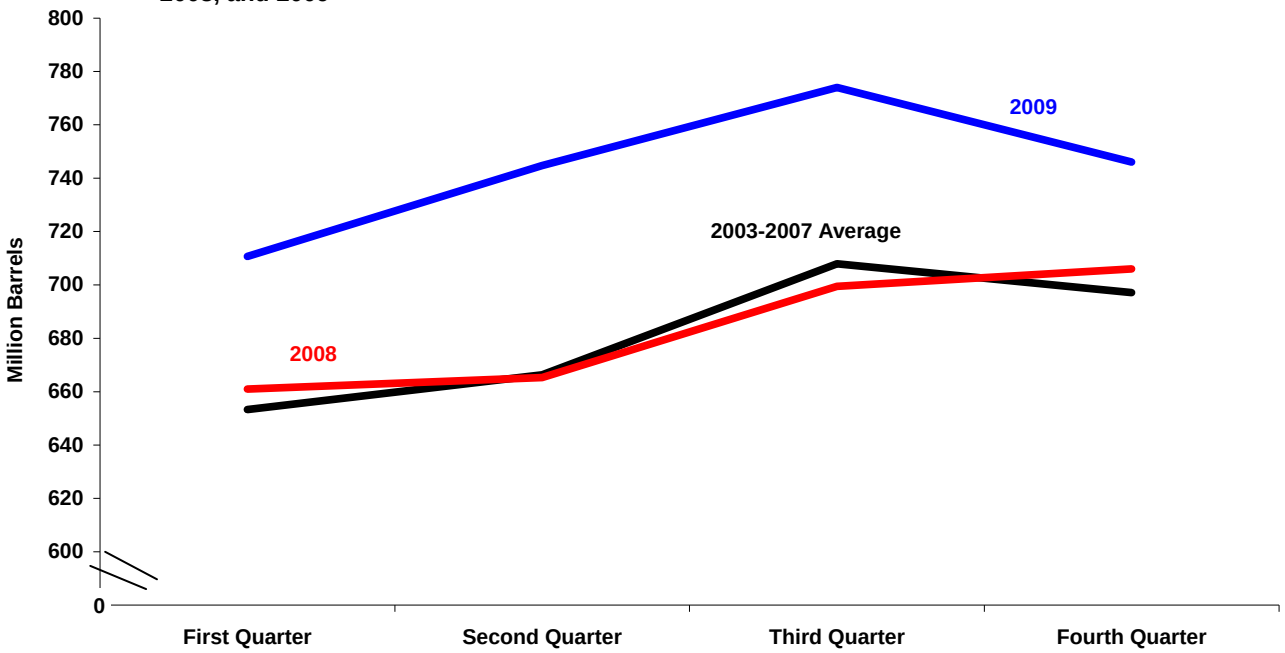
Petroleum product prices tend to move with crude oil prices, both of which fell in 2009 (compared with 2008). Additionally, industry-wide stocks of petroleum products were higher in 2009 than in 2008 (and the average over 2003-2007) throughout the year (**Figure 20**). Although relatively high petroleum product stocks levels put downward pressure on product prices in general, total motor gasoline[29] stock levels were essentially unchanged in 2009 relative to 2008 (or the average over 2003-2007) (**Figure 21**) and exerted little pressure on motor gasoline prices.

[27] Calculated for composite refiner acquisition cost of crude oil, see U.S. Energy Information Administration, *Petroleum Marketing Monthly* (October 2010), Table 1.

[28] Crude oil stock levels are only one of many factors affecting the price of crude oil. See the *Short-Term Energy Outlook* for a broader discussion of crude oil prices (http://www.eia.gov/emeu/steo/pub/contents.html as of November 9, 2010).

[29] Total motor gasoline stocks are stocks of both finished motor gasoline and motor gasoline blending components. This measure of motor gasoline, rather than only finished motor gasoline, is used because the substitution of ethanol for MTBE has changed the storage pattern of motor gasoline. Less finished motor gasoline and more unfinished motor gasoline is now stored nationwide. Ethanol is added to unfinished gasoline at the terminal, only then creating finished reformulated motor gasoline.

Figure 20. Quarterly Average U.S. Commercial Petroleum Product Stocks, 2003-2007 Average, 2008, and 2009



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly* , DOE/EIA-0109 (Various issues, Washington, DC), Table 51.

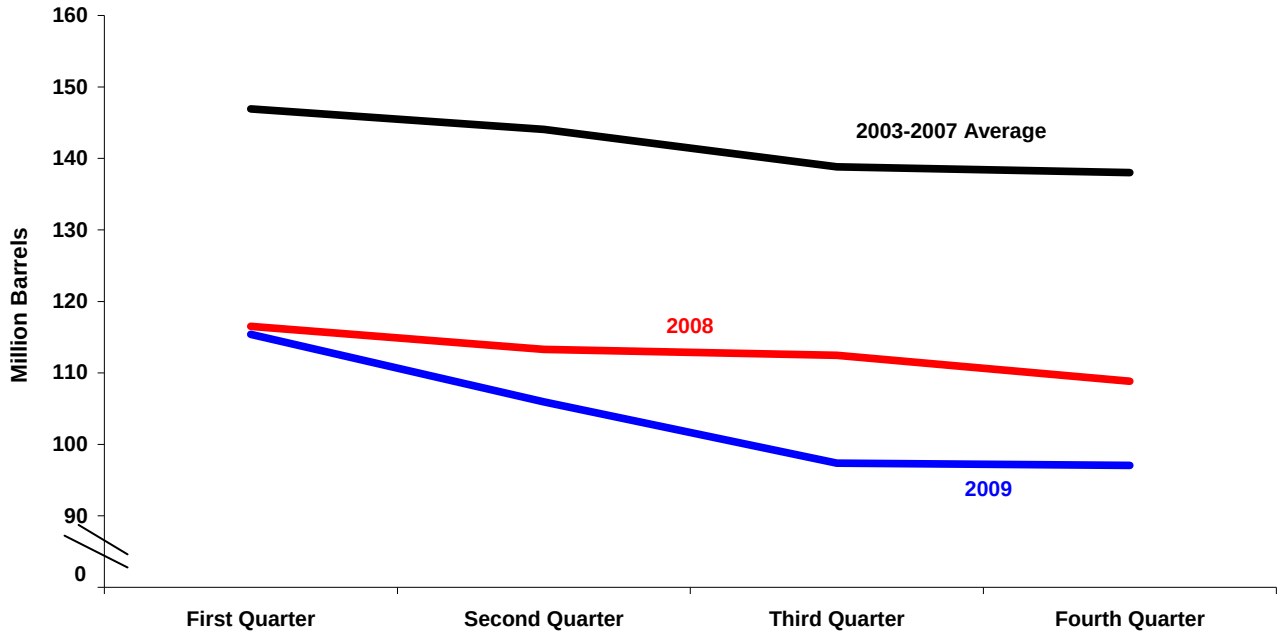
FRS petroleum product sales increased 1 percent in 2009 relative to 2008 (**Table 13**), largely because of the addition of Alon, Chalmette, and Western Refining[30] to the FRS group, against an industry backdrop of a 4-percent decline in product sales.[31] Product sales are composed chiefly of motor gasoline and distillate. Gasoline sales increased 4 percent while distillate sales decreased slightly more than 1 percent. Sales of all other petroleum products declined 2 percent in 2009 relative to 2008 (**Table 14**). Negligibly higher sales and much lower average petroleum product prices reduced domestic petroleum product sales revenues by $298 billion (**Table 15**). Meanwhile, operating costs fell by $284 billion, resulting in a decline in operating income of more than $18 billion (including the decline in other revenue). Comparing 2009 with 2008, the changes in revenues and costs resulted in an operating loss of more than $12 billion and a net loss (including special items) of more than $9 billion in 2009.

