An hourglass-shaped graphic with a globe inside. The top bulb is dark blue, and the bottom bulb is light blue. The globe is a darker shade of blue. The hourglass is centered on the page.

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February 2, 2009

Congressional Research Service

Report RL33021

Oil Industry Profits: Analysis of Recent Performance

Robert Pirog, Resources, Science, and Industry Division

August 4, 2005

Abstract. High prices for crude oil in 2004 and into 2005 have reduced consumers' purchasing power and raised costs for businesses while providing billions of dollars to the oil industry and oil exporting countries. The industry's increased revenues have led to record profit levels. As the 109th Congress engages in oversight of recent broad energy legislation which aims to increase the domestic supply of crude oil to mitigate oil price increases in the longer term, another key factor in determining increased supply is how oil companies decide to allocate their profits between shareholder returns and investment in oil production. This report is written in response to a number of requests from Congress concerning profits in the oil industry. This report provides background information concerning the level of oil industry profits, the sources of those profits, and a discussion of the potential uses of profits.

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Oil Industry Profits: Analysis of Recent Performance

August 4, 2005

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Oil Industry Profits: Analysis of Recent Performance

Summary

High prices for crude oil in 2004 and into 2005 have reduced consumers' purchasing power and raised costs for businesses while providing billions of dollars to the oil industry and oil exporting countries. The industry's increased revenues have led to record profit levels. As the 109th Congress engages in oversight of recent broad energy legislation which aims to increase the domestic supply of crude oil to mitigate oil price increases in the longer term, another key factor in determining increased supply is how oil companies decide to allocate their profits between shareholder returns and investment in oil production. This report is written in response to a number of requests from Congress concerning profits in the oil industry. This report provides background information concerning the level of oil industry profits, the sources of those profits, and a discussion of the potential uses of profits.

In response to the increased price of crude oil since the fall of 2004, profits of virtually all firms in all segments of the oil industry have increased. However, the greatest increases have been in the downstream, or refining and marketing, segments of the industry. These increases in profit are apparent whether the major integrated oil companies, the independents, or refiners are considered, lending some credence to the viewpoint that industry profits are the result of factors beyond the elevated price of crude oil. Historically, the current combination of high oil prices and high profits have been seen before, and periods of low prices and profits tended to follow.

The relatively high profit levels earned in refining and marketing suggest that conditions in the petroleum products markets, including the gasoline, diesel, and jet fuel segments, contributed to earned profits above and beyond the effect of higher crude oil prices. Key factors in these markets included tight refining capacity and low inventory levels. Mergers, acquisitions, and asset sales may also have changed the relative profit positions of many firms in the industry. All of these factors have been influenced by investment decisions in the oil industry.

Firms in the oil industry are likely to use their recently earned profits in a variety of ways. They are holding record cash balances, buying back their shares and increasing dividends. Merger and acquisition activity in the industry again appears to be on the rise. In addition, the major oil companies are investing in a variety of energy related projects, although not necessarily oil, including liquified natural gas and gas-to-liquids technologies. These projects tend to be international in scope. In the longer term, investments in exploration, production, and refining capacity are likely to be needed to mitigate the high prices of 2004-2005.

This report will not be updated.

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Oil Industry Profits: Analysis of Recent Performance

The rapid increase in the price of crude oil which began in 2004 and has continued into 2005 has been a major factor contributing to the record profits earned in the oil industry. However, other factors were likely also at work. High capacity utilization in the refining industry led to increases in profit for refiners exceeding that for the industry as a whole. Companies' ability to expand output, either of crude oil or petroleum products, also might have affected profitability. The effects of mergers, acquisitions and other asset transactions also likely affected the profit performance of many firms in the industry.

Perhaps of even more long term importance than the level of profits in 2004 and 2005 is what the oil industry chooses to do with them. If firms invest earned profits into expanding capacity at key stages in the production chain, consumers might expect to see expanded supply with a moderating effect on price. If firms do not make significant investments in production capacity, or if those investments experience sharply diminishing returns in terms of volumes of oil and petroleum products per dollar invested, then the moderating effect on price is likely to be limited.

In a market economy, decisions on the use of profit is the responsibility of the industry in which they are earned. However, because of the central importance of petroleum based products to the functioning of the economy, as well as the direct effect of oil prices on consumer's budgets, public interest in the level, as well as the use, of profits tends to be high. Also, government regulation can have a direct impact on the ability, or willingness, of firms to make investments (i.e. refineries), and this could have a ripple effect on other upstream and downstream investments and ultimately affect petroleum product supply on the market.

The price of crude oil surged during the last eight months of 2004, with the price of a barrel of West Texas Intermediate (WTI), the standard benchmark oil, reaching over \$55 in October. This price represented a 60% increase over the low price for the year, reached in January 2004, of \$34.31. The average price of WTI per barrel was 25% higher in the last six months of the year than in the first six months. After moderating somewhat at the end of 2004, and early in 2005, crude oil prices went above \$60 per barrel in the summer months.

Gasoline prices, which more directly affect consumers, peaked in May 2004, earlier than those of crude oil, which peaked in October. The price of reformulated gasoline at New York Harbor in January 2004 was \$1.00 per gallon; by May 2004,

that price had risen 41% to \$1.41 per gallon. Gasoline prices peaked again in June 2005, rising to \$1.58 per gallon.¹

These price increases represent a money transfer from consumers of oil and petroleum products to the U.S. oil industry and foreign oil producers. For example, U.S. consumers used, on average, about 9 million barrels per day of gasoline in 2004. With the average price of gasoline for the year about \$0.28 per gallon higher than in 2003, American consumers spent an additional \$105 million per day for gasoline compared to 2003. This money became increased revenues for the oil industry. In a functioning market economy, increases in revenue are likely to lead to investment in the industry, expansion of supply, and ultimately moderating prices for consumers in the longer term. If this self-correcting process is not working, this could be an indication that factors other than traditional profit and investment incentives are at work. These would likely result in additional long term increases in price and profit for the industry. The public has an obvious interest in determining whether the market process is working effectively to expand supply in the oil industry.

In 2004, the net incomes of the nine integrated oil companies rose by 39% compared to a similar period in 2003, while revenues rose by 26%.² Net incomes of independent oil and gas producing firms rose by 37% over the same period, while the net incomes of independent refiners and marketers rose by 190% over the same time period on revenue increases of 27% and 45%, respectively.³ An obvious explanation cited for these elevated profit levels is that the world price of oil was high, a factor attributable to forces in the global oil market; a force over which even the largest oil companies have little direct control. This report analyzes the profit performance of firms in the oil industry, evaluates factors that might have affected profitability in the oil industry, and examines the use of profits by the industry and the implications for the development of the oil market.

