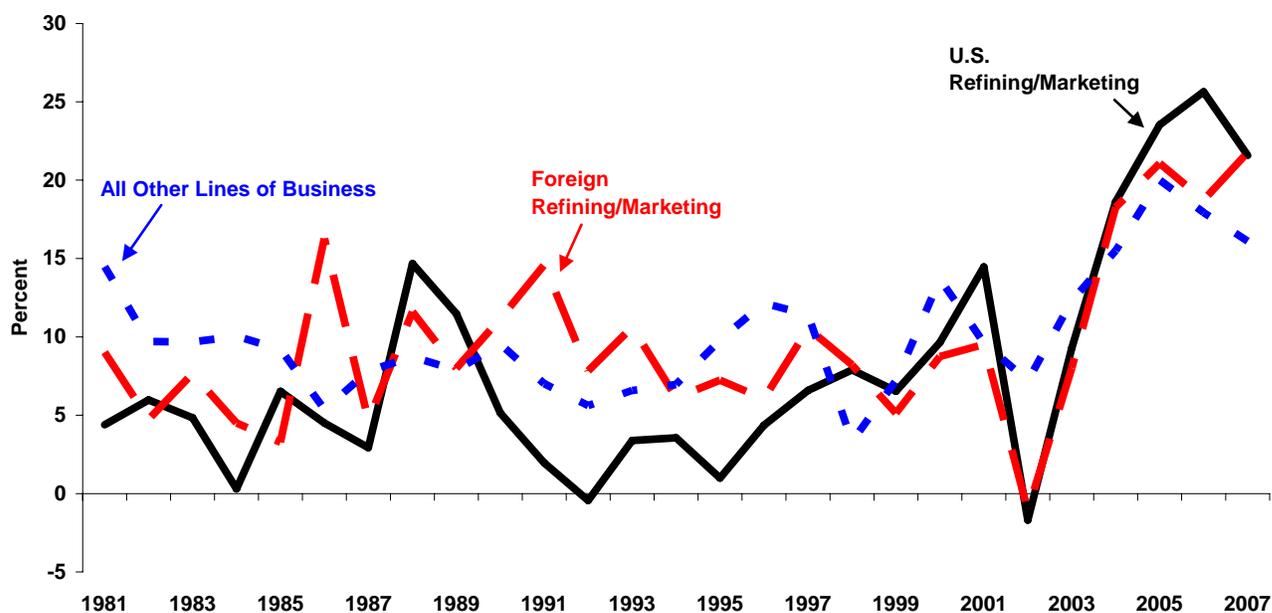


Refining and Marketing

U.S. Refining/Marketing

The average profitability (contribution to net income divided by net investment in place) of U.S. refining/marketing operations of the respondents to the Financial Reporting System (FRS) survey reached 22 percent in 2007, the third-highest level in the 31-year history of the FRS (since 1977). The years 2004 through 2007 account for the four highest returns on investment in the history of the FRS, but are only slightly removed from the all-time low of -2 percent in 2002 (**Figure 21**). Since the 1990s, when ongoing cost-cutting efforts began, they have been a major contributing factor to the profitability of the FRS refining/marketing operations. This strategy has put downward pressure on operating costs for more than a decade (see **Figure 5**, above), lowering them in some years and diminishing the rate of increase in other years. Thus, despite variable product and raw materials prices over the past several years, profitability has generally been well above the average of the 1990s (i.e., 4 percent).³⁵ Most recently, cost-cutting efforts have been less successful as per-barrel operating costs increased in 2007 relative to the previous year (**Table 13**).

Figure 21. Return on Investment in U.S. and Foreign Refining/Marketing,^a and All Other Lines of Business for FRS Companies, 1981-2007



^a: International Marine has been combined with Foreign Refining/Marketing for the years 2003-2007 to avoid disclosure of company-level data.

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

An examination of the net refined product margin (net margin), which has been found to strongly correlate with profitability,³⁶ can illuminate the reasons underlying changes in the profitability of U.S. refining/marketing operations. The net margin is the gross margin (essentially the difference between petroleum product prices and

³⁵ The weighted-average profitability of the 1990-1999 period was 4.3 percent and the weighted-average profitability of the 1991-2000 period was 5.0 percent.

³⁶ 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 0.93. See "Refining Margins as Predictors of Profitability" in Chapter 4 of *Performance Profiles of Major Energy Producers 2003*.

crude oil costs)³⁷ minus out-of-pocket operating costs per barrel of refined product sold. The net margin measures before-tax cash earnings from the production and sale of refined products.³⁸ The \$4.78-per-barrel net margin of 2007 was the second highest (in terms of 2007 dollars)³⁹ in the 31-year history of the FRS (see **Figure 5**, above), falling short of the all-time high of 2006 by \$0.20.

The average gross refining margin reported by the FRS companies in 2007 increased 2 percent compared with 2006 (**Table 13**). The average price received for petroleum products in 2007 (\$86.78 per barrel) increased \$5.81 relative to the 2006 value after adjusting for general price changes between 2006 and 2007, while raw materials and purchased product costs rose \$5.55 per barrel to \$74.53. These changes resulted in a \$0.26-per-barrel increase in the gross refining margin to \$12.25.

Table 13. Sales, Prices, Costs, and Margins in U.S. Refining/Marketing for FRS Companies, 2006-2007

	2006	2007	Percent Change 2006-2007
Refined Product Sales (Million Barrels per Day) ^a	21.3	20.1	-5.7
	(2007 dollars per barrel)		
Gasoline Average Price	86.04	92.62	7.6
Distillate Average Price	85.48	91.31	6.8
Other Products Average Price	58.60	62.20	6.1
All Refined Products Average Price	80.97	86.78	7.2
Less: Raw Materials Costs and Product Purchases	68.98	74.53	8.0
Equals: Gross Refining Margin	11.99	12.25	2.1
Less: Operating Costs	7.01	7.47	6.6
Equals: Net Refining Margin ^b	4.98	4.78	-4.1
Reseller/wholesaler spread (dealer price - wholesale price)	3.53	3.59	1.7
Retailer spread (company-operated price - dealer price)	5.01	5.70	13.6

^aRefined product sales include sales for resale to other FRS companies and sales of imported products.

^bSee Detailed Statistical Tables, Table DS32 for the components to calculate the refined product margin.

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

Revenues and Costs

Higher crude oil prices in 2007 (compared to 2006) put upward pressure on petroleum product prices. Similarly, industry-wide stocks of petroleum products were consistently lower through 2007 than in 2006 (**Figure 22**),⁴⁰ as

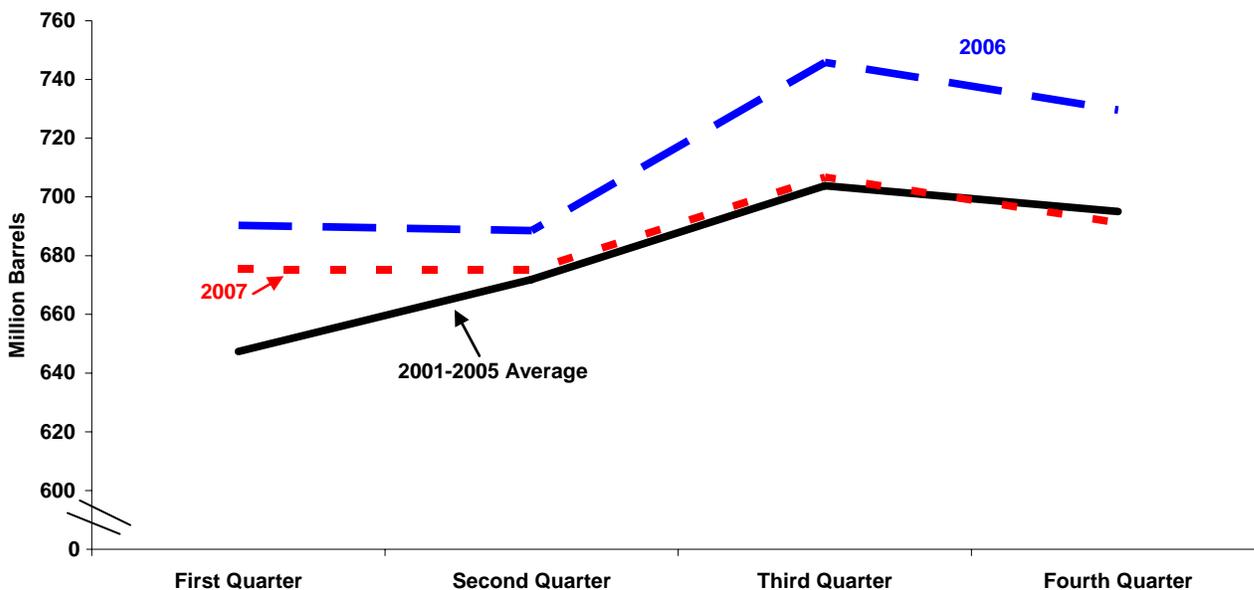
³⁷ More precisely, gross margins are calculated, on a per-barrel basis, by taking refined product revenues minus purchases of raw materials input to refining and refined product purchases.