Those operating expenses most closely associated with refining and marketing operations decreased by 25 percent on a per-barrel basis between 2008 and 2009 (**Table 13**), led by decreases in refining energy costs and other operating costs (**Table 14**).

[30] Product sales for Chalmette are not publicly available, however Alon and Western Refining accounted for almost 0.35 million barrels of product sales. Thus, in the absence of only Alon and Western, FRS petroleum product sales would have declined by more than 0.14 million barrels, or 0.7 percent. See Alon USA Energy Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 57; and Western Refining Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 43.

[31] U.S. Energy Information Administration, *Monthly Energy Review* (September 2010), Table 3.1.

Figure 21. Quarterly Average Total U.S. Motor Gasoline Stocks, 2003-2007 Average, 2008, and 2009



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly* , DOE/EIA-0109 (Various issues, Washington, DC), Table 51.

Energy costs decreased by $1.20 to $1.32 per barrel,[32] their lowest level since 2002 and one of the lowest levels ever reported in the history of the FRS.[33] Average wellhead natural gas prices fell $4.46, from $8.18 in 2008 to $3.72 per thousand cubic feet[34] in 2009, accounting for some of the decrease. Lower energy costs also could be attributed to factors such as lower utility costs,[35] lower fuel costs,[36]and a full year of benefits from cost-reductions implemented during 2008.[37] FRS companies continue to implement changes aimed at the containment of energy costs, but it appears that one of the major efforts over the last 10 years, U.S. cogeneration projects, have finally been completed.[38]

[32] The per-barrel energy costs are computed by dividing U.S. refining energy costs by total product sales, and, thus, may not fully reflect changes in per-unit energy costs if there are unusual changes in the net sales/refinery output of the respondent companies.

[33] The energy cost level of 2009 is the 6th lowest in the 33-year history of the FRS and was lower only in 1994 ($1.31/barrel), 2002 ($1.30/barrel), 1995 ($1.11/barrel), 1999 ($1.04/barrel), and 1998 ($0.94/barrel).

[34] U.S. Energy Information Administration, *Monthly Energy Review* (September 2010), Table 9.11.

[35] ConocoPhillips Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 26

[36] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-9.

[37] For example, BP acquired a cogeneration facility from NiSource for its 405,000-barrels-per-day Whiting, Indiana refinery July 1, 2008 (BP plc, "BP Buys Whiting Clean Energy Power Plant in Indiana," press release (July 1, 2008) and 2008 U.S. Securities and Exchange Commission Form 20-F, p. 115).

[38] This ends (or at least pauses) a recurring storyline that has characterized the FRS U.S. refining/marketing operations for 11 of the last 12 years, excepting only the year 2000. Only Exxon Mobil explicitly mentioned ongoing cogeneration projects, and both refineries were outside the United States (see Exxon Mobil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 48).

Table 14. U.S. Refined Product Margins and Costs per Barrel Sold and Product Sales Volume for FRS Companies, 2008-2009

	2008	2009	Percent Change 2008 - 2009
	(2009 dollars per barrel)		
Gross Margin	11.23	6.95	-38.1
- Marketing Costs	1.76	1.47	-16.6
- Energy Costs	2.52	1.32	-47.6
- Other Operating Costs	5.45	4.52	-17.1
= Net Margin	1.49	-0.36	n.a.
	(Thousand Barrels per Day)		
Product Sales Volume[a]			
Motor Gasoline	10,300	10,664	3.5
Distillate	6,526	6,436	-1.4
Other Products	3,551	3,482	-1.9
Total	20,376	20,583	1.0

[a]Refined product sales include sales for resale to other FRS companies and sales of imported products.
n.a.: not applicable
Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

Other operating costs related to refining decreased from $5.45 per barrel in 2008 to $4.52 per barrel in 2009 (**Table 14**). Operating costs associated with compliance with the Clean Air Act Amendments of 1990 were mixed in 2009 relative to 2008, increasing for some companies and falling for others.[39]

Additional reasons that other operating costs fell in 2009 include reduced negotiated prices for materials, labor, and services;[40] reduced waste water-treatment costs due to recently introduced technology; [41] lower turnaround costs,[42] and an absence of hurricane-related charges.[43] Meanwhile, impairment write-downs were another major reason for higher costs.[44]

[39] Although EIA has no estimate of the significance of the environmental spending in 2009 for other operating costs, some companies indicated that their operating expenses attributable to environmental cost were higher in 2009 than in 2008. For example, Sunoco reported environmental operating costs of $210 million in 2008 and of $217 million in 2009, and ConocoPhillips reported environmental expenses of $957 million in 2008 and $1,070 million in 2009 (see Sunoco Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 51; ConocoPhillips, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 59; and ConocoPhillips Corporation, 2008 U.S. Securities and Exchange Commission Form 10-K, p. 65). Alternatively, Exxon Mobil indicated that its environmental operating costs decreased from $2,730 million in 2008 to $2,610 million in 2009 (see Exxon Mobil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 54). For additional discussion of this topic, also see an EIA study that examined the effects of environmental compliance on operating costs on EIA's website at http://www.eia.gov/emeu/perfpro/ref_pi2/index.html.

[40] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-9.

[41] ConocoPhillips Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 26.

[42] Marathon Oil Corporation, "4Q 2009 Earnings Conference Call Remarks" (February 2, 2010). Available on the internet at http://www.marathon.com/Investor_Center/Speeches_and_Presentations/Speeches_and_Presentations/4Q2009_Earnings_Conference_Call_Remarks/ (as of October 11, 2010).