Profit Performance

Introduction

Profit analysis may be carried out using total profits and their yearly growth, or with profit rates. Total profit analysis is useful in evaluating the effect of the industry's profitability on expenditure flows within the economy as well as the potential command over resources held by companies in the industry. Yearly growth of profits can show whether the industry is becoming more or less of a factor in overall expenditure flows in the economy.

Profit analysis based on profit rates is useful in examining the effectiveness of the firm's management in using available resources. Profit rate analysis is also useful

¹Energy Information Administration, *Weekly Petroleum Status Report*, for the week ending July 22, 2005, Table 14, p.27. Gasoline price data does not include taxes.

²Oil Daily, *Profit Profile*, November 15, 2004, p.7.

³Ibid.

in making comparisons based on the relative performance of firms in the industry and is widely used by investment analysts.

In this report, the focus is on total profits and the growth of profits within the oil industry and the likely uses of profits by the industry, specifically the potential ability of the industry to invest in oil supply related projects.⁴

Profits in the oil industry have been volatile over the past three decades, reflecting oil price changes as well as other market effects. For example, net income for the major energy companies, as defined by the Energy Information Administration (EIA), increased almost threefold by 1981, compared to 1977, on the oil price increases associated with the Iran-Iraq war. By 1986, net incomes of the major energy companies had sunk below 1977 levels. Profits peaked and declined at least three other times during the period 1987-2002.⁵ Volatility in the price of oil, which leads to volatility in profits, makes investment planning risky. Investments which might qualify for implementation if a high oil price is assumed may not qualify if a lower price of oil is assumed. This uncertainty may have contributed to the cyclical nature of investment and capacity expansion in the industry.

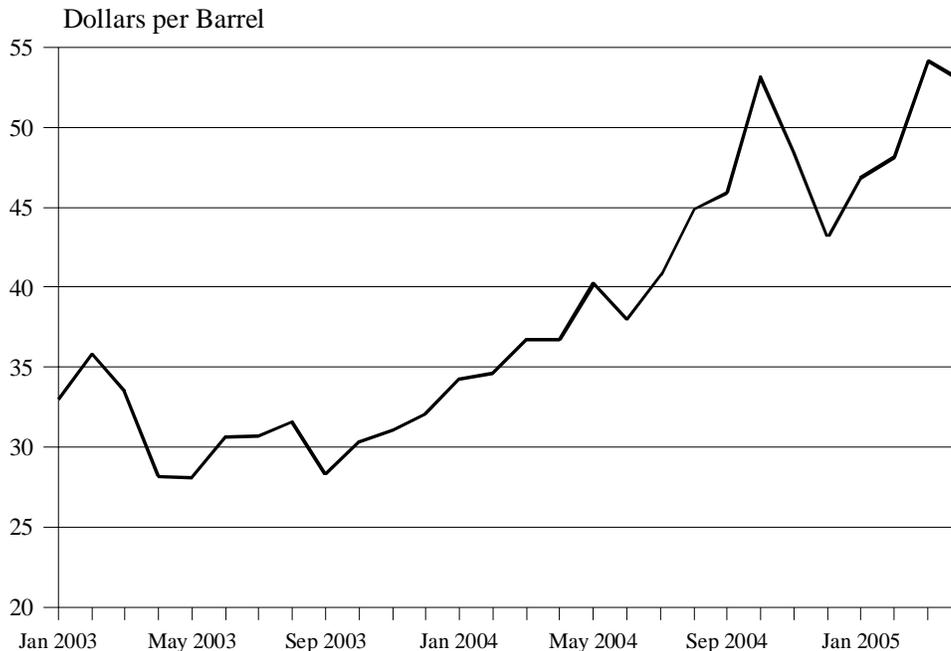
Major Oil Company Profits in 2004

Oil industry profits are widely identified as related to world oil price levels. **Figure 1** shows the movement of the monthly price of WTI crude oil at Cushing, Oklahoma from 2003 through 2005.⁶

⁴A more complete discussion of profit analysis is in the **Appendix** to this report.

⁵Historical net income data for the major energy companies is available at the EIA website, [<http://www.eia.doe.gov/pub/energy.overview/frs/s5110.xls>] (as viewed on July 19, 2005). Net income totals are not adjusted for inflation.

⁶West Texas Intermediate is the benchmark crude oil which is the basis for futures trading on the New York Mercantile Exchange. Cushing, Oklahoma, is the delivery point for New York Mercantile Exchange traded crude oil.

Figure 1. Spot Price of WTI, 2003-2005

Source: Energy Information Administration. *Weekly Petroleum Status Report, For Week Ending May 20, 2005*. Table 14. p. 27.

Upward pressure on the price of WTI, which began in 2003, strengthened during the summer of 2004, leading to peak price levels in October 2004. The daily peak price for the year, \$55.17 per barrel of WTI, occurred in late October. The average price of WTI for the second half of 2004, \$46.01 per barrel, was 25%, or almost \$10 per barrel, higher than the average price for the first six months of the year, which was \$36.79 per barrel. If the profit performance of the oil industry was based, or related, only to the price of oil, given normal lags in the production chain between producing crude oil and distributing petroleum products, it might have been expected that profits might have risen late in 2004 and into 2005.

Table 1. Refiners Composite Acquisition Cost of Crude Oil, 2003-2005, Quarterly
(dollars per barrel)

	2000	2004	2005
1 st Quarter	31.39	31.91	42.27
2 nd Quarter	26.56	34.80	47.43
3 rd Quarter	28.03	39.43	
4 th Quarter	28.43	41.49	

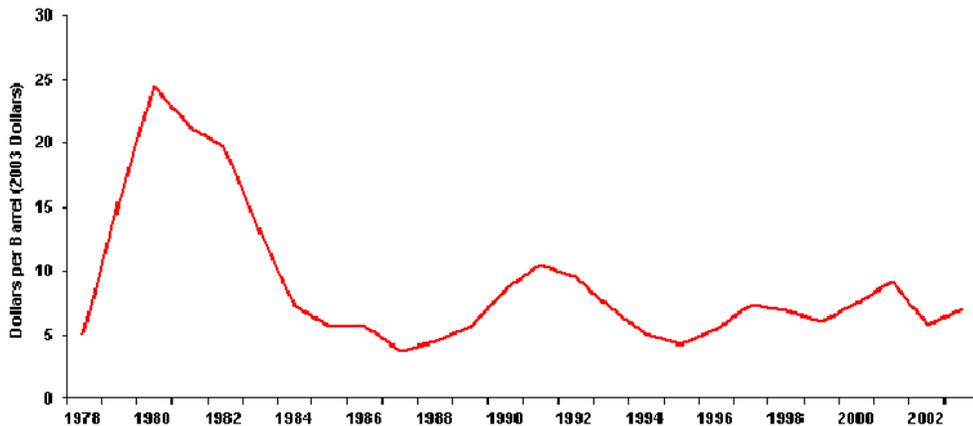
Source: Energy Information Administration, *Petroleum Marketing Monthly*, June 2005, Table 1, p. 5.