³⁸ The net margin excludes peripheral activities such as non-petroleum product sales at convenience stores.

³⁹ Unless otherwise indicated, all dollar values and percentage changes in this report are based in constant 2007 dollars, adjusted using the Gross Domestic Product implicit price deflator.

⁴⁰ The stock levels of all petroleum products in 2007 were higher in all quarters relative to 2006, varying from 2 percent lower in the second quarter to 5 percent lower in the fourth quarter, but was above the quarterly average for the 2001-2005 period in most quarters, varying between less than 1 percent lower in the fourth quarter (0.55 percent) to 4 percent higher in the first quarter.

Figure 22. Quarterly Average U.S. Commercial Petroleum Product Stocks, 2001-2005 Average, 2006, and 2007



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

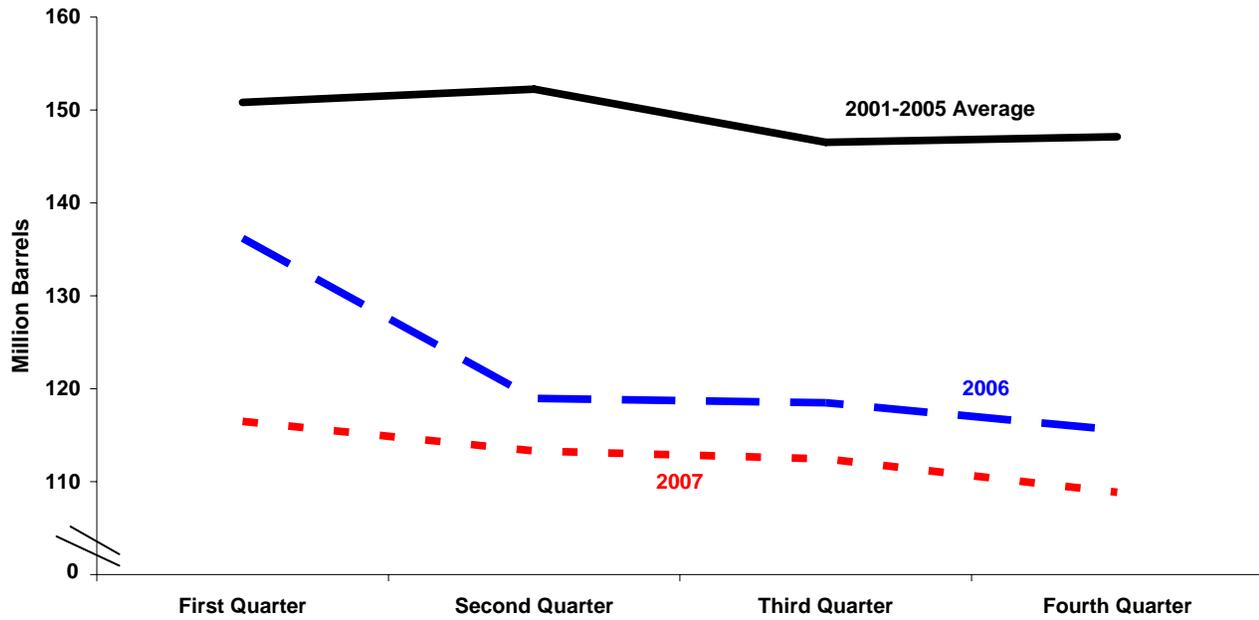
were motor gasoline stocks, which also were consistently lower than the average for the 2001-2005 period (**Figure 23**).⁴¹

All of these factors tended to put upward pressure on prices for all petroleum products, particularly motor gasoline prices. Thus, tight market conditions, which had driven prices higher in 2006, continued in 2007. U.S. crude oil stock levels were generally lower in 2007 than in 2006, but remained historically high (relative to 2001-2005 averages) until the end of the year (**Figure 24**). Thus, stock levels put upward pressure on crude oil prices, and raw material and purchased product costs for FRS companies, which rose 8 percent (**Table 13**). Additionally, problems with the U.S. refining system⁴² put upward pressure on product prices and may have contributed to higher crude oil stock levels (along with lower product and motor gasoline stock levels).

⁴¹ The stock levels of motor gasoline in 2007 were lower in each quarter relative to both 2006, varying from a low of 5 percent in the second quarter to a high of 15 percent in the first quarter, and the average for the period of 2001-2005, varying from a low of 23 percent in the first quarter to a high of 26 percent in both the second and fourth quarters.

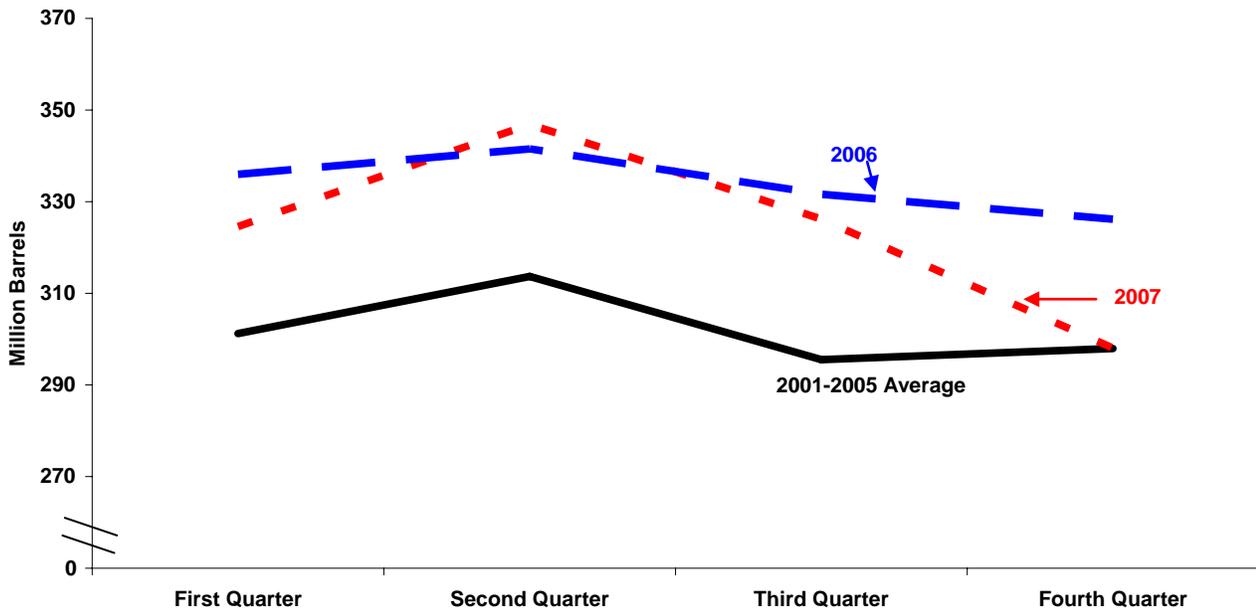
⁴² In particular, BP's 467,720-barrels-per-day Texas City, Texas refinery, which went off-line March 23, 2005, remained partially off-line throughout 2007 (BP plc, *Annual Review 2007*, p. 3 and 2007 Annual Report on Form 20-F, p. 26). Additionally, a serious fire occurred in March 2007 at BP's 410,000-barrels-per-day Whiting, Indiana refinery, which impaired the refinery's "... ability to produce low-sulfur motor gasoline or diesel fuel from sour crude oil ..." until near year-end (BP plc, 2007 Annual Report on Form 20-F, p. 26). Hess had a small fire in early January 2007 at its 70,000-barrels-per-day Port Reading, New Jersey catalytic cracker, which shut down the unit for less than 1 week (Hess Corporation, "Hess Corporation Port Reading Refinery Temporarily Shut Down," press release (January 9, 2007 and Reuters UK, "Hess's Port Reading refinery back up after fire—trade" (January 16, 2007), which is available on-line at <http://uk.reuters.com/article/oilRpt/idUKN1617028220070116> (as of October 15, 2008). Lyondell took its fluid catalytic cracker off-line for about 10 days for adjustments (Lyondell Chemical Company, "Lyondell Houston Refinery Unite to Take 10-Day Outage," press release (April 5, 2007).