Table 15. U.S. and Foreign Refining/Marketing[a] Financial Items for FRS Companies, 2008-2009
(2009 Million Dollars)

	2008	2009	Percent Change 2008-2009
Domestic Refining/Marketing Operations			
Refined Product Sales Revenue	819,586	521,497	-36.4
Other Revenue[b]	21,483	17,479	-18.6
Operating Expense[b, c]	835,031	550,871	-34.0
Operating Income[c]	6,038	-11,895	n.a.
Net Income, excluding special Items	8,611	-12,468	n.a.
Special Items	-5,566	3,072	n.a.
Net Income	3,045	-9,396	n.a.
Foreign Refining/Marketing Operations[a]			
Refined Product Sales Revenue	364,849	233,264	-36.1
Other Revenue[b]	15,527	10,966	-29.4
Operating Expense[b, c]	365,331	240,431	-34.2
Operating Income[c]	15,045	3,799	-74.7
Net Income, excluding special Items	11,393	2,557	-77.6
Special Items	-231	19	n.a.
Net Income	11,162	2,576	-76.9

[a]In order to prevent disclosure of company-level data the International Marine business segment has been combined with Foreign Refining/Marketing for this presentation. Relative to Foreign Refining/Marketing, International Marine is about one-tenth the size and has little material effect on the overall results of Foreign Refining/Marketing.
[b]Raw materials revenues are netted against total operating expense.
[c]Excludes Special Items.
n.a.: not applicable
Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

Operational Changes

The FRS companies refocused their marketing operations for the last several years, culminating in the lowest outlet total in the history of the FRS in 2009. Historically, this was accomplished by making selective investment in some outlets,[45] acquiring some outlets,[46] and divesting others,[47] which also was true of 2009. However, the last

[43] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-9.
[44] For example, Valero Energy Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 78.
[45] For example, BP continues to make investments to implement its "am pm" convenience store concept. BP plc, 2009 U.S. Securities and Exchange Commission Form 20-F, p. 37.
[46] Hess "acquired 37 previously leased retail gasoline stations …" and Marathon acquired "89 new stores during … [the most recent] five-year period." See, Hess Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 52 and Marathon Oil Corporation, *2009 Annual Report*, p. 11.
[47] Chevron "sold its interest in about 465 individual service-station sites in various other countries, including the United States. The majority of these sites continue to market company-branded gasoline through new supply agreements …. The company plans to discontinue, by mid-2010, sales of Chevron- and Texaco-branded motor fuels in the mid-Atlantic and other eastern states, where the company sold to retail customers through approximately 1,100 stations and to commercial and industrial customers through supply arrangements. Sales in these markets represent approximately 8 percent of the company's total U.S. retail fuels sales volumes (see Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K,

two years have brought unusually large changes as BP,[48] ConocoPhillips, Exxon Mobil, three of the largest FRS respondents, began exiting motor gasoline retailing rather than merely "refocusing" their operations as had been the case.[49] The FRS companies' continued reduction in their direct-supplied outlets may demonstrate their confidence that the low returns of 2008 and 2009, not the high returns of 2004-2007, from their U.S. refining/marketing operations will persist.

Marketing costs fell $0.29 per barrel in 2009 relative to 2008 (**Table 14**) as FRS direct-supplied[50] motor gasoline outlets were reduced 6 percent in 2009[51] (**Table 16**), continuing a long-time trend (**Figure 22**). Companies' marketing costs decreased as they shifted sales of motor gasoline from higher-cost channels of distribution, company-operated outlets and dealer outlets, to lower-cost channels of distribution, wholesale and direct sales.

The number of company-operated outlets fell 11 percent while dealer outlets fell 5 percent[52] during 2009 (**Table 16**) against an industry backdrop of a small increase in U.S. motor gasoline outlets.[53] The overall effect was a reduction of 2,153 direct-supplied FRS branded outlets during 2009 and a small decline in the FRS share of total U.S. outlets from 22 percent at year-end 2008 to 20 percent at year-end 2009.

Marginal outlets ideally would be the first divested, which would tend to increase average productivity of the remaining outlets,[54] measured by average monthly motor gasoline sales volume. Dealer productivity increased 5 percent between 2008 and 2009. However, productivity of company-operated outlets fell 4 percent,[55] which may

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p. 26)." Marathon sold or closed "155 non-core and underperforming stores (see Marathon Oil Corporation, *2009 Annual Report*, p. 11)." Sunoco noted that it divested 261 outlets during the 2007-2009 period in order "to selectively reduce the Company's invested capital in Company-owned or leased sites. Most of the sites were converted to contract dealers or distributors thereby retaining most of the gasoline sales volume (see Sunoco, Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 6)."

[48] Although it was BP plc, the parent company of the FRS respondent BP America, that made the announcement, the number of BP-branded U.S. outlets has fallen from 12,200 in 2007 to 11,500 in 2009. See BP plc, 2009 U.S. Securities and Exchange Commission Form 20-F, p. 36.

[49] ConocoPhillips Company, 2008 U.S. Securities and Exchange Commission Form 10-K, p. 19; BP plc, "BP to Sell Most Company-Owned, Company-Operated Convenience Stores to Franchisees," press release (November 15, 2007); and "Exxon Plans to Sell Its Gas Stations," *The New York Times* (June 13, 2008). The article noted that Exxon Mobil already did not own about 75 percent of its branded outlets. ConocoPhillips has nearly completed its exit as of January 2010 with only another 100 outlets to divest (see ConocoPhillips, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 17). More recently, Royal Dutch Shell, the parent of the FRS respondent Shell Oil, announced substantial reductions in its refining/marketing operations ("Shell to slash downstream as Q4 profits collapse," Reuters (February 4, 2010). Available on the internet at http://www.reuters.com/article/idUSTRE6130XR20100204 (as of October 11, 2010)). The implications this has for Shell Oil's future U.S. refining/marketing operations are presently unclear.

[50] An FRS "direct-supplied" motor gasoline outlet is one that has a supply contract directly with an FRS company. Many outlets that display an FRS motor gasoline brand are not directly supplied by the FRS company whose brand the outlet displays.

[51] However, this figure may be misleading due to the addition of Western Refining (149 outlets, see Western Refining Inc, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 53) and Alon USA (308 outlets, see Alon USA Energy Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 57) for the 2009 reporting year. Exclusive of the outlets of these two companies, the decline in FRS-supplied outlets was a slightly larger 8 percent.

[52] Again, in the absence of Western and Alon, the decline would have been 15 percent and 6 percent, respectively.

[53] According to the *National Petroleum News*, there were 161,068 outlets in 2008 and 162,350 in 2009 (M2Media360, *NPN Magazine, 2009 Market Facts*, p. 70.

[54] However, as some FRS companies have noted in the past, these efforts can be frustrated if productive dealers elect to change brands.

[55] Part of the reason is that the entrants with company-operated outlets (Alon and Western) had sales volumes below the FRS average, which were 33,000 gallons/month and 114,950 gallons/month, respectively. See Alon USA Energy Inc., 2009 U.S.