Although the price of WTI attracts the most headlines through its association with both the future and spot market prices, a more reliable measure of the real cost

of crude oil to the nation's refiners is the refiner's acquisition cost of crude oil as shown in **Table 1** for 2003 through 2005. This composite cost measure is a weighted average of the cost of domestic and imported crude oils used by refiners and also reflects the mix of various qualities of crude oils used in refineries.

Refineries of different levels of technological complexity can use different mixes of crude oil to produce varying mixes of petroleum products within technological limits. This ability to vary the production mix can be used to enhance profitability when price differentials between sweet light and heavy sour crude oils or between light and heavy product mixes change. **Figure 2** shows the difference between light and heavy crude oils was generally less than \$10 per barrel during the period 1992 to 2002. The spread increased in 2004 and into 2005. The average monthly difference between light and heavy crude oil in 2003 was approximately \$7 per barrel. The average difference increased to over \$10 per barrel in 2004, approaching \$15 per barrel at times. For the first three months of 2005, the differential remained at approximately \$12 per barrel.⁷

Figure 2. Real Price Difference Between Light Crude Oil and Heavy Crude Oil, 1978-2003



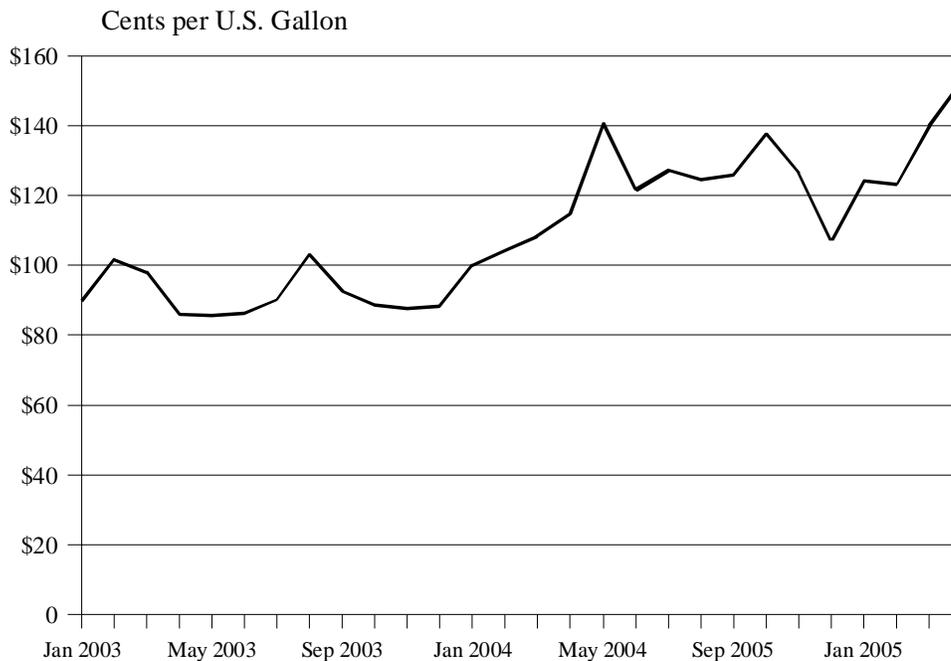
Source: Energy Information Administration, Performance Profiles of Major Producers 2003, March 2005, Figure 31, p. 31.

Figure 3 shows the movement of the monthly spot market price of reformulated regular gasoline at New York harbor during 2003 and 2004.⁸

⁷Energy Information Administration, *Petroleum Marketing Monthly*, June 2005, Table 27, p. 53.

⁸Energy Information Administration, *Weekly Petroleum Status Report*, for the week ending December 31, 2004. Table 14, p.27, and for the week ending May 27, 2005, Table 14, p. 27.

Figure 3. U.S. Spot Market Price for Reformulated Regular Gasoline, New York Harbor, 2003-2005



Source: Energy Information Administration. *Weekly Petroleum Status Report, For Week Ending May 20, 2005*. Table 16. p. 30.

After a relatively stable year in 2003, gasoline prices peaked twice in 2004, reaching record nominal levels. The first peak, of almost \$1.41 per gallon, occurred in May, before the summer driving season began in the United States. The second peak, of almost \$1.38 per gallon, occurred in October. The timing of these peaks are similar to those observed in the crude oil market. Prices continued to be high in 2005, with a peak price of over \$1.52 per gallon attained in April 2005.

The high gasoline prices of 2004 also brought what some identified as a partial decoupling of the oil and gasoline markets. Fears related to limited refinery capacity, low inventory levels, and strong demand growth in China and other parts of the world led some analysts to conclude that gasoline prices might remain high even if crude oil markets weakened. These conditions might be expected to yield high margins for refiners.

Table 2 reports the basic financial performance of the major integrated oil companies from 2002 through 2004.

Table 2. Financial Performance of the Major Integrated Oil Companies, 2002-2004

(million of dollars)

Company	Net Income			Revenues		
	2002	2003	2004	2002	2003	2004
Exxon Mobil	\$11,220	\$21,654	\$25,330	\$178,909	\$213,199	\$298,027
BP	6,922	10,437	16,208	178,721	232,571	294,849
Royal Dutch/Shell	9,577	12,606	18,536	179,431	201,728	265,190
Chevron Texaco	1,189	7,506	13,328	91,685	112,937	155,300
Conoco Phillips	762	4,585	8,129	50,512	90,458	136,900
Marathon	709	1,314	1,261	27,214	36,678	49,907
Amerada Hess	-218	467	977	11,932	14,311	16,733
Occidental	1,240	1,657	2,491	7,338	9,326	11,368
Murphy	97	301	701	3,966	5,275	8,359
Total	\$31,498	\$60,527	\$86,961	\$729,708	\$916,483	\$1,236,663

Source: *Oil Daily*, Profits Profile Supplement, vol. 55, no. 39, February 28, 2005, p. 8; and Financial Data by Company at [<http://www.Hoovers.com>].