Figure 23. Quarterly Average U.S. Motor Gasoline Stocks, 2001-2005 Average, 2006, and 2007



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

Figure 24. Quarterly Average U.S. Crude Oil Stocks, 2001-2005 Average, 2006, and 2007



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

Table 14. U.S. Refined Product Margins and Costs per Barrel Sold and Product Sales Volume for FRS Companies, 2006-2007

	2006	2007	Percent Change 2006 - 2007
	(2007 dollars per barrel)		
Gross Margin	11.99	12.25	2.1
- Marketing Costs	1.45	1.67	15.3
- Energy Costs	1.79	1.93	7.7
- Other Operating Costs	3.77	3.87	2.6
= Net Margin	4.98	4.78	-4.1
	(Thousand Barrels per Day)		
Product Sales Volume ^a			
Motor Gasoline	11,182	10,325	-7.7
Distillate	6,294	6,149	-2.3
Other Products	3,802	3,587	-5.7
Total	21,278	20,061	-5.7

^aRefined product sales include sales for resale to other FRS companies and sales of imported products.

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

FRS petroleum product sales declined 6 percent in 2007 relative to 2006 (**Table 13**). The product sales are composed chiefly of motor gasoline and distillate, which decreased 8 percent and 2 percent, respectively, but all categories of petroleum product sales declined in 2007 relative to 2006 (**Table 14**). The result of lower sales and higher petroleum product prices was a 1-percent increase in domestic petroleum product sales revenues (**Table 15**). Meanwhile, operating costs increased by a slightly larger amount than did sales revenues. This combination of increases in revenues and costs resulted in a 25-percent decrease in operating income in 2007 over that of 2006 (\$26.2 billion and \$34.8 billion, respectively) and a 10-percent decrease in net income relative to a year earlier (\$22.4 billion and \$25.0 billion, respectively).

Overall domestic operating expenses increased 2 percent between 2006 and 2007 (**Table 15**). Similarly, those operating expenses most closely associated with refining and marketing operations increased by 5 percent on a per-barrel basis between 2006 and 2007 (**Table 13**). More particularly, operating expenses associated with refining (energy costs and other operating costs) increased by \$0.24⁴³ per barrel (4 percent), while marketing costs increased by \$0.22 per barrel (**Table 14**).

Continued efforts by the FRS companies to reduce their energy costs were less successful in 2007, as costs increased by \$0.14 per barrel. Although industry-wide natural gas prices were \$0.19 per million cubic feet lower (after adjusting for inflation), FRS companies reported increased costs as a result of contractual obligations and increased operations.⁴⁴ FRS companies continue their efforts to contain energy costs through cogeneration projects,⁴⁵ which has been true for the last many years,⁴⁶ and implementation of digital refinery control systems.⁴⁷

⁴³ Refining energy costs increased by \$0.14 per barrel and other refining costs increased by \$0.10 per barrel with an overall effect of a 4 percent increase between 2006 and 2007.

⁴⁴ 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 of the respondent companies.

⁴⁵ During 2007, Tesoro noted, "We expect to reduce energy costs ... as a result of ... a new cogeneration facility and boilers (Tesoro Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 37)." Further Exxon Mobil noted earlier that it has "... several cogeneration facilities being progressed for start-up in future years (Exxon Mobil Corporation, 2006 *Financial and Operating Review*, p. 68)."

Table 15. U.S. and Foreign Refining/Marketing^a Financial Items for FRS Companies, 2006-2007
(Million 2007 Dollars)

	2006	2007	Percent Change 2006-2007
Domestic Refining/Marketing Operations			
Refined Product Sales Revenue	628,876	635,416	1.0
Other Revenue ^b	14,949	14,250	-4.7
Operating Expense ^{b, c}	609,066	623,514	2.4
Operating Income ^c	34,759	26,152	-24.8
Net Income, excluding unusual Items	25,320	20,826	-17.8
Unusual Items	-353	1,555	NM
Net Income	24,967	22,381	-10.4
Foreign Refining/Marketing Operations^a			
Refined Product Sales Revenue	284,480	297,736	4.7
Other Revenue ^b	11,734	13,141	12.0
Operating Expense ^{b, c}	286,231	300,147	4.9
Operating Income ^c	9,984	10,730	7.5
Net Income, excluding unusual Items	7,557	8,444	11.7
Unusual Items	195	757	288.0
Net Income	7,752	9,201	18.7

^aIn 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.

^bRaw materials revenues are netted against total operating expense.

^cExcludes Unusual Items.

NM: Not meaningful.

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

Other operating costs related to refining increased between 2006 and 2007, from \$3.77 per barrel to \$3.87 per barrel after adjusting for inflation (**Table 14**). Adjustments to comply with the Clean Air Act Amendments of 1990 and the replacement of methyl tertiary butyl ether (MTBE) with ethanol have increased operating costs.⁴⁸

⁴⁶ See for example, Energy Information Administration, *Performance Profiles of Major Energy Producers 2001*, DOE/EIA-0206 (2001) (Washington, D.C., January 2003), p. 43. (This publication is available on the Internet through a link at <http://www.eia.doe.gov/emeu/finance/histlib.html> (as of October 11, 2008).)

⁴⁷ Tesoro and Exxon Mobil both noted that digital control systems were added to refineries during 2007 to improve performance, particularly lower energy costs (Exxon Mobil Corporation, *2007 Financial & Operating Review*, p. 71 and Tesoro Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, pp. 31-32.)

⁴⁸ Although EIA has no estimate of the significance of the environmental spending in 2007 for other operating costs, several companies indicated that their operating expenses attributable to environmental cost had increased. For example, Marathon reported that “[we] will continue to incur substantial capital expenditures and operating costs as a result of compliance with, and changes in environmental laws and regulations, and, as a result, our profitability could be materially reduced (Marathon Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 26).” Additionally, Sunoco indicated that it is “... incurring higher operating costs as we continue to produce the low-sulfur fuels (Sunoco, Inc., 2007 U.S. Securities and Exchange Commission Form 10-K, p. 21).” Also see an EIA study that examined the effects of environmental compliance on operating costs, which is available on EIA’s web site (http://www.eia.doe.gov/emeu/perfpro/ref_pi2/index.html).

Recent divestitures of refinery capacity,⁴⁹ and other refocusing, cost-control efforts in the wake of earlier mergers and acquisitions were insufficient to prevent operating costs from increasing.

Operational Changes

The FRS companies have been refocusing their marketing operations for the last several years. They have done so by making selective investment in some outlets⁵⁰ and divestiture of others.⁵¹ However, developments during 2007 suggest that these efforts will soon almost exclusively entail divestitures. For example, in November 2007 BP announced plans to sell all of its company-owned and operated convenience stores.⁵² They were hardly alone⁵³ in signaling a general lack of confidence that the recent high returns to U.S. refining/marketing operations would persist (or at least lack of confidence in the future profitability of marketing operations, if not also refining operations).