Table 16. Motor Gasoline Distribution and Number of Direct-Supplied Branded Outlets for FRS Companies, 2008-2009

	2008	2009	Percent Change 2008-2009
	(Million Barrels)		
Third-Party Volume			
Wholesale	2,064.9	2,184.2	5.8
Retail			
Dealer	796.4	796.9	0.1
Company-Operated	338.5	290.3	-14.3
Total Retail	1,134.9	1,087.2	-4.2
Direct	504.8	573.7	13.6
Total Third-Party Volume	3,704.6	3,845.1	3.8
Intersegment Volume	54.8	47.4	-13.6
	(Number of Direct-Supplied Branded Outlets)		
Dealer Outlets	28,335	26,923	-5.0
Company-Operated Outlets	6,937	6,196	-10.7
Total Retail Outlets	35,272	33,119	-6.1
Average Monthly Outlet Volume	(Thousand Gallons per Month)		
Dealers	98.4	103.6	5.3
Company-Operated	170.8	164.0	-4.0
All Direct-Supplied Outlets	112.6	114.9	2.0

Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

indicate the FRS companies' strategy to exit this part of their marketing operations, regardless of its effect on per-outlet productivity.[56]

Meanwhile, refinery capacity reported by the FRS companies increased by 2 percent (**Table 17**), primarily because of the addition of the joint venture Chalmette (Exxon Mobil and Petroleos de Venezuela, S.A.), Alon USA, and Western Refining. The addition of their total capacity of 649,900 barrels per day[57] (bpd) more than offset the reduction of capacity of 412,200 bpd from the shutdown of two refineries and the sale of another. In June 2009, Sunoco both permanently shut down its 145,000 barrel-per-day Westville, New Jersey (Eagle Point), refinery in June 2009 and sold its 85,000 barrels-per-day Tulsa, Oklahoma, refinery to Holly Corporation.[58] Additionally, Valero shut down its 182,200-barrels-per-day Delaware City, Delaware, refinery in November 2009.[59]

Securities and Exchange Commission Form 10-K, p. 57and Western Refining Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 53.

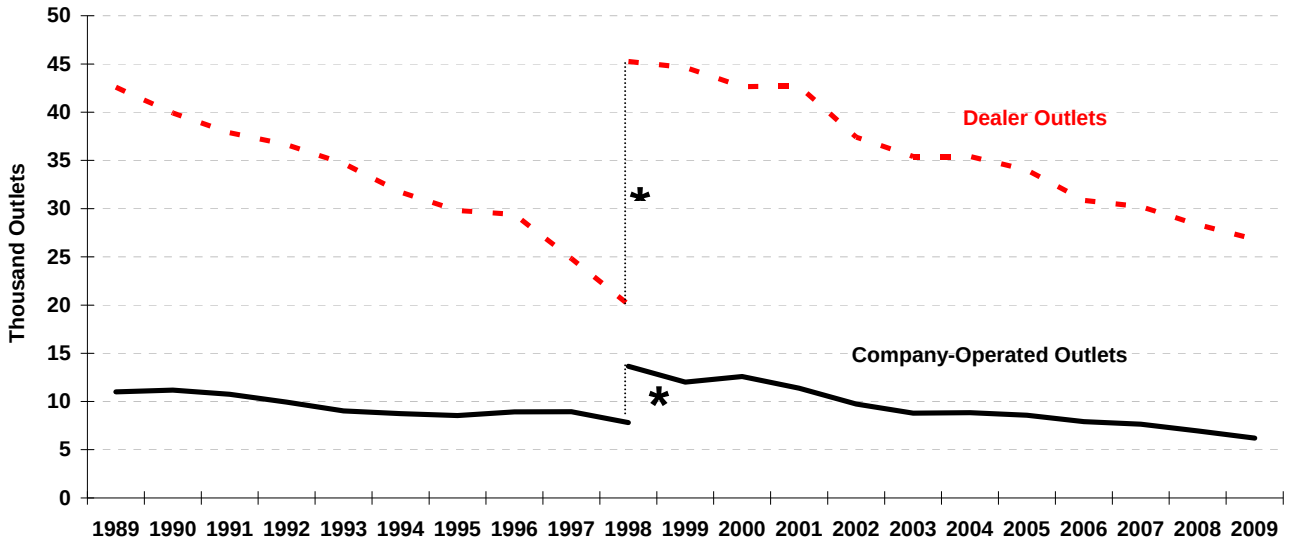
[56] Calculations such as this can be affected by the timing of the change in the status of the outlets and of differences in the timing between years. That is, divesting a large number of outlets near year-end will tend to generate an inflated average sales volume while divesting a large number of outlets near year-beginning will tend to generate a depressed average sale volume.

[57] The individual capacities are: Alon – 231,500 barrels per day (bpd), Chalmette – 192,500 bpd, and Western – 225,900 bpd. See Energy Information Administration, "Refinery Capacity Report 2010" (June 2010), Table 5. Available on the internet at http://www.eia.gov/oil_gas/petroleum/data_publications/refinery_capacity_data/refcapacity.html (as of October 10, 2010).

[58] Sunoco, Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, p. 33.

[59] Valero Energy Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 78.

Figure 22. Company-Operated and Direct-Supplied Dealer Outlets for FRS Companies, 1989-2009



*The addition of 11 companies to the group of U.S. majors in 1998, the largest single-year change in the history of the Financial Reporting System, resulted in the vertical displacement of the series in 1998.
Note: Only outlets directly supplied by the FRS companies are included here.
Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

Increased ability to process heavier and/or higher sulfur crude oil[60] and further environmental investments,[61] including those related to ethanol,[62] were among the major motivations for the refinery investments of 2009. The combination of transactions and marginal upgrades resulted in a 1-percent increase in U.S. refining additions to net investment in place (**Table 17**). Although the increase in addition to net investment in place was modest, it resulted in 2009 supplanting 2008 as the year of the greatest investment in U.S. refining by the FRS companies in the history of the FRS.[63]

[60] Several companies noted such investment. For example, BP, Chevron, ConocoPhillips, Exxon Mobil, and Marathon made upgrades in their refining capacity (see BP plc, 2009 U.S. Securities and Exchange Commission Form 20-F, p. 41; Chevron Corporation, U.S. Securities and Exchange Commission Form 10-K, p. 25; ConocoPhillips Corporation, U.S. Securities and Exchange Commission Form 10-K, p. 57; Exxon Mobil Corporation, *2009 Financial & Operating Review*, p. 79; Marathon Oil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 59).

[61] Several companies indicted that they continued making environmental investments (e.g., expand their ability to make Phase II-compliant petroleum products or meet other environmental requirements), including BP, Chevron, ConocoPhillips, Exxon Mobil, Marathon, Sunoco, Tesoro, and Valero (see BP plc, 2009 U.S. Securities and Exchange Commission Form 20-F, p. 56; Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 29; ConocoPhillips Company, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 57; Exxon Mobil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 48; Marathon Oil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 76; Sunoco Inc., 2009 U.S. Securities and Exchange Commission Form 10-K, pp. 4-5; Tesoro Energy Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 43; and Valero Energy Corporation, 2008 U.S. Securities and Exchange Commission Form 10-K, p. 46).