Aggregate net income rose in 2004 for the major integrated oil companies, compared to 2003, which itself was a strong year for industry profit performance, and rose by an even greater amount compared to 2002. Only ExxonMobil (17.8%) experienced a gain of less than 20%, and only Marathon (-4.5%) experienced lower net income in 2004 than in 2003. Five of the companies in this group posted net income gains in excess of 50% for 2004, while the average gain in net income was approximately 40%. Comparing 2004 to a 2002 base, the gains in net income totaled over 175% for the major integrated oil companies.

Total revenue growth for 2004 compared to 2003 was 35% for the group, which was less than the 44% growth in net income, suggesting that possibly the greater profitability of the major oil companies in 2004 did not arise solely from the higher price of crude oil. Compared to 2002, revenue growth for 2004 was approximately 70%, less than the 175% growth in net income for the same period.

The profit rate on sales for this group of oil companies, based on the totals of revenue and net income reported in **Table 2**, were 7% for 2004, 6.5% for 2003, and 4.3% in 2002. The growth in the profit rate experienced by these companies suggests that the stronger underlying market fundamentals in the crude oil and oil product markets were successfully translated into increased performance by the companies.

Table 3 shows the upstream (exploration, development, and production) performance of the major integrated oil companies in 2004. This segment of the firms' business accounted for approximately 60% of the net income for the group.

Table 3. Upstream Financial Performance of the Major Integrated Oil Companies, 2004

(millions of dollars)

	Net income		Oil production (000 b/d)		Gas production (MM cf/d)	
	2004	%Change	2004	%Change	2004	%Change
Exxon Mobil	\$16,675	30.3	2,571	2.2	9,864	-2.5
BP	19,759	21.7	2,531	19.3	8,503	-1.3
Royal Dutch/Shell	9,664	6.1	2,253	-5.3	8,808	-0.5
Chevron Texaco	9,490	49.2	1,710	-5.4	3,958	-7.8
Conoco Phillips	5,702	32.5	905	-3.1	3,317	-5.8
Marathon	1,696	7.3	170	-12.4	999	-8.9
Amerada Hess	755	82.4	246	-5.0	575	-15.8
Occidental	3,544	33.0	434	3.6	637	5.1
Murphy	513	69.3	97	16.9	140	-34.9
Total	\$51,123	26.1	8,346	1.9	26,937	-3.1

Source: *Oil Daily*, Profits Profile Supplement, vol. 55, no. 39, February 28, 2005, p. 8.

As shown in **Table 3**, increased net income was not derived from large increases in oil and gas production for most companies. For 2004, more than half of the companies produced less oil during this year of high prices than they did in 2003. The total increase in oil production by the group of 1.9% was largely attributable to the 19% increase of one company, BP. The production results for natural gas are even more uniform. Every company, except one, Occidental, produced less natural gas in 2004 than in 2003, yielding a total 3.1% decrease in production from the group as a whole.

Table 4 reports the downstream (refining and marketing) results for the major integrated oil companies. This sector accounts for approximately 23% of the total net income earned by these companies. Data in **Table 4** show that net income from this sector increased by almost 100% in 2004, compared to 2003, but production increased by only 1.5%. Again, consistent with the upstream results, it seems the integrated oil companies derived increases in net income from price increases with little support from increased production in the short term.

Table 4. Downstream Financial Performance of the Major Integrated Oil Companies, 2004

(millions of dollars)

	Net income		Product sales (000 b/d)	
	2004	% Change	2004	% Change
Exxon Mobil	\$6,256	77.9	8,210	3.2
BP	5,603	78.2	6,398	-4.3
Royal Dutch/Shell	6,530	107.5	7,600	2.1
Chevron Texaco	3,250	178.5	3,908	4.5
Conoco Phillips	2,743	115.6	2,664	1.8
Marathon	1,406	71.7	1,400	3.2
Amerada Hess	451	37.9	428	2.1
Occidental	NA	NA	NA	NA
Murphy	82	NA	339	27.9
Total	\$20,065	96.7	22,737	1.5

Source: *Oil Daily*, Profits Profile Supplement, vol. 55, no. 39, February 28, 2005, p. 8.

NA = Not Available.

The recent record of the major integrated oil companies in expanding production of crude oil and oil products may be the result of several factors. Unfavorable geologic and political factors might have inhibited output expansion. While the decision to expand oil and gas production in the United States is generally based on the underlying market economics, the geology of many producing regions in the United States may not support large increases in output, especially without financial investment in new technologies. Many U.S. oil and gas fields have either peaked or are in decline, making it difficult to expand production, irrespective of the available price incentives. Overseas, oil and gas production decisions may reflect the policies of the host governments, the Organization of Petroleum Exporting Countries (OPEC) quotas, or host nation's tax policies.

Another possible explanation for the relatively slow production response by the major integrated oil companies in reaction to high oil prices might be that significant investments are required and that the resulting time lags might be long enough to delay the appearance of additional supply on the market. The major oil companies have been active in international investment, although a good part of that investment has been in new product technologies, such as gas to liquids and liquefied natural gas. These projects, requiring multi-billion dollar investments, take up to five to seven years to complete. This could be one explanation why little additional output of gasoline and other refined products has appeared to result from higher prices in the short term.

Oil companies are owned by shareholders and managerial performance is evaluated in terms of corporate earnings. It is possible that because of limitations on the ability of the firms to invest in additional oil and gas production in the short term, profits have been returned to investors in the form of dividends, or the buy back of shares to enhance the market capitalization of the companies.

Independent Oil Company Profits

The profit picture for the independent oil and gas producers with respect to net incomes and total revenues in 2004 was, in some ways, similar to that of the major integrated companies. However, some features of their performance differed from that of the major companies. **Table 5** presents data for ten independent producers.

Aggregate net income for the group of 10 independent oil and gas producers in 2004 rose by approximately the same rate, just below 40%, as that of the major integrated oil companies. Similarly, revenues grew by over 25%. The major difference in the picture for the independent oil and gas producers is that they raised output during 2004 by a multiple of the amounts registered by the major companies. Oil production was up by over 12.5% and natural gas production rose by almost 4%. This increased production may, however, be partly the result of asset acquisition by the independent companies. Over the past several years the major integrated oil companies have sold off smaller producing fields and facilities which have been acquired by the independent companies. For this reason, it is possible that the increased production in this sector as well as the small production increases recorded by the major companies might be related, and reflect an ownership transfer of existing assets.