Marketing costs rose 15 percent in 2007 (**Table 14**) despite divestitures of FRS direct-supplied⁵⁴ motor gasoline outlets for many years (**Figure 25**) and 2 percent fewer outlets at year-end than at the beginning of the year (**Table 16**). Companies indicated that marketing costs increased because of competitive pressures; that is, that companies increased their spending to differentiate their petroleum products from those of their competitors.

Company-operated outlets were reduced by 4 percent, while dealer outlets were reduced by 2 percent during by 2007 (**Table 16**). The overall effect was 929 fewer direct-supplied FRS branded outlets at the end of 2007 than at

⁴⁹ In particular, ConocoPhillips contributed two refineries to the unconsolidated joint venture that it and EnCana began during 2007, which is called WRB Refining LLC; Shell sold a California refinery and related assets to Tesoro; and Valero sold an Ohio refinery to Husky, a Canadian petroleum company (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 64; Royal Dutch Shell plc, *Annual Review and Summary Financial Statements 2007*, p. 29; and Valero Energy Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 38).

⁵⁰ For example, BP noted, "We continue to improve the efficiency of our retail asset network and increase the consistency of our site offer through a process of regular review (BP plc, *2007 Annual Report on Form 20-F*, p. 30)." Exxon Mobil indicated that it uses strategic alliances with food and grocery marketers to enhance its returns from its convenience stores, noting that nonfuels (e.g., convenience products and car washes) have increased site productivity almost 30 percent since 2003 (Exxon Mobil Corporation, *2007 Financial and Operating Review*, p. 75). Similarly, Valero introduced a new convenience store concept with more food choices during 2007 (Valero Energy Corporation, "Valero Unveils the Road Runner Store Concept New Design Provides More Space for Prepared Foods," press release (December 28, 2007)). Meanwhile, Tesoro took a more traditional approach to enhancing its marketing operations by expanding them, acquiring 276 outlets from Shell and 138 outlets from USA Gasoline, all in California (Tesoro Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, pp. 30-31).

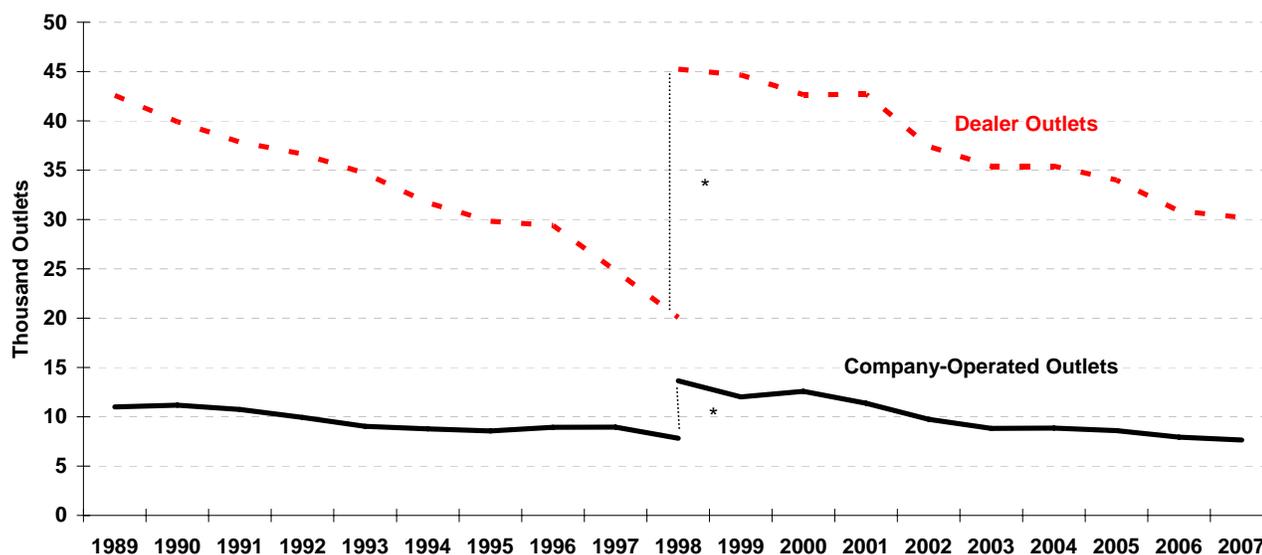
⁵¹ ConocoPhillips and Shell indicated that they divested 250 and 54 outlets, respectively, during 2007 (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 25; and Royal Dutch Shell plc, 2007 U.S. Securities and Exchange Commission Form 20-F, p. 44). Less specific was Sunoco, which indicated that it had divested 211 outlets over the 2005-2007 period (Sunoco, Inc., 2007 U.S. Securities and Exchange Commission Form 10-K, p. 9). Even more general was Exxon Mobil's, which indicated that its petroleum product sales declined in 2007 relative to 2006 due to divestitures (Exxon Mobil Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 36).

⁵² BP plc, *2007 Annual Report on Form 20-F*, pp. 26 and 27. BP subsequently offered for sale the first 146 of an approximate 700 total outlets March 3, 2008 ("BP to Sell Retail Outlets," *Oil Daily* (March 4, 2008), p.4).

⁵³ In December 2006, ConocoPhillips "announced our U.S. company-owned and company-operated retail outlets, and our U.S. company-owned and dealer-operated outlets, were expected to be divested to new or existing wholesale marketers (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 35)." By August 27, 2008 ConocoPhillips had completed the sale of its company-operated motor gasoline outlets (Merolli, Paul, "Conoco to Exit Low-Margin Retail Market," *Oil Daily* (August 28, 2008), pp. 1-2. Similarly, Exxon Mobil announced in June 2008 that it plans to sell all of its 820 company-operated outlets (Gosmano, Jeff, "Exxon Exits Retail Business, Sees Stronger Profits Elsewhere," *Oil Daily* (June 16, 2008), p. 5).

⁵⁴ 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.

Figure 25. Company-Operated and Direct-Supplied Dealer Outlets for FRS Companies, 1989 -2007



*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: Energy Information Administration, Form EIA-28 (Financial Reporting System).

the beginning of 2007, which resulted in the FRS share of total U.S. outlets falling negligibly to 23 percent of the U.S. total (company-operated outlets also negligibly fell to slightly less than 5 percent).⁵⁵ Efforts to eliminate marginal outlets normally would be expected to tend to increase average productivity of the remaining outlets,⁵⁶ which is measured by the outlets' average monthly motor gasoline sales volume. This anticipated result was weakly supported by the essentially unchanged productivity between 2006 and 2007 of dealer outlets, which fell 2 percent. However, the decline in productivity of company-operated outlets, which fell 10 percent, essentially rejects the expected increase in productivity. The decline in productivity of the remaining company-operated outlets may indicate the single-mindedness with which the FRS companies attempted to divest company-operated outlets.⁵⁷

Meanwhile, refinery capacity reported by the FRS companies decreased by almost 4 percent (**Table 17**), primarily due to the sale of three refineries. ConocoPhillips spun-off its 306,000-barrels-per-day⁵⁸ Wood River, Illinois, refinery and its 146,000-barrels-per-day Borger, Texas, refinery, creating an unconsolidated joint venture (WRB

⁵⁵ According to the *National Petroleum News*, there were 164,292 outlets in 2006 and 161,768 in 2007 (M2Media360, *National Petroleum News, 2008 Market Facts* (August 2008), p. 26.

⁵⁶ However, as some FRS companies have noted in the past, these efforts can be frustrated if productive dealers elect to change brands.

⁵⁷ 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.

⁵⁸ All individual refinery capacities are from Energy Information Administration, "Refinery Capacity Report 2008" (June 2008), Table 5, which available on the Internet at http://www.eia.doe.gov/oil_gas/petroleum/data_publications/refinery_capacity_data/refcapacity.html (as of October 15, 2008).