[62] Sunoco "[c]ompleted an acquisition totaling $9 million in June 2009 of a 100 million gallon-per-year ethanol manufacturing facility in New York (see Sunoco, Inc., 2009 U.S. Securities and Exchange Commission Form 20-F, p. 33)."

[63] Although 2009 had the highest level of additions to net investment in place for U.S. refining, the story for U.S. marketing was the opposite; it was the lowest in the history of the FRS, but in keeping with the change in retail outlets, for example.

Table 17. U.S. and Foreign Refining/Marketing Investment and Refining Operating Items for FRS Companies, 2008-2009

	2008	2009	Percent Change 2008-2009
	(2009 Billion Dollars)		
U.S. Refining Additions to Investment in Place	30.7	31.0	1.1
U.S. Marketing and Transportation Additions to Investment in Place	7.1	3.0	-57.5
Foreign Refining/Marketing Additions to Investment in Place	14.3	15.1	5.7
	52.1	49.2	-5.6
	(Thousand Barrels per Day)		
U.S. Refining Capacity	14,880	15,153	1.8
U.S. Refinery Output	14,519	14,686	1.2
Foreign Refining Capacity	5,461	5,470	0.2
Foreign Refinery Output	4,998	4,768	-4.6
	(Percent)		
U.S. Refinery Utilization Rate[1]	87.2	82.0	[2]
Foreign Refinery Utilization Rate[1]	84.3	80.8	[2]

[1]Refinery utilization rate is calculated by dividing runs to stills at own refineries by the average of the year-beginning and year-ending crude oil distillation capacity.

[2]Not meaningful.

Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

For the last several years the relatively complex FRS refineries (**Table 18**) provided cost savings by taking advantage of price differences between the relatively lower-cost heavy crude oils and the relatively higher-cost light crude oils because the refineries can refine a wide range of crude oils. Further, revenues were increased marginally because complex refineries can produce relatively more higher-priced, light products. However, the circumstances of 2009 diminished both advantages of refining complexity.

The difference between the prices of light crude oil and heavy crude decreased substantially (**Figure 23**) as the discount paid for heavy crude oil fell from $16.65 per barrel in 2008 to $8.13 per barrel in 2009. Further, the difference between the price of lighter products (represented by the price of motor gasoline) and the price of heavier products (represented by the price of residual fuel oil) decreased between 2008 and 2009 (**Figure 24**), falling $12.67 per barrel. These changes put upward pressure on raw materials costs and downward pressure on product revenues. Thus, despite reductions in all crude oil and product prices in 2009, the decline in FRS costs of raw materials and product purchases ($36.51 per barrel) was smaller than the decline in FRS product revenues ($40.79 per barrel) (**Table 13**), diminishing the bottom line of the FRS U.S. refining/marketing operations.

The year 2009 not only was the least profitable for U.S. refining/marketing operations in the 33-year history of the FRS, but it seemed all the more so by following the three most profitable years in the history of the FRS so closely. The primary reason for the decreased profitability of the FRS U.S. refining/marketing operations in 2009 relative to 2008 was a reduced gross refining margin (i.e., average annual petroleum product prices increased by less than average annual raw materials costs), which was somewhat offset by lower operating costs for all categories of cost – marketing, energy costs, and "other" operating costs. The combination of these changes resulted in a decline in the net refining margin from $1.49 in 2008 to a loss of $0.36 per barrel, the only negative net margin in the 33-year history of the survey. Falling revenues and earnings provided incentives for FRS companies to realign their U.S. refining/marketing operations. The long-time divestiture of their motor gasoline retailing assets continued in 2009. Upgrading of refinery capacity also continued in 2009, further expanding their ability to refine the lowest quality (and lowest cost) crude oils available and produce more highly-valued products. Despite these cost reduction and revenue maximization efforts, the FRS companies

Table 18. U.S. Refinery Configurations for FRS Companies, Selected Years, 1974-2009
(Percent)

	Downstream Capacity as a Percent of Crude Distillation Capacity															
	1974	1981	1993	1996	1997	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
FRS Integrated Refiners[a]																
Coking	n.c.	n.c.	n.c.	13.0	12.6	12.9	13.9	14.1	15.8	15.4	15.7	15.4	15.4	15.9	16.0	16.3
Catalytic cracking	27.7	30.4	36.5	33.8	35.9	35.8	35.6	35.2	33.0	33.4	33.7	33.7	33.9	33.4	34.3	33.6
Catalytic reforming	17.6	22.4	25.8	24.9	23.4	22.3	22.4	22.2	21.8	21.8	21.8	21.4	21.7	21.9	21.0	21.5
Hydro cracking	5.6	5.7	9.6	9.6	9.6	10.9	11.0	10.9	10.7	10.4	10.7	10.5	11.0	11.4	11.1	12.1
Catalytic hydrotreating	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	79.5	82.3	85.8	88.0	87.7	87.0
Alkylation	4.8	5.3	7.7	6.8	7.5	7.4	7.4	7.2	7.1	7.2	7.3	7.3	7.5	7.1	7.2	7.0
FRS Non-Integrated Refiners[b]																
Coking	n.c.	n.c.	n.c.	11.0	12.7	12.0	12.1	12.4	12.0	13.5	14.7	14.3	14.4	14.4	14.2	12.5
Catalytic cracking	n.c.	n.c.	n.c.	29.8	34.1	34.0	35.5	35.5	36.3	36.7	38.4	37.2	37.2	37.1	36.7	34.0
Catalytic reforming	n.c.	n.c.	n.c.	18.9	21.5	22.5	21.9	21.7	21.4	21.1	21.8	20.4	20.1	20.6	21.2	20.1
Hydro cracking	n.c.	n.c.	n.c.	6.3	7.8	8.6	8.6	8.4	7.8	8.5	8.7	8.1	8.3	8.4	8.5	8.4
Catalytic hydrotreating	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	n.c.	71.4	73.3	74.3	74.2	76.9	73.5
Alkylation	n.c.	n.c.	n.c.	6.0	6.8	6.0	6.3	6.3	6.4	6.4	6.9	6.6	6.6	6.6	6.8	6.6