Table 5. Financial Performance of Independent Oil Companies, 2004

(millions of dollars)

	Net income		Revenues		Oil production (000 b/d)		Gas production (MM cf/d)	
	2004	% Change	2004	% Change	2004	% Change	2004	% Change
Devon	\$2,176	25.3	\$9,189	25.0	279	21.3	2,433	2.8
Unocal	1,208	87.9	8,204	26.0	159	-0.6	1,510	-14.4
Anadarko	1,601	24.4	6,067	18.4	230	-0.4	1,741	-1.2
Burlington	1,527	27.1	5,618	30.3	151	36.0	1,914	0.8
Apache	1,663	49.0	5,333	27.3	242	12.6	1,235	1.5
Kerr-McGee	404	84.5	5,179	23.8	159	5.3	921	21.2
EDG	614	46.5	2,271	30.1	33	22.2	1,036	7.8
XTO	508	76.4	1,948	63.7	30	57.9	835	20.0
Pioneer	313	-23.8	1,847	43.5	69	19.0	685	18.4
Newfield	312	56.0	1,353	33.0	21	23.5	666	9.3
Total	\$10,326	37.3	\$47,009	27.4	1,373	12.6	12,976	3.8

Source: *Oil Daily*, Profits Profile Supplement, vol. 55, no. 39, February 28, 2005, p. 8.

Independent Refiners and Marketers

Independent refiners and marketers are typically only involved in the downstream activities of the oil industry. They typically purchase crude oil, process it in their refineries, and market the resulting petroleum products either directly to consumers or wholesale the products to other firms. As shown in **Table 6**, the financial performance of this sector was the strongest of any in the petroleum industry, surpassing even the downstream performance of the major integrated oil companies that are among their major competitors.

Table 6. Financial Performance of Independent Refiners and Marketers, 2005
(millions of dollars)

	Net income		Revenues		Product sales (000 b/d)	
	2004	%Change	2004	%Change	2004	%Change
Valero	\$1,791	187.9	\$54,619	43.9	NA	NA
Sunoco	605	93.9	25,508	41.6	903	19.8
Premcor	478	308.5	15,335	74.2	NA	NA
Tesoro	328	331.6	12,262	38.6	604	8.4
Ashland	101	197.1	2,177	12.4	1,414	4.4
Frontier	70	2,233.3	2,862	31.8	166	0.0
Total	\$3,737	189.8	\$112,763	45.0	3,087	9.0

Source: *Oil Daily*, Profits Profile Supplement, vol. 55, no. 39, February 28, 2005, p. 8.

NA = Not available.

As shown in **Table 6**, these firms did expand their product sales in response to the high prices of 2004. The 9% expansion in product sales by these firms in 2004 was about six times the magnitude of the increase in production generated by the major integrated oil companies in their comparable downstream business, although the independent's production base was smaller.⁹ The 9% increase in product sales translated into a 45% increase in revenues which resulted in a 190% increase in net

⁹Not all the increase in product sales was necessarily due to expanding production. Over the past decade, the oil industry has experienced asset churning. The major oil companies have sold producing fields, refineries, and other assets as a result of merger and acquisition requirements, inadequate returns from smaller fields and refineries, or changes in business focus to a more international stance. These assets have typically been acquired by the independent oil and gas producers and the independent refiners and marketers. These asset transfers might bias the major integrated oil companies' production totals downward, while the independents' production totals rise. The net effect might just be a reallocation of existing productive capacity.

income, with every company in the reporting category, except one, achieving at least triple digit increases. This performance, coupled with the downstream profitability of the major integrated oil companies, gives some support to the viewpoint that, in addition to high oil prices, conditions in the petroleum product markets, especially gasoline, decoupled from their traditional linkage to crude oil and generated independent market tightness and higher prices.

Key profit indicators in the refining industry are the gross and net refining margins.¹⁰ **Table 7** presents data for the twenty four firms included in the EIA's set of major energy companies.¹¹

Table 7. Refining Margins, 1996-2004
(dollars per barrel)

	1995	1997	1998	1999	2000	2001	2002	2003	2004
Gross Refining Margin	7.20	4.40	6.53	5.82	7.34	7.94	6.36	10.70	13.82
Net Refining Margin	0.97	1.61	1.63	1.17	2.32	2.76	0.19	2.06	—

Source: Energy Information Administration, Performance Profiles of Major Energy Producers 2003, Table B-32, p. 101, and Financial News for Major Energy Companies, updated March 9, 2005, Table 2.

For the years 1996 through 2002, the net refining margin averaged \$1.44 per barrel of refinery throughput. The value of the gross refining margin in 2003 was approximately 7 times the average for the previous seven years. The gross margin increased by a further 29% in 2004 compared to 2003. With domestic refinery throughput approximately 13.5 million barrels per day, and the gross refining margin approaching \$14 per barrel, the source of the profit performance of the oil companies downstream operations and the independent refiners and marketers is clear.

¹⁰The gross profit margin is defined as the revenue achieved from petroleum product sales minus the cost of crude oil, the primary input. When a further deduction in operating costs is made, the result is the net margin. These margins are usually expressed on a per barrel basis.

¹¹The EIA publishes aggregated financial data for both major and independent energy producers. Company specific data on refining profitability is proprietary. The firms included in Table 7 are: Amerada Hess Corporation, Andarko Petroleum Corporation, Apache Corporation, BP (only U.S. operations), Burlington Resources, Inc., Chesapeake Energy Corporation, ChevronTexaco Corporation, CITGO Petroleum Corporation, ConocoPhillips Inc., Devon Energy Corporation, Dominion Resources, Inc., EOG Resources, Inc., Equitable Resources, Inc., ExxonMobil Corporation, Kerr McGee Corporation, Lyondell Chemical Company, Marathon Oil Corporation, Occidental Petroleum Corporation, Premcor, Inc., Royal Dutch Shell Group(only U.S. operations), Sunoco, Inc., Tesoro Petroleum Corporation, Unocal Corporation, Valero Energy Corporation, Williams Companies, Inc., XTO Energy, Inc.

The gross refining margins of 2003 and 2004, which increased by a greater percentage than the price of crude oil, are a likely indication that tightness in the gasoline market, which is linked to a refining sector running at nearly full capacity, has led to profits that increased by a larger percentage than the price of crude oil. Another indication of tightness in the refining sector is that imports of finished gasoline, as well as gasoline blending components, have been increasing and were at record levels in 2004. It is also true that the number of operating refineries in the United States has declined to 149 from a peak of 324 in 1981. No significant new refineries have been constructed in the United States for a quarter of a century. The refining capacity growth that has occurred in the United States since 1990 has been largely due to improvements made at existing facilities, called capacity creep.