Table 16. Motor Gasoline Distribution and Number of Direct-Supplied Branded Outlets for FRS Companies, 2006-2007

	2006	2007	Percent Change 2006-2007
	(Million Barrels)		
Third-Party Volume			
Wholesale	2,119.5	1,961.4	-7.5
Retail			
Dealer	828.4	794.8	-4.1
Company-Operated	487.2	422.6	-13.3
Total Retail	1,315.6	1,217.4	-7.5
Direct	586.6	539.9	-8.0
Total Third-Party Volume	4,021.7	3,718.7	-7.5
Intersegment Volume	59.8	49.8	-16.8
	(Number of Direct-Supplied Branded Outlets)		
Dealer Outlets	30,870	30,226	-2.1
Company-Operated Outlets	7,927	7,642	-3.6
Total Retail Outlets	38,797	37,868	-2.4
	(Thousand Gallons per Month)		
Average Monthly Outlet Volume			
Dealers	93.9	92.0	-2.0
Company-Operated	215.1	193.6	-10.0
All Direct-Supplied Outlets	118.7	112.5	-5.2

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

Refining LLC) with EnCana.⁵⁹ Additionally, Valero sold its 146,200-barrels-per-day Lima, Ohio, refinery to Husky Energy Inc.⁶⁰ Tesoro's acquisition of Shell's 97,000-barrels-per-day Wilmington, California, refinery⁶¹ increased additions to investment in place for 2007, but had no net effect on FRS refinery capacity, since both companies are part of the FRS. Additionally, many of the companies made marginal expansions to their refineries,⁶² some of which increased capacity in 2007 and some of which will increase future capacity. Increased ability to process heavier and/or higher sulfur crude oil⁶³ and further environmental investments,⁶⁴ including those

⁵⁹ ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 64.

⁶⁰ Valero Energy Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K filing, p. 38.

⁶¹ Tesoro Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K filing, p. 29.

⁶² For example, Chevron "completed modifications at the ... El Segundo, California [refinery] to enable the processing of heavier crude oils ... (Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 25)." ConocoPhillips noted that "... construction was completed on a 25,000-barrel-per-day coker and a new vacuum unit along with revamps of heavy oil and distillate hydrotreaters " [at its Borger, Texas refinery] (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 24). Marathon continues expanding its Garyville, Louisiana refinery during 2007 (Marathon Oil Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 40). Motiva also announced that its owners (i.e., Royal Dutch Shell plc and Saudi Refining (itself an affiliate of ARAMCO)) had authorized a 325,000 barrel-per-day expansion at its Port Arthur, Texas refinery (Motiva Enterprises LLC, "Motiva Port Arthur Refinery to Become Largest Refinery in the United States," press release (September 21, 2007)).

⁶³ Several companies noted such investment. "BP continued to progress the planning for the previously mentioned investment in Canadian heavy crude oil processing capability at its Whiting refinery (BP plc, 2007 Annual Report on Form 20-F, p. 27)." Chevron indicated that "In 2007, the company completed modifications at its refineries in El Segundo, California, to enable the processing of heavier crude oils into gasoline, diesel and other light products (Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, pp. 25 and 26)." ConocoPhillips indicated that projects at its Borger, Texas refinery increased the ability of the refinery to process heavy crude oil (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 24). Exxon Mobil is attempting to improve margins by reducing its raw material costs and improving its yield of high-value products (Exxon Mobil Corporation, 2007 Financial & Operating Review, p. 71). Marathon

related to ethanol⁶⁵ and biodiesel,⁶⁶ were the major motivations for the marginal investments. The combination of transactions and marginal upgrades resulted in a 52-percent increase in U.S. refining additions to net investment in place (**Table 17**) (and led to the relatively small decline in refinery capacity despite the sale of 3 FRS refineries).

Table 17. U.S. and Foreign Refining/Marketing Investment and Refining Operating Items for FRS Companies, 2006-2007

	2006	2007	Percent Change 2006-2007
	(billion 2007 dollars)		
U.S. Refining Additions to Investment in Place	11.2	17.1	51.8
U.S. Marketing and Transportation Additions to Investment in Place	2.2	3.4	51.4
Foreign Refining/Marketing Additions to Investment in Place	5.9	3.8	-34.7
	19.4	24.3	25.6
	(Thousand Barrels per Day)		
U.S. Refining Capacity	14,652	14,101	-3.8
U.S. Refinery Output	14,726	14,168	-3.8
Foreign Refining Capacity	5,924	5,571	-6.0
Foreign Refinery Output	5,164	5,008	-3.0
	(Percent)		
U.S. Refinery Utilization Rate ¹	92.5	89.6	--
Foreign Refinery Utilization Rate ¹	88.2	85.3	--

¹Only includes output at FRS refineries. Note that this amount does not equal the amount in Table DS1, which also contains output at refineries of others for FRS companies..

²Refinery 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.

--: Not applicable.

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

“[c]ompleted a 26,000 barrel per calendar day expansion of the Detroit, Mich., refinery (2007 *Fact Book*, p. 4).” Sunoco expanded its ability to upgrade heavy petroleum products and expand its crude oil processing capability at its Toledo, Ohio refinery (Sunoco Inc., 2007 U.S. Securities and Exchange Commission Form 10-K, p. 7). Tesoro spent \$124 million during 2007 “transforming an existing fluid coker unit at the Golden Eagle refinery into a delayed coker (Tesoro Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 11).”

⁶⁴ Several companies indicated that they continued making investments to expand their ability to make Phase II-compliant petroleum products well into 2007, including BP, ConocoPhillips, Exxon Mobil, Lyondell, Marathon, Sunoco, Tesoro, and Valero (BP plc, 2007 U.S. Securities and Exchange Commission Form 20-F, p. 28; ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 80; Exxon Mobil Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 42 and 2007 *Financial & Operating Review*, p. 73; Lyondell Chemical Company, “Lyondell Announces Capital Investment Plan for 2007,” press release (January 25, 2007); Marathon Oil Corporation, 2007 *Annual Report*, p. 4; Sunoco Inc., 2007 U.S. Securities and Exchange Commission Form 10-K, p. 7; Tesoro Energy Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, pp. 31-32 and “Tesoro holds dedication to celebrate completion of major clean fuel capital project,” press release (June 27, 2007); and Valero Energy Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 13).

⁶⁵ Marathon continues investing in various aspects of ensuring its ethanol supply (Marathon Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 40 and 2007 *Annual Report*, p. 22).”

⁶⁶ Chevron is focusing on biodiesel (Chevron Corporation, “Bioselect and Chevron Unveil Fully Operational Biodiesel Plant in Galveston, Texas,” press release (May 29, 2007) and “Chevron and Weyerhaeuser Create Biofuels Alliance,” press release (April 12, 2007)).

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 2007 diminished both aspects of this advantage.

Table 18. U.S. Refinery Configurations of FRS Companies, Selected Years, 1974-2007
(Percent)

	Downstream Capacity as a Percent of Crude Distillation Capacity														
	1974	1981	1993	1996	1997	1999	2000	2001	2002	2003	2004	2005	2006	2007	
FRS Integrated Refiners^a															
Coking	NC	NC	NC	13.0	12.6	12.9	13.9	14.1	15.8	15.4	15.7	15.4	15.4	15.9	
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	
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	
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	
Catalytic hydrotreating	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	79.5	82.3	85.8	88.0
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	
FRS Non-Integrated Refiners^b															
Coking	NC	NC	NC	11.0	12.7	12.0	12.1	12.4	12.0	13.5	14.7	14.3	14.4	14.4	
Catalytic cracking	NC	NC	NC	29.8	34.1	34.0	35.5	35.5	36.3	36.7	38.4	37.2	37.2	37.1	
Catalytic reforming	NC	NC	NC	18.9	21.5	22.5	21.9	21.7	21.4	21.1	21.8	20.4	20.1	20.6	
Hydro cracking	NC	NC	NC	6.3	7.8	8.6	8.6	8.4	7.8	8.5	8.7	8.1	8.3	8.4	
Catalytic hydrotreating	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	71.4	72.7	73.7	73.6	
Alkylation	NC	NC	NC	6.0	6.8	6.0	6.3	6.3	6.4	6.4	6.9	6.6	6.6	6.6	

NC: Information not collected.