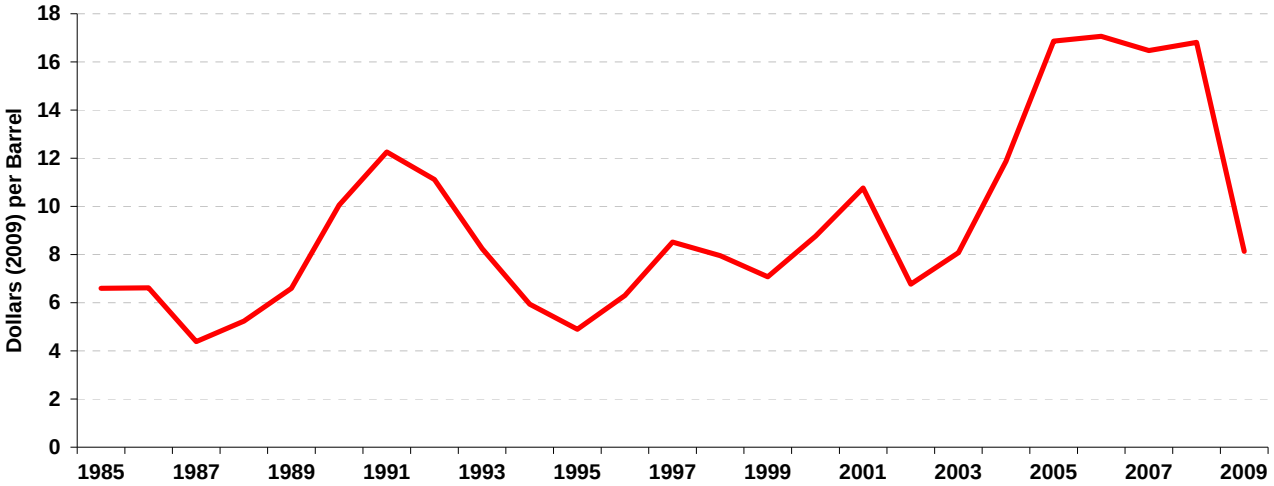
n.c.: Information not collected.

[a]:FRS Integrated Refiners includes BP America, Chevron, ConocoPhillips, Deer Park (consolidated with Shell for FRS reporting), Exxon Mobil, Marathon, Shell Oil, and Total Holdings USA.

[b]: FRS Non-Integrated Refiners includes Alon (2009 only), Chalmette (2009 only), CITGO, Lyondell Chemical, Motiva, Sunoco, Tesoro, Valero, Western Refining (2009 only), and WRB (2008 and 2009).

Sources: Oil and Gas Journal, "Worldwide Refinery Report," 1974, 1981, 1993, 1996, 1997, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009.

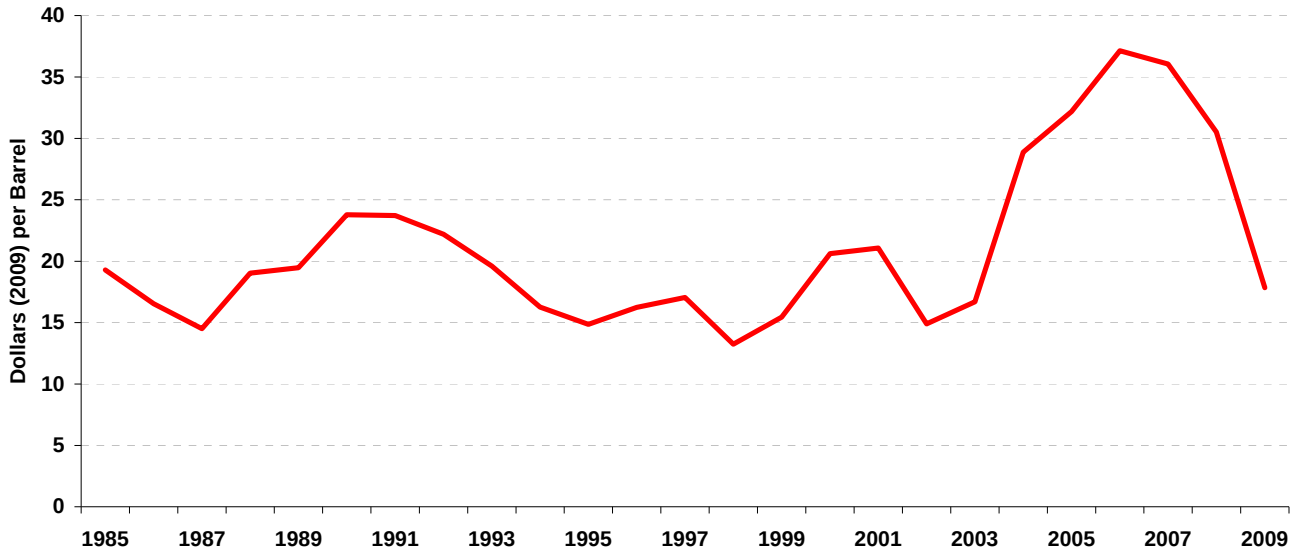
Figure 23. Price Difference Between Light Crude Oil and Heavy Crude Oil, 1985-2009



Note: Light crude oil tends to sell for a higher price per barrel than does heavy crude oil. Thus, the vertical distance of the line in the figure from the horizontal axis indicates the premium paid for light crude oil relative to heavy crude oil. The more expensive light crude oil is defined here as having an API gravity of 40.1 or greater, and heavy crude oil is defined as having an API gravity of 20 or less.

Source: U.S. Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380, Tables 27 and 28 (2006 and earlier), and Tables 24 and 25 (2007, onward).

Figure 24. Resale Price Difference Between Motor Gasoline and Residual Fuel Oil, 1985-2009



Note: Motor gasoline tends to sell for a higher price per barrel than does residual fuel oil. Thus, the vertical distance of the line in the figure from the horizontal axis indicates the premium paid for motor gasolinel relative to residual fuel oil.
Source: U.S. Energy Information Administration, *Petroleum Marketing Monthly* , DOE/EIA-0380, Table 4.

experienced the worst year in survey's history. However, early returns[64] suggest that these efforts will be more successful in 2010.

Foreign Refining/Marketing[65]

Somewhat similar to their 2009 domestic refining/marketing performance, the FRS companies reported the eighth-lowest profitability for their foreign refining/marketing operations in the history of the FRS. The profitability of 2009 was 6 percent, slightly more than 20 percentage points below 2008's rate, which was the third-highest in FRS history (**Figure 18**). The combination of refined product and other revenue decreased by $136.1 billion relative to 2008, which exceeded the $124.9-billion decrease in operating expense and resulted in an $11.2-billion decrease (-75 percent) in operating income and an $8.6-billion decrease (-77 percent) in net income (**Table 15**).