Use of Oil Profits

Refinery Investment

An expansion of refinery capacity in the United States might alleviate the portion of petroleum product price increases not due to the high price of crude oil. Construction of new refineries in the United States would add stability to the supply of gasoline and other petroleum products; the current capacity is stretched nearly to the limit to accommodate growing petroleum product demand. In addition, the growing U.S. dependence on imported gasoline and petroleum products would be reduced. Re-investing profit into a growing, profitable business is also a normal business strategy. However, current conditions may limit potential expansion.

The key factor in determining whether new refinery capacity will be constructed in the United States is the underlying economics. An oil company seeking to meet gasoline demand in the U.S. market can do that in any of three ways. The company can either expand existing refineries, build a new refinery, or import additional gasoline from overseas. The economics dictate that companies choose the cheapest alternative, given that all gasoline will sell for the same price, irrespective of source. In 2005, it is likely that the cheapest source of gasoline is through imports. Europe is thought to have surplus gasoline capacity as their vehicle fleet is in transition to diesel fuel, and refineries are still largely oriented toward now excess gasoline production.¹² Expansion of existing refineries is likely the next cheapest source of product. Expansion of existing refineries avoids many, or all, of the fixed costs associated with a new refinery and allows firms to benefit from economies of scale in the refining process. Construction of new refineries is likely the most expensive source of new product.

As shown in **Table 7**, not only have the returns to refiners been low, on average, but they have also been volatile. Even recent profit performance has not been uniformly good. Although returns in 2004 and 2003 were favorable, 2002 was a year of very low return. As a result of the observed volatility in returns, the industry might question whether the current increases in profitability are the beginning of a

¹²Oil and Gas Journal, *Europe Sees Growing Diesel-Gas Mismatch*, vol.103, Issue 8, February 28, 2005, pp. 5-8.

new era of profitability, or an upward aberration that will be reversed with the next market correction.

Related to the uncertainty with respect to the permanence of high refining returns is a longer term projection for the price of crude oil. Supply increases up and down the oil supply chain are normally linked to investment. Based on net present value analysis, investment is likely to take place only if the long term, forecasted price of crude oil is high enough to generate projected cash flows sufficient to justify the multi-billion dollar costs of major petroleum projects. If the companies use projected oil prices in the \$25 to \$35 per barrel range in investment planning decisions, limited extra investment and supply expansion can be expected to develop. One oil analyst has asserted that prices might need to remain in the \$50 to \$80 per barrel range for a sustained period for investment to occur in sufficient volume to build up a comfortable cushion of spare oil production capability.¹³

A reluctance to invest based on current price levels might reflect historical experience with the price-investment-supply dynamic of the oil market. As a result of the rise in the price of crude oil associated with the Iran-Iraq War of 1979-80, supply from non-OPEC sources increased and demand declined. Prices during this period reached real values (corrected for inflation) of between \$50 and \$80 per barrel, and then declined to a nominal value of \$11 per barrel by 1985. Investments undertaken early in the decade based on an expectation of continued high prices would have likely not been profitable in the market conditions that actually evolved.

Refinery investment trends over the past two decades have been influenced by environmental compliance requirements. EIA has studied the effect of refinery investment required by environmental regulations, and its relationship to profitability. The EIA report found that return on investment in the refining industry was reduced by 42% from 1996 to 2001 as a result of mandated investment expenditures.¹⁴ The industry is currently preparing to expand and introduce low sulfur gasoline and diesel fuels. These investment requirements may claim a share of the companies capital budget and reduce returns, in parallel with past experience.

The permitting process has been identified by some as an impediment to refinery investment in the United States. Critics contend that even if it is possible to assemble all of the necessary permits to construct a refinery, the long time line required for approvals will tend to make the investment less attractive. One example that has been cited concerning the length of the time required for the permitting process associated with the possible construction of a new, grassroots refinery, is the facility planned to be constructed near Yuma, Arizona. The refinery has an estimated cost of \$2.5 billion, a capacity of 150,000 barrels per day and is to be located on vacant desert land owned by the federal government. The refinery is planned by Arizona Clean Fuels, formerly Maricopa Refining. The refinery is scheduled to process imported Mexican crude oil. The refineries output of gasoline is to be marketed in

¹³Piotrowski, Matt, "Higher Prices Needed to Spur Capacity Outlays", *Oil Daily*, vol. 55, no.51, March 16, 2005, p. 1.

¹⁴Energy Information Administration, *The Impact of Environmental Compliance Costs on U.S. Refining Profitability 1995-2001*, May 2003, pp. 1-10.

southern California, an area which has a tight product market because of limited pipeline access to major U.S. refineries on the Gulf coast as well other factors.¹⁵

The company first applied for an air permit in 1999 at another Arizona site. The application was withdrawn in 2004. Local groups opposed the project based on possible health and environmental risks. The U.S. Environmental Protection Agency decided not to object to an air permit for the refinery on March 21, 2005. The company awaits an air permit from the Arizona Department of Environmental Quality, expected to be issued in 2005. After that permit is obtained approximately two dozen additional permits need to be obtained, ranging from a county permit for zoning approval to a presidential permit from the U.S. State Department to allow the importation of Mexican crude oil.¹⁶

The tight petroleum products market in California, with the resulting high prices, as well as the generally good returns to refining since 2000 have maintained interest in this project. The long delays in construction start-up might have led to the project being cancelled if the underlying economics, especially in the California market, had not been so strong in recent years.

Mergers and Acquisitions

The oil industry of today has evolved to its current structure partly through years of mergers, acquisitions, and joint ventures. In May 2004, the Government Accountability Office (GAO) released a study on the effects of mergers and the restructuring of the U.S. petroleum industry.¹⁷ GAO found that between 1991 and 2000 there were over 2,600 mergers, acquisitions, and joint ventures in the U.S. petroleum industry. A majority of the transactions took place in the last five years of the decade. The transactions took place at all stages in the chain of production, from exploration and production, through refining and marketing. These transactions included deals among the very largest oil companies. For example, in 1999 Exxon Corporation acquired Mobil Oil; in 1998 British Petroleum and Amoco formed BP-Amoco, which acquired ARCO in 2000; and in 2001 ChevronTexaco was formed.

Merger activity is again on the rise in the U.S. petroleum industry. In April 2005, ChevronTexaco made a \$17 billion stock and cash bid to acquire Unocal, the number 9 oil company in the United States, ranked by reserves of crude oil. Unocal was also targeted for takeover by CNOOC Ltd., a company majority-owned by the Chinese government, in a bid that has since been withdrawn.¹⁸ In the same month,

¹⁵“Arizona Firm Close to Building New Refinery”, *Oil Daily*, vol. 55, no. 55, March 22, 2005, p. 1.