^a: FRS Integrated Refiners includes BP America, Chevron, ConocoPhillips, Exxon Mobil, Marathon, Shell Oil, and Total Holdings USA.

^b: FRS Non-Integrated Refiners includes CITGO, Lyondell Chemical (now LyondellBasell), Motiva, Sunoco, Tesoro, and Valero.

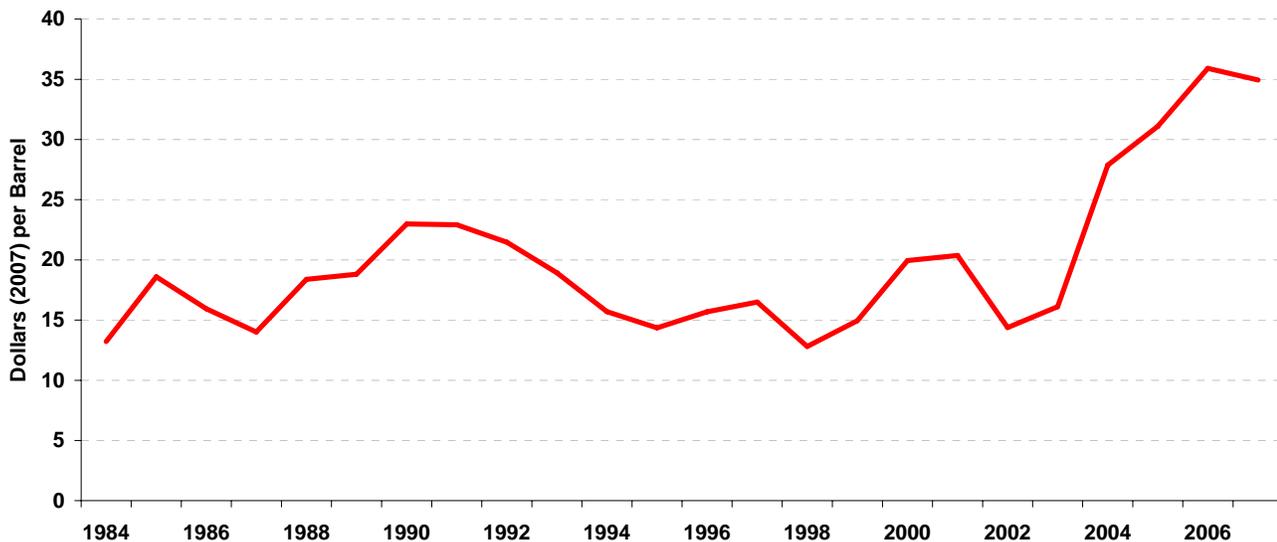
Sources: Oil and Gas Journal, "Worldwide Refinery Report," 1974, 1981, 1993, 1996, 1997, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, and 2007.

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 (**Figure 26**) \$0.98 per barrel between 2006 and 2007. Similarly, during 2007 the difference between the price of light crude oil and the price of heavy crude fell (**Figure 27**), lowering the discount paid for heavy crude oil from \$16.50 per barrel in 2006 to \$16.08 per barrel in 2007. Thus, raw materials costs were somewhat higher (**Table 13**) and product revenues were essentially unchanged (**Table 15**). However, incentives for the FRS companies to further expand their capability to process heavy crude oil appear to remain strong.⁶⁷

The year 2007 was the third-most profitable in the 31-year history of the FRS and followed a recent series of unusually profitable years, which were preceded in 2002 by the most unprofitable year in the history of the FRS. The primary reason for the decreased profitability of the FRS U.S. refining/marketing operations in 2007 relative to 2006 was that the increase in the gross refining margin (by \$0.26 per barrel) was overwhelmed by higher operating costs (by \$0.46 per barrel). Increases in marketing, energy costs (by a total of \$0.36 per barrel), and "other" operating costs (which increased by \$0.10 per barrel). The combination of these changes resulted in a decrease of \$0.20 per barrel (4 percent) in the net refining margin relative to 2006. FRS cost-cutting efforts were less successful but continue. Efforts such as divestiture of large parts of the FRS companies' motor gasoline retailing operations in the coming years (and the anticipated decline in marketing costs) and upgrading of refinery capacity to further expand the ability of the FRS companies to refine the lowest cost (and lowest quality) crude

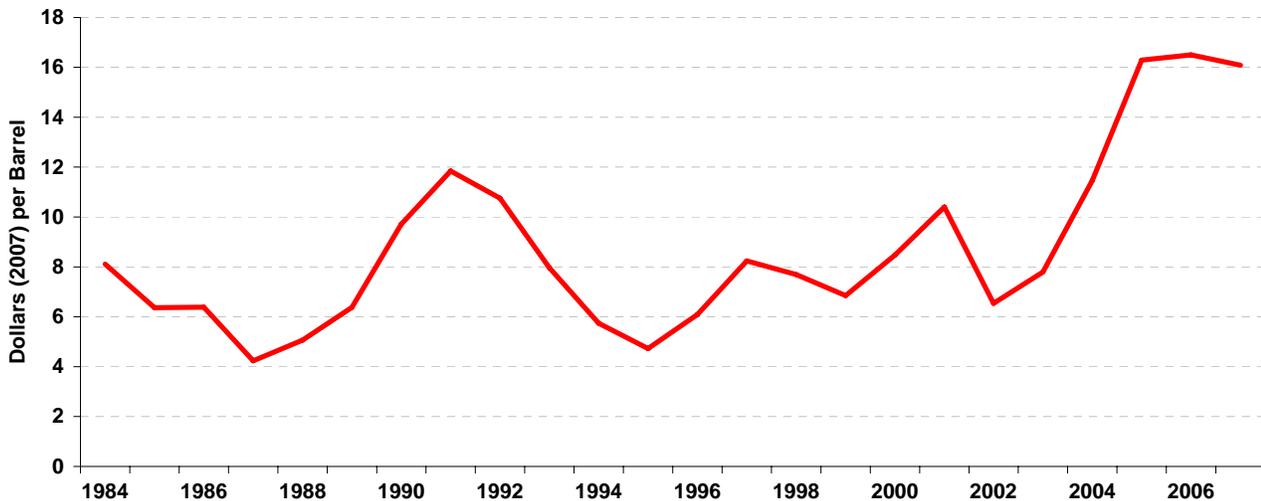
⁶⁷ For example, BP and Exxon Mobil both indicated future plans for additional investment in upgrading capacity (BP plc, 2007 Annual Report on Form 20-F, p. 46 and Exxon Mobil Corporation, 2007 *Financial and Operating Review*, p. 71.).

Figure 26. Resale Price Difference Between Motor Gasoline and Residual Fuel Oil, 1984-2007



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 gasoline relative to residual fuel oil.
 Source: Energy Information Administration, *Petroleum Marketing Monthly*, DOE/EIA-0380, Table 4.

Figure 27. Price Difference Between Light Crude Oil and Heavy Crude Oil, 1984-2007



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

oils available represent their attempts to withstand the vicissitudes of their industry by focusing on the factors that they can most easily control.