The FRS companies derive their foreign refining/marketing earnings from two sources: consolidated operations and unconsolidated affiliates. A fully consolidated affiliate is directly controlled by the parent corporation (although it could be owned by several companies, with the parent corporation retaining control). In addition, public financial disclosures of the parent corporation include all operating financial information about a fully

[64] Energy Information Administration, "Financial News for Major Energy Companies, Second Quarter 2010" (September 8, 2010). Available on the internet at http://www.eia.doe.gov/emeu/perfpro/news_m/index.html (as of October 12, 2010).
[65] For this report, the International Marine and Foreign Refining/Marketing business segments are combined to prevent disclosure of company-level data. Relative to Foreign Refining/Marketing, International Marine is about one-tenth the size of Foreign Refining/Marketing and has little material effect on the overall results.

consolidated affiliate (such as revenues). Conversely, the corporate parent of an unconsolidated affiliate usually owns 50 percent or less of the affiliate, and does not directly control the affiliate[66] (a joint venture, for example, is usually an unconsolidated affiliate from the perspective of at least one of the partners). Essentially, the unconsolidated affiliate is more of a property or holding of the parent corporation than a company that the parent actually operates. The effect on financial operations of an unconsolidated affiliate can be seen only on the parent corporation's income statement, on which the parent company reports its proportional share of the affiliate's net income.

Historically, approximately half of the FRS consolidated foreign refinery capacity is located in Europe, reaching 54 percent in 2009 (**Table 19**), with most of the remaining consolidated refinery capacity in Asia. Historically and at present the operations of the FRS companies' unconsolidated foreign refining/marketing affiliates overwhelmingly are in Asia, with Chevron the primary owner of unconsolidated FRS Asian refinery capacity.

Table 19. Regional Distribution of Foreign Refinery Capacity for FRS Companies, 2008-2009
(Percent)

	Consolidated Operations		Unconsolidated Affiliates	
	2008	2009	2008	2009
Europe	51.1	54.2	9.0	8.6
Asia	24.1	25.5	76.5	77.6
Latin America	8.7	2.8	0.3	0.3
Canada	13.6	14.9	0.0	0.0
Africa and Middle East	2.4	2.6	14.2	13.5
Total	100.0	100.0	100.0	100.0

Sources: Company Annual Reports and filings of U.S. Securities and Exchange Commission Form 10-K.

Reduced net income in 2009, relative to 2008, from FRS foreign refining/marketing operations was because of decreased income from both consolidated and unconsolidated operations (**Figure 25**). Worldwide petroleum demand fell slightly in 2009, primarily due to lower North American and OECD Europe consumption (**Figure 26**), putting downward pressure on prices and revenues. Further, companies reported reduced revenues due to lower product sales, [67] leading to additional downward pressure on their revenues and bottom line. Additional reasons for reduced earnings from both FRS consolidated and FRS unconsolidated operations noted in public statements included foreign currency losses,[68] an absence of trading gains,[69] decreased refining and marketing margins,[70] capital expenditures to produce clean fuels,[71] lower sales, and lower refinery utilization rates[72] (**Table 16**). However, the companies also undertook several actions aimed at improving future profitability – increasing ability to process lower-cost crude oil,[73] and divestitures of refinery[74] and other assets.[75]

[66] The actual percentage of ownership necessary to convey control of an entity is open to debate and, for some purposes, can be as little as 10 percent.
[67] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-8; and ConocoPhillips, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 46.
[68] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-8.
[69] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-8.
[70] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-8; ConocoPhillips Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 46; and Exxon Mobil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 45..
[71] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 25.
[72] ConocoPhillips Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 46.
[73] Chevron Corporation, *2009 Supplement to the Annual Report*, p. 46; and ConocoPhillips Corporation, *2009 Fact Book*, p. 49.

Consolidated Operations

Much lower earnings from consolidated FRS foreign refining/marketing operations occurred within an industry environment of lower (**Figure 26**) European petroleum demand, which fell 4 percent (0.6 million barrels per day) compared with 2008 and 9 percent (1.0 million barrels per day) relative to the 2003-2007 average. Earnings from the FRS companies' consolidated operations decreased (**Figure 25**) more than $7.1 billion (77 percent) between 2008 and 2009, providing $2.1 billion of net income. Historically, 2009 is in the lower half of all-time FRS consolidated results, the lowest level since 2002's loss of $37 million, and one year after the second-highest[76] FRS result ever.

The FRS consolidated operations generated lower earnings due to lower prices received, lower margins, and reduced sales.[77] However, they attempted to increase future profitability by adding cogeneration capacity,[78] making refinery upgrades,[79] and divesting non-core marketing outlets.[80]

Unconsolidated Operations

During 2009, the FRS companies' unconsolidated affiliates generated $0.5 billion of net income, which was 76 percent lower than 2008. Lower earnings occurred despite increased product demand in all of Asia/Pacific, both relative to 2008 and to the 2003-2007 average. However, changes in petroleum product consumption in Asia were varied (**Figure 26**). Consumption by the Asian Developing Countries rose 4 percent (0.8 million barrels per day) relative to 2008 and 14 percent (2.6 million barrels per day) relative to the 2003-2007 average. However, consumption in the developed Asian countries of Australia, Japan, and New Zealand collectively fell 8 percent (0.5 million barrels per day) relative to 2008 and 13 percent relative to the 2003-2007 average (0.8 million barrels per day). The higher petroleum consumption level in all of Asia/Pacific was insufficient to prevent a decline in FRS earnings from their unconsolidated foreign refining/marketing operations, which fell to $461 million -- the lowest level since 2002, the sixth-lowest in FRS history, and a mere 4 years removed from the all-time high of 2005.

Company public disclosures included some reasons for the lower earnings generated by the Asian (and other unconsolidated) operations of the FRS companies, which included declines in foreign exchange rates,[81] lower prices, and lower margins.[82] Future revenue-enhancing efforts made during 2009 include increasing refinery