¹⁶Piotrowski, Matt, “EPA Does Not Object to Air Permit for New Arizona Refinery”, *Oil Daily*, vol. 55, no. 56, March 23, 2005, p. 2.

¹⁷United States General Accounting Office, *Energy Markets: Effects of Mergers and Market Concentration in the U.S. Petroleum Industry*, GAO-04-96, May 2004.

¹⁸Manimoli Dinesh, *CNOOC Seeks Quick US Review of Unocal Bid*, *Oil Daily*, vol. 55, no.127, July 5, 2005, p. 1.

Valero Energy Corp. bid to acquire Premcor Inc., to form the largest refining company in the United States in a \$6 billion deal.

As a result of the profitability of the last year, companies with large cash reserves on their balance sheets are searching for ways to better position themselves on the world oil market, increase their crude oil reserves and other assets, and create economies of scale and cost savings. Individually, they are able to accomplish these goals through mergers and acquisitions. In addition, a large amount of accumulated profits is returned to investors, usually at a premium price, through these transactions.

Although these transactions may improve the market position of the firms involved and imply the expenditure of billions of dollars of accumulated profit, they do little to improve the nation's demand and supply balance with respect to oil and petroleum products in the near term.

Dividends and Share Purchases¹⁹

The firms that make up the oil industry are private firms that use shareholder capital to engage in business operations. When they make profits they are obliged to return those profits to shareholders, unless management deems it likely that business opportunities exist such that reinvestment will yield even larger future profits for shareholders.

The major oil companies have increased dividends for shareholders, but in general, by less than increases in available funds. For example, ExxonMobil increased quarterly dividends by \$0.02 per share during 2004, an increase of about 8%. However, during the last quarter of 2004 earnings per share increased by \$0.42, an increase of about 47%. For the years 2002 through 2004, earning per share increased from \$1.68 to \$3.89, an increase of approximately 130%, but dividends, the amount actually paid out to shareholders, increased by only about 15%. ExxonMobil did however reduce the number of shares outstanding over the period by about 300 million, to 6.4 billion from 6.7 billion. If a company re-purchases its shares, the value of shares outstanding is likely to increase and the company may choose to re-sell them on the market if it needs capital in the future. ExxonMobil also held over \$18 billion in cash at the end of 2004, an increase of 75% over the year.

A similar dividend strategy was in place at ChevronTexaco, where quarterly dividends increased by \$0.03 per share during 2004, an increase of about 8%, while earnings per share almost doubled compared to levels attained in the last quarter of 2003. For ChevronTexaco, earnings per share increased over the period 2002 to 2004 by an approximate factor of 10, from \$0.54 to \$6.28, while yearly dividends per share increase from \$1.40 to \$1.53, an increase of about 9%. The number of ChevronTexaco shares outstanding declined by about 29 million.

¹⁹Financial data used in this section was obtained at [<http://www.hoovers.com>], viewed on June 21, 2005.

ConocoPhillips, over the period 2002 through 2004 increased yearly dividends from \$0.74 per share to \$0.90 per share, an increase of about 21%. However, earnings per share increased from a loss of \$0.31 in 2002 to \$5.81 in 2004. ConocoPhillips increased the number of shares outstanding over the period by about 34 million.

Limited dividend payouts, coupled with a modest expansion of investment in relation to profit has left oil companies highly liquid and well positioned to take advantage of future market opportunities.

Conclusion

Since oil price increases began in 2004, the oil industry has earned increased profits. These profits might have resulted from other factors in addition to the increased price of oil. A key factor in increased profitability might be the tightness in the U.S. gasoline market, a factor related to the lack of enough refinery capacity to meet U.S. demand for petroleum products.

If oil and petroleum product prices are to decrease, supply will likely have to increase relative to demand. Expanded supply results from investment in the various stages of the oil industry production process, from exploration and development of new oil fields to increased refinery capacity. If the underlying economic parameters and the regulatory environment are not encouraging, investment might not be undertaken. Historically volatile prices and profit levels coupled with a tight regulatory environment contribute to industry uncertainty.

Other legitimate uses for earned profits include paying higher dividends and retiring outstanding shares, acquiring assets through merger and acquisition, and investing in new product areas. These uses of profit may benefit shareholders and strategically position the firm in the global market, but they do less to expand the supply of oil and products on the market and thereby reduce prices for consumers.

As a result of significant time lags that tend to occur in the oil industry, it may be too soon to know whether or not investments in the industry, if taken, will result in the increased supply of oil and petroleum products needed to reduce prices and consumers' costs.

Appendix: Measuring Profit

In a market economy, a firm's key measure of success is its ability to earn a profit. Profit is important to firms because it is a signal to the financial markets and investors that the firm is worthy of funding either through debt or equity capital. Firms that earn less profit than expected by the market have difficulty funding investment opportunities with negative implications for growth. Firms that consistently earn less than adequate profits tend to experience slow growth, stagnation, and ultimately, failure.

Profit is seemingly a simple concept. Total cost is subtracted from total revenue, leaving a residual, total profit. In this approach, profit is measured in dollars. For the oil industry, the simple total revenue minus total cost approach is complicated by the difficulty in neatly separating the revenue-generating outputs of the firms from the cost-creating production inputs. For any given oil company, crude oil price changes may affect both the revenues and costs of the company. If the company is an upstream producer and sells crude oil, the production of crude oil is revenue generating. However, downstream operations, notably refining and marketing, make use of crude oil as a raw material, and for them, the acquisition of crude oil is a cost. As a result, it is not always clear that an increase in the price of crude oil will raise, or lower, profits for firms with differing positions in the upstream and downstream segments of the industry.

Another key factor in the profit calculation is how easily the increase in the cost of crude oil can be passed on to consumers in the form of higher prices for gasoline and other refined products without suffering a more than proportionate decrease in sales. If cost increases can be passed on to consumers, and the firm has significant upstream business interests, then it is more likely that an increase in the price of crude oil will yield increased profits.

A simple way to rank companies, for comparative purposes, is by total profit. However, this type of simple ranking is likely to provide a misleading picture of the relative performance of the companies in the oil industry.

While the total dollar value of profit is important, it may be equally important to know the value of the resources, or assets, at a firm's disposal that were used to earn a given dollar level of profit. The size of the firm relative to the level of total profit is important, especially for investment analysts. For this reason, the most commonly used measures of profit in investment analysis are expressed as percentages, or rates, independent of specific magnitudes. The use of percentages allows meaningful comparisons to be made between companies of different sizes and differing access to resources.