Foreign Refining/Marketing⁶⁸

Five years after recording the lowest profitability (–1 percent) in the 31-year history of the FRS, the companies in 2007 reported the third-highest average profit rate for FRS foreign refining/marketing operations. The average profit rate of 22 percent was 3 percentage points higher than in 2006, which was at the time the third-highest in the history of the FRS (**Figure 21**). Refined product and other revenue increased by more than \$14,600 million relative to 2006, but they were largely offset by more than a \$13,900-million increase in operating expense, resulting in more than a \$700-million increase (8 percent) in operating income and almost a \$1,500-million increase (19 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, all operating financial information about a fully consolidated affiliate (such as revenues) is reported in the public financial disclosures of the parent corporation. Conversely, the corporate parent of an unconsolidated affiliate usually owns 50 percent, or less, of the affiliate, and does not directly control the affiliate⁶⁹ (a joint venture, for example, is usually an unconsolidated affiliate from the perspective of at least one of the partners⁷⁰). 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, 51 percent in 2007, with most of the remaining consolidated refinery capacity in Asia. Meanwhile, the operations of the FRS companies' unconsolidated foreign refining/marketing affiliates have been mainly in Asia. In fact, 77 percent of FRS unconsolidated foreign refinery capacity was in Asia in 2007 (**Table 19**). Chevron owns much of the FRS Asian refinery capacity, most of which is unconsolidated.

The increase in net income between 2006 and 2007 in FRS foreign refining/marketing operations was because of increased income from both consolidated and unconsolidated operations (**Figure 28**). The former increased slightly more than \$900 million, while the latter increased by more than \$500 million. Worldwide petroleum demand increased by almost 2 percent, contributing somewhat to higher petroleum product prices (**Figure 29**). Additionally, the companies identified some reasons for the increased profitability of FRS consolidated and unconsolidated foreign refining/marketing operations in public statements, including increased refining margins,⁷¹ benefits from asset rationalization efforts,⁷² and, principally, asset sales⁷³ despite decreased sales volumes,⁷⁴ refinery utilization rates,⁷⁵ and refinery capacity⁷⁶ (**Table 17**).

⁶⁸ For this report, the International Marine business segment has been combined with Foreign Refining/Marketing 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.

⁶⁹ 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.

⁷⁰ The Caltex joint venture was an unconsolidated affiliate for both of its parents, Chevron and Texaco, until their merger in 2002. However, most of the refinery capacity of Caltex (which was retained as an operating entity) is unconsolidated because Caltex generally owns less than 50 percent of each refinery in which it has ownership.

⁷¹ ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 64.

⁷² ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 64.

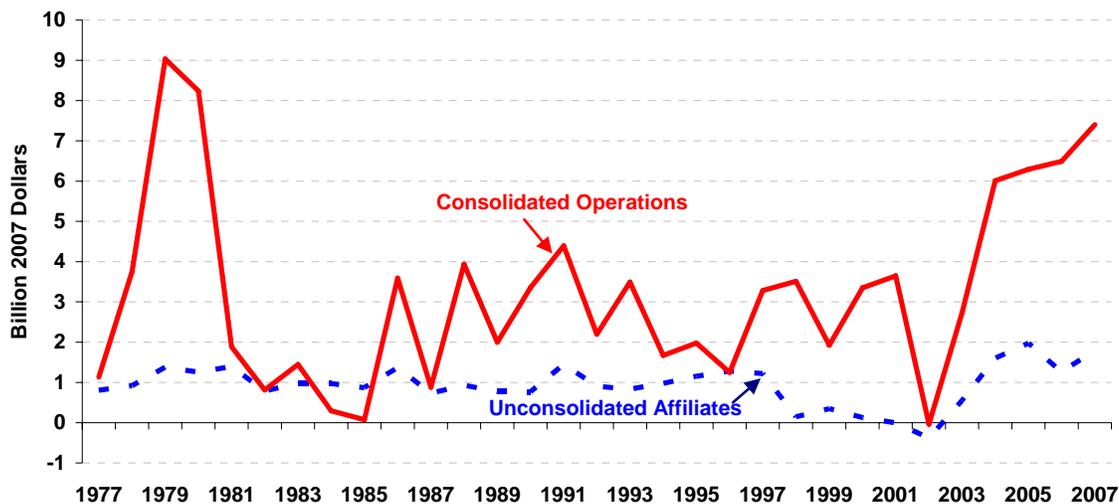
Table 19. Regional Distribution of Foreign Refinery Capacity for FRS Companies, 2006-2007
(Percent)

	Consolidated Operations		Unconsolidated Affiliates	
	2006	2007	2006	2007
Europe	51.7	50.7	16.4	8.8
Asia	24.2	24.7	70.7	76.5
Latin America	8.5	8.6	0.3	0.3
Canada	13.3	13.5	0.0	0.0
Other	2.4	2.4	12.7	14.4
Grand Total	100.0	100.0	100.0	100.0

Note: The region denoted as "Other" includes Africa and the Middle East.

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

Figure 28. Foreign Refining/Marketing Net Income^a from Consolidated Operations and Unconsolidated Affiliates of FRS Companies, 1977-2007



^aThe International Marine business segment has been combined with Foreign Refining/Marketing for the years 2003 - 2007 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: Energy Information Administration, Form EIA-28 (Financial Reporting System).

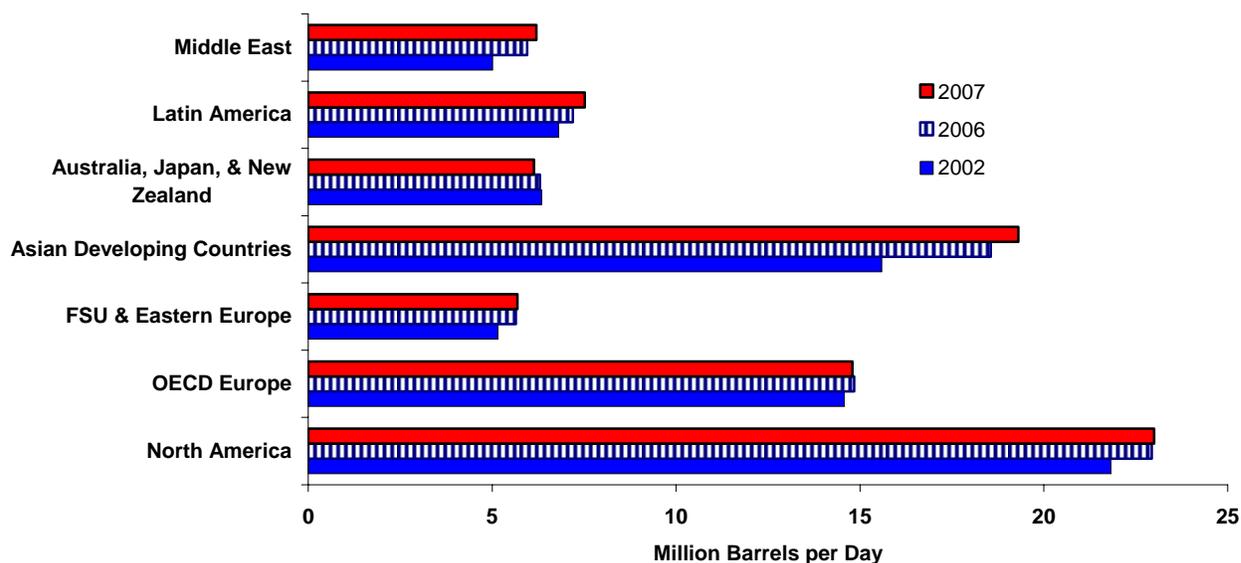
⁷³ Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 74 and Exxon Mobil Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 36.

⁷⁴ Exxon Mobil Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 36..

⁷⁵ ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 64.

⁷⁶ Chevron, ConocoPhillips, and Exxon Mobil all divested refinery capacity during 2007. Chevron sold its 31 percent interest (124,000-barrels-per-day) in the Nerefco (Netherlands) refinery in March 2007 (Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 25). ConocoPhillips sold its "... 16.33 percent ownership (27,100-barrels-per-day) in Ceska Rafinerska, a.s. (CRC), consisting of two refineries located in the Czech Republic, ... during 2007 (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 28)." Exxon Mobil sold its 110,000-barrels-per-day Ingolstadt, Germany refinery to PetroPlus Holdings A.G. April 1, 2007 (PetroPlus Holdings A.G., "Petroplus completes purchase of Ingolstadt Refinery," press release (April 2, 2007)).

Figure 29. Petroleum Consumption by Region, 2002, 2006, and 2007



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

Source: BP plc, *BP Statistical Review of World Energy* (June 2008), p. 11.