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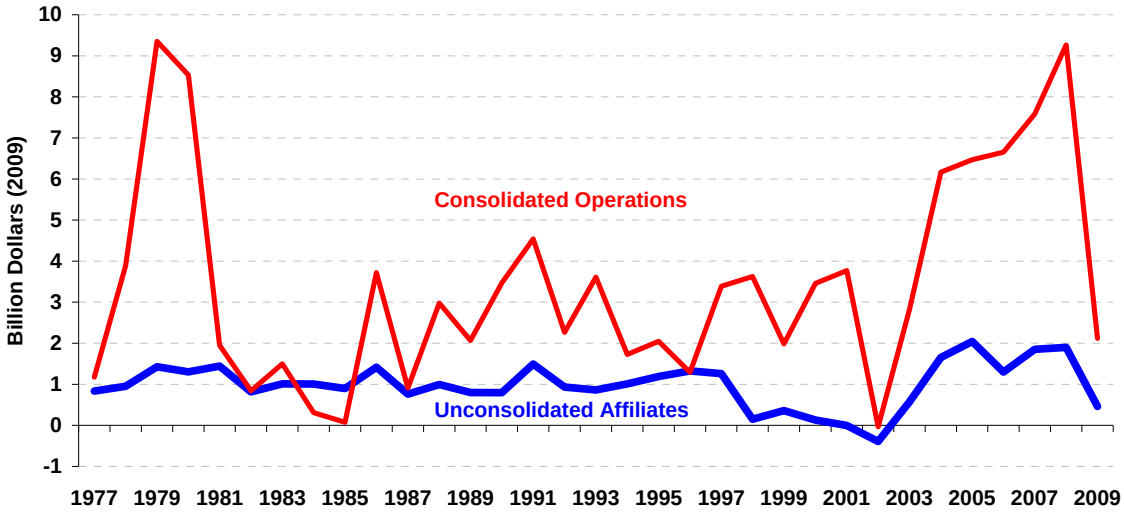
[74] Chevron divested refinery capacity during 2009. Chevron sold its 16-percent interest in the Kenya Petroleum Refinery Ltd (Mombasa , 90,000-barrels-per-day) in July 2009 (Chevron Corporation, *2009 Supplement to the Annual Report*, p. 46).
[75] Chevron Corporation, *2009 Annual Report*, p. 16.
[76] Although 2008 was the second-highest result in the history of the FRS, it was slightly less than $91 million (1 percent) lower than the highest ever of 1979.
[77] Exxon Mobil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p.49.
[78] Exxon Mobil Corporation, *2009 Financial & Operating Review*, p. 77.
[79] Exxon Mobil Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 48.
[80] ConocoPhillips Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 20; and ConocoPhillips Corporation, 2008 U.S. Securities and Exchange Commission Form 10-K, p. 21.
[81] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-8.
[82] Chevron Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. FS-8.

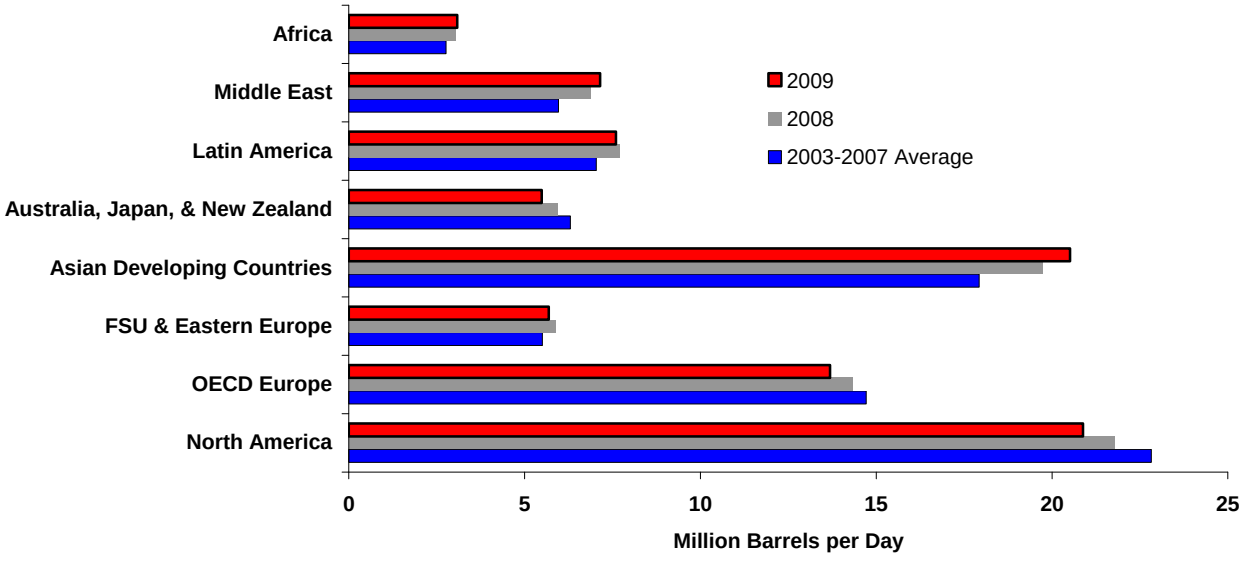
Figure 25. Foreign Refining/Marketing Net Income[a] from Consolidated Operations and Unconsolidated Affiliates of FRS Companies, 1977-2009



[a]The International Marine business segment has been combined with Foreign Refining/Marketing for the years 2003 - 2009 in order to prevent disclosure of company-level data. Relative to Foreign Refining/Marketing, International Marine is about one-tenth the size and has little material effect on the overall results of Foreign Refining/Marketing.

Source: U.S. Energy Information Administration, Form EIA-28 (Financial Reporting System).

Figure 26. Petroleum Consumption by Region, 2003-2007 Average, 2008, and 2009



Note: OECD stands for the Organization for Economic Cooperation and Development.

Source: BP plc, *BP Statistical Review of World Energy* (June 2010), p. 11.

capability to refine lower-quality crude and produce ultra-low sulfur products,[83] adding refinery and cogeneration capacity,[84] revising refining upgrade schedules,[85] and refocusing marketing operations.[86]

FRS companies' foreign refining/marketing earnings decreased substantially in an industry setting of lower worldwide petroleum product consumption, particularly in Europe and the more developed Asia/Pacific countries of Japan, Australia, and New Zealand. Foreign exchange declines, lower product prices, margins, and sales all contributed to the much lower profitability of the FRS companies' foreign refining/marketing operations in 2009. Thus, long-term strategies to maximize revenues and minimize costs remain important, if not more so. Cost-cutting measures, such as increasing cogeneration capacity[87] and strategic divestment,[88] likely will continue to occupy prominent positions in the companies' ongoing strategic actions.

[83] ConocoPhillips Corporation, 2009 U.S. Securities and Exchange Commission Form 10-K, p. 20.

[84] Exxon Mobil completed its Fujian, China refinery-expansion project, which tripled the refinery's crude oil distillation capacity (Exxon Mobil Corporation, *2009 Financial & Operating Review*, p. 77)."

[85] ConocoPhillips Corporation, "ConocoPhillips Delays Wilhelmshaven Upgrade Project," press release (November 17, 2009).

[86] Chevron sold its marketing operations in several Latin American (Brazil, Chile, Haiti, and Peru) and African (Benin, Cameroon, Cote d' Ivoire, Kenya, Nigeria, Republic of the Congo, Togo, and Uganda) countries during 2009. It additionally sold its marketing operations in India and Italy. See Chevron Corporation, *2009 Supplement to the Annual Report*, pp. 45 and 47.

[87] Exxon Mobil Corporation, *2009 Financial & Operating Review*, p. 77.

[88] Chevron sold its marketing operations in several Latin American (Brazil, Chile, Haiti, and Peru) and African (Benin, Cameroon, Cote d' Ivoire, Kenya, Nigeria, Republic of the Congo, Togo, and Uganda) countries during 2009. It additionally sold its marketing operations in India and Italy. See Chevron Corporation, *2009 Supplement to the Annual Report*, pp. 45 and 47.