Profit also can be measured to include or exclude special, non-recurring items that may temporarily affect a company's revenues and costs. For example, if a company incurs substantial costs and legal penalties associated with an environmental cleanup due to an oil spill at one of its facilities, its profit performance for the relevant time period might well be negatively affected. However, profit numbers that include the costs resulting from the spill may tell potential investors

and other interested parties little about the real, continuing, business performance of the company.²⁰ Profits from continuing operations, excluding one-time charges (or revenues), may be more informative for some purposes.

All stakeholders in a company do not necessarily have an interest in the same conceptual definition of profit. Accountants are interested in profit calculations that meet generally accepted accounting practices and are consistent with the tax code. Economists use profit as a signal to judge the efficiency of resource allocation decisions and include opportunity costs in their calculations.²¹ Potential investors in the company's stocks and bonds may choose to evaluate profit from a still different perspective, comparing profit to a measure of the assets management had available for business purposes relative to the risk the company faced.

The Profit Rate

Even once the efficacy of using a profit rate is determined, measurement issues still need to be addressed. Since profit as a rate, or percentage, must be expressed relative to some base, an appropriate base must be specified. Three possible bases, widely used in business analysis, are sales, assets, and net worth, or shareholder equity. Each is useful in answering particular questions about the operation of the business, but none necessarily serves as an all-purpose profit measure.

The profit margin on sales uses the total sales revenue of the business as the base and expresses profit, or net income, as a percentage of sales revenue. Profit rates expressed in this manner can answer questions as to whether increasing sales become more or less profitable as the business grows.²² This profit measure can also lead analysts to basic questions as to whether the businesses' prices were too low or too high, or whether adequate cost controls were in place as the business expanded. A variation on this profit measure results from replacing net income in the calculation with operating income.²³

Profits based on assets, or the return on assets, divides profit, or net income, by the value of the total assets of the business. This measure allows analysts to determine how well management uses the asset base of the company to generate profits for investors. If the asset base represents the tools available to management

²⁰A large, non-recurring expense might, however, affect a company's financial condition.

²¹Opportunity costs are the value of the returns that could be earned in the next best alternative. For example, if a firm earns \$100,000 in profits according to the tax laws, but could earn \$150,000 from liquidating the firm's resources and applying them to another activity, an economist would observe that the firm lost \$50,000 by engaging in its current activities rather than having made \$100,000 in profit.

²²The answer to this question requires a set of profit results over time, as sales have presumably grown. In general, it is more revealing to have a time dependent set of profit data, rather than one data point, so that trends may be ascertained.

²³Operating income is defined as gross profit minus operating expenses. It is profit before the payment of interest and income taxes. It is considered to be a measure of how well the firm has succeeded in making money from the sales of goods and services, before financial and tax obligations are considered.

to carry out business activities, the return on assets gives an indication of how effective management has been in using those tools. This approach has been criticized by some because certain “intangibles” important to the functioning of the business may not receive adequate weight in this measure.

A profitability rate popular with potential investors is the return on equity, or the return on net worth. This measure divides profit, or net income, by the value of shareholders equity in the firm. Since the fundamental accounting identity, $\text{Assets} = \text{Liabilities} + \text{Owners Equity}$, must always hold, for every business, this profit rate is generally greater than, and at least equal to, the return on assets.²⁴ This measure is especially interesting to investors who might plan to buy shares of stock in the business. While this profit measure may be revealing to potential investors, care should be exercised in its use. If two businesses have the same asset value and the same level of profits, differences in return on net worth can arise solely as a result of the amount of debt financing on the firm’s balance sheet, a difference purely of financial structure, unrelated to a firm’s ability to efficiently produce goods and earn revenues from selling goods. This can generate misleading conclusions about the strength of the firm’s performance, because the choice of financial structure for a business is not generally related to its current profitability from continuing operations.

Another measure, sometimes identified with profitability, is earnings per share. This measure divides profit, or net income, by the total number of shares of common stock outstanding. Earnings per share provides the prospective maximum of dividends per share that might be paid by the firm. However, it is not a relevant measure to evaluate profit. Like the return on net worth, it is affected by the capital structure of the company, the division between equity and debt financing. Earnings per share can also be directly affected by strategic management decisions. Firms may decide to buy back shares of common stock and retire them, holding them as treasury shares. This type of strategy raises earnings per share by decreasing the number of outstanding shares over which any level of net income is divided. This strategy might well be viewed negatively by financial analysts, who might interpret it as a signal that the firm does not have, or recognize, profitable investment opportunities available, and hence chooses to return to shareholders the money they had invested in the company.

An important factor in analyzing profit data is that in many cases it is more informative to use comparative analysis. Comparisons can be made over time, with other companies in the same industry, or with other companies that bear the same level of risk.

Time-based comparative profit analysis may be helpful because it suggests the direction the company is heading, or the direction of market trends. A particular rate of profit might be viewed as favorable if it was embedded in a trend of rising profit rates, or unfavorable if embedded in a trend of falling profit rates. Time trends might also help to identify correlations between profit and other factors which influence

²⁴In the case where a firm has no debt, assets must equal owner’s equity and the two profit measures will be identical.

profits. In addition, key lags that affect profit are also more likely to be identified in a time trend.

Standing alone, any rate of profit might be difficult to evaluate. Comparisons can be drawn with other firms in the same, or closely related, lines of business to determine whether a particular firm is a profit leader, average, or a low profit earner within its industry cohort. Barring special circumstances, which should be clearly reported in the company's financial statements, if two firms in the same line of business, with approximately the same asset base, report very different profit rates, it is possible that this differential might suggest that one or the other firm's management strategy is superior. Looking at profit rates of different sized firms within the same industry allows the analyst to assess whether growth of the firm to a larger scale may imply any advantage or disadvantage with respect to profit.

In some cases, particularly for investment decisions, the most relevant comparison is with firms with a comparable level of risk, independent of the line of business in which the firms are engaged.²⁵ This approach is appropriate for prospective investors because they may have less interest in what business activity a firm undertakes, than the results of that activity in terms of profits earned and risk borne. In many cases, profits can be expressed in comparison to an index of firms designed to show average, or market, returns and risk.

²⁵Risk is defined as the dispersion of the rate of return for the company. In terms of the stock market, risk is usually measured, somewhat incompletely, to reflect the dispersion in the movement of share prices, without accounting for variations in dividends.