Consolidated Operations

Earnings from the FRS companies' consolidated operations increased (**Figure 28**) more than \$900 million (14 percent) between 2006 and 2007, providing \$7,405 million of net income. The FRS consolidated operations generated higher earnings by selectively upgrading (or expanding the number of) marketing outlets⁷⁷ and reducing its costs by divesting non-core assets, particularly retail assets⁷⁸ but also refinery capacity.⁷⁹

Higher earnings from consolidated FRS foreign refining/marketing operations occurred within an improved (relative to 2006) industry environment of higher refining margins and essentially unchanged (**Figure 29**) (0.3 percent lower) European petroleum demand. Further, European refining margins (represented by the

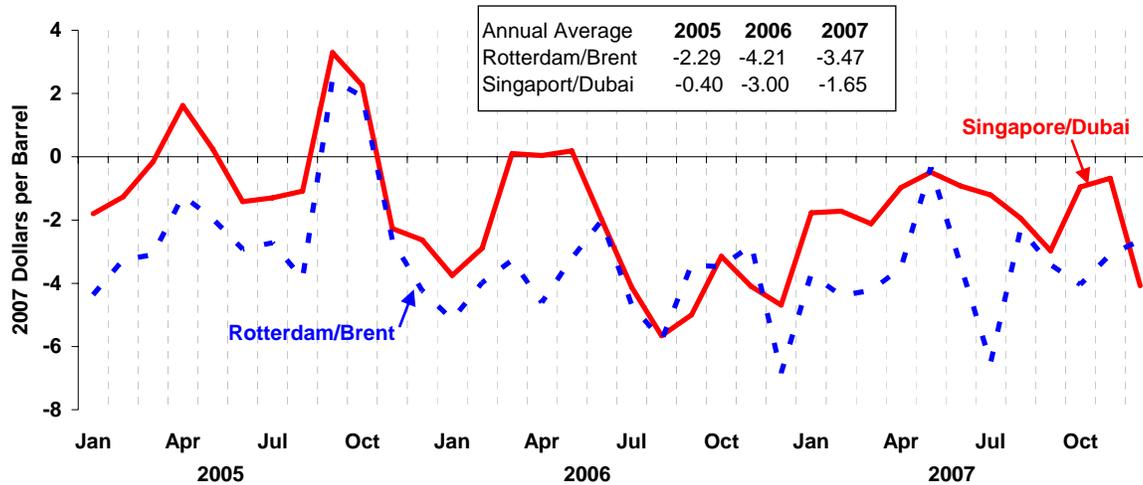
⁷⁷Exxon Mobil uses "... an integrated approach when developing new business opportunities, such as our refining, petrochemicals, and fuels marketing venture in Fujian, China ... (Exxon Mobil Corporation, 2007 Financial & Operating Review, p. 71)."

⁷⁸"Chevron Corporation ... announced the completion of the sale by its subsidiaries in Belgium, the Netherlands and Luxembourg (Benelux) of their fuels marketing business to Dutch company Delek Benelux B.V., a subsidiary of Israeli company Delek Group (Chevron Corporation, "Chevron Completes Sale of Benelux Fuels Marketing Business to Delek," press release (August 9, 2007))." Further, Chevron "... sold its interest in about 500 individual service station sites, primarily in the United Kingdom and Latin America (Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 27)." Additionally, ConocoPhillips "... sold 377 of our fueling stations in six European countries to LUKOIL As of December 31, 2007, agreements were signed for the sale of Norway, Sweden, and Denmark marketing assets (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 29)."

⁷⁹ Chevron, ConocoPhillips, and Exxon Mobil all divested European refinery capacity during 2007. Chevron sold its 31-percent interest (124,000-barrels-per-day) in the Nerefco (Netherlands) refinery in March 2007 (Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 25). ConocoPhillips sold its "... 16.33 percent ownership (27,100-barrels-per-day) in Ceska Rafinerska, a.s. (CRC), consisting of two refineries located in the Czech Republic, ... during 2007 (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 28)." Exxon Mobil sold its 110,000-barrels-per-day Ingolstadt, Germany refinery to PetroPlus Holdings A.G. April 1, 2007 (PetroPlus Holdings A.G., "Petroplus completes purchase of Ingolstadt Refinery," press release (April 2, 2007)).

Rotterdam/Brent reforming/cracking netback minus the West Texas Intermediate spot price) were generally higher during 2007 than during 2006 (**Figure 30**). As a result, the average margin for all of 2007 was \$0.74 per barrel higher (in 2007 dollars) than the average margin for 2006.

Figure 30. Foreign Gross Refining Margins,^a 2005-2007



^a Gross refining margin is defined as netback crude oil price less spot crude oil price. The netback price is calculated by multiplying the spot price of each refined product by the percentage share in the yield of a barrel of crude oil. Transport and out-of-pocket refining costs are then subtracted to arrive at netback price.

Note: The gross refining margin for Dubai crude oil refined in Singapore is used a proxy for Asia/Pacific gross refining margins. Similarly, the gross refining margin for Brent crude oil refined in Rotterdam is used as a proxy for European gross refining margins.

Source: Energy Intelligence Group, *Oil Market Intelligence*, p. 12, **2005**: July 2005 and January 2006; **2006**: July 2006 and January 2007; and **2007**: July 2007 and January 2008.

Unconsolidated Operations

During 2007, the FRS companies’ unconsolidated affiliates generated \$1,796 million of net income, which was 43 percent higher than the 2006’s \$1,259 million (in 2007 dollars). Company public disclosures included some reasons for the higher earnings generated by the Asian operations of the FRS companies, which included higher gains on asset sales,⁸⁰ and higher margins and lower feedstock costs during the first half of the year.⁸¹ Cost-cutting efforts included upgrading refinery capacity⁸² and refocusing marketing operations.⁸³

Higher earnings occurred in a stronger, relative to 2006, industry environment. Consumption of petroleum products in Asia (comprising Asian Developing Countries, which grew by 4 percent and Australia, Japan, and New Zealand, which collectively declined by 3 percent) increased between 2006 and 2007 (**Figure 29**) by slightly more than 2 percent.

⁸⁰ Exxon Mobil Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 36.

⁸¹ Chevron Corporation, Chevron Supplement to Annual Report 2007, p. 49.

⁸² In late 2007, Chevron’s GS Caltex affiliate “... completed commissioning of new facilities associated with a \$1.5 billion upgrade project at the 680,000-barrel-per-day Yeosu refining complex in South Korea ... [which] is expected to increase the yield of high-value refined products ... and reduce feedstock cost through an increase in the refinery’s ability to process heavy oil (Chevron Corporation, 2007 U.S. Securities and Exchange Commission Form 10-K, p. 26).”

⁸³ ConocoPhillips “... completely divested ... marketing operations in Thailand and Malaysia (ConocoPhillips Company, 2007 U.S. Securities and Exchange Commission Form 10-K, p.29).”

Industry-wide Asian refining margins of 2007 were higher than those of 2006 for most of the year (**Figure 30**) (except for March, April, and May). The early-year decrease in refining margins (relative to 2006) was insufficient to prevent the average annual gross refining margin for Asia (represented by the Singapore/Dubai topping/reforming netback minus the West Texas Intermediate spot price) for 2007 from exceeding that of 2006 by \$1.34 per barrel (in 2007 dollars). The higher margins of 2007 put upward pressure on earnings from unconsolidated operations, resulting in an all-time high for unconsolidated FRS foreign refining/marketing operations.

FRS companies' foreign refining/marketing earnings increased substantially because of slightly higher worldwide petroleum product consumption (2 percent) and higher industry gross refining margins in the two major regions in which the FRS companies operate—Europe and Asia. However, the exceptional profitability of FRS foreign refining/marketing operations in 2007 appears chiefly from asset sales, this can only be successful in the short-term. Thus, longer-term strategies such as expansion and enhancement of operations and cost-cutting measures likely will continue to occupy prominent positions in the companies' ongoing strategic actions in the future